Università degli studi di Verona

Department of Foreign Languages and Literature
Graduate School of Arts and Humanities
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Typological variation in language contact

A phonological analysis of Italiot Greek

Coordinator: Prof. STEFAN RABANUS (University of Verona)

Tutor: Prof. BIRGIT ALBER (University of Verona)

Tutor: Prof. MARTIN KRÄMER (UiT The Arctic University of Norway)

Doctoral Student: EIRINI APOSTOLOPOULOU

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Eirini Apostolopoulou
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To my grandfather Giannis.

Your curiosity about science,
even though you haven't even finished school,
is a never-fading source of inspiration.

'Look up at the sky.
Ask yourselves: Is it yes or no?
Has the sheep eaten the flower?
And you will see how everything changes'

Antoine de Saint-Exupéry, The Little Prince

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Any errors and misconceptions are my sole responsibility.

Abstract

This dissertation investigates the phonology of Italiot Greek (IG) from both a synchronic and a diachronic perspective, pursuing two core objectives: first, to provide an up-to-date description of the phonological system of IG, highlighting the deviations from Medieval Greek as well as the vast cross- and intra-dialectal variation, and, second, to account for the typological changes IG has undergone and formalize the convergence with the Romance grammatical system.

The description of the phonological system of IG is based on original data obtained via fieldwork in the IG-speaking enclaves (Salento and Calabria). The in-depth presentation covers phoneme inventories, phonological processes, the organization of the syllable, sandhi phenomena, and stress properties. Moreover, it focuses attention on the diachronic changes with respect to the consonant inventories and certain phonological processes. Special emphasis is placed on substantial modifications in syllable structure, compared to the Medieval Greek system, and the processes these changes have triggered; specifically, (a) the gradual reduction of place and manner features that are admitted in the coda, which is manifested through diachronic shifts towards less marked values; (b) the licensing of complex onsets at the left edge of the root, which allows long-distance metathesis of liquids. These phenomena not only differentiate contemporary IG from its ancestor as well as from virtually any other Modern Greek dialect, but also constitute crucial points of convergence with Romance dialects due to language contact. Within Optimality Theory (Prince & Smolensky 1993/2004), the dissertation proposes a novel typological analysis of these major changes in the syllable structure of IG. Following Alber & Prince (2015, in prep.), the analysis places IG within a broader typology of place and manner changes as well as long-distance metathesis and identifies the crucial ranking conditions, i.e. the *typological properties*, that define each grammar of the typological system. Minimally varying grammars, i.e. grammars that share all but one *property value*, are shown to constitute chronologically adjacent stages in the history of IG (see Alber 2015; Alber & Meneguzzo 2016). In light of this, stepwise diachronic changes are explained as minimal switches in the property values. Crucially, the divergence of the IG grammar from the Greek system and its converge with Romance is accounted for through the lens of minimal differences in the property values. Thus, the dissertation offers an innovative formal account of contact-induced grammatical change.

Contents

Abbreviations

AncG	Ancient Greek
CIG	Calabrian Italiot Greek
HS	Harmonic Serialism
IG	Italiot Greek
LDM	long-distance metathesis
MedG	Medieval Greek
MoA	Manner of Articulation
MSD	Minimum Sonority Distance
OCP	Obligatory Contour Principle
OT	Optimality Theory
PoA	Place of Articulation
PW	Prosodic Word
RF	Raddoppiamento Fonosintattico
SD	Sonority Distance
SIG	Salentinian Italiot Greek
SylCont	Syllable Contact
σ1	first syllable

C	consonant
$CL_{1/2/3}$	complex onset in the first/second/third syllable
θ	non-strident continuant consonant
k	dorsal consonant
L	liquid
$LC_{1/2}$	pre-consonantal coda in the first/second syllable
N	nasal
O	non-strident obstruent
p	labial consonant
S	sibilant
s	strident or sonorant consonant (in MoA typology)
t	coronal consonant (in PoA typology); non-continuant consonant (in MoA typology)
V	vowel

Glosses

1, 2, 3	1st, 2nd, 3rd person
ACC	accusative
ADJZ	adjectivizer
CMPD	compound
DIM	diminutive
F	feminine
GEN	genitive
IPFV	imperfective
M	masculine
N	neuter
NMZ	nominalizer
NOM	nominative
PFV	perfective
PFX	prefix
PL	plural
PTCP	participle
SFX	suffix
SG	singular
TH	theme element
VBZ	verbalizer

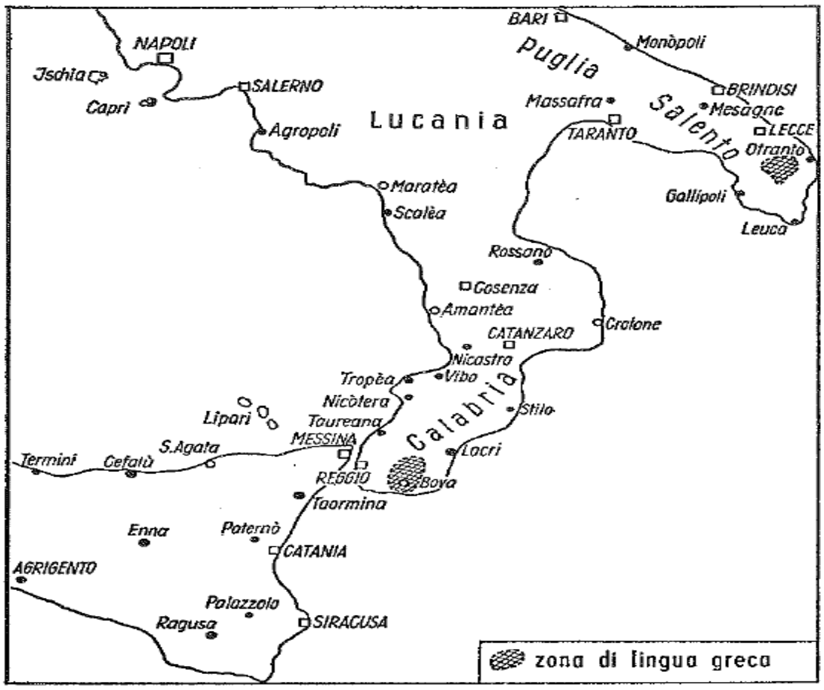
CHAPTER 1

Introduction

‘materia romanza, spirito greco’ (Rohlfs 1972/1997: 259)

It is widely established that the Greek culture and language became dominant in Southern Italy with the colonization in 8th–7th century BC and continued to be so even after the absorption of the area by the Roman empire (Sakellariou 1971; Horrocks 2010). A lesser known fact is that, almost 3.000 years later, two distinct Italiot Greek dialects (IG) are still spoken in two enclaves in the Italian peninsula. Calabrian Greek, referred to as *Greko* by the speaking community and as *Grecanico* by Italian scholars, survives in Southern Calabria, in the area of Bovesia. Salentinian Greek, commonly referred to as *Griko*[1], is found in the so-called Grecia Salentina in Apulia (Profili 1983; Lambrinos 1994). There has been no contact between the two dialects, which have developed independently (Squillaci 2017a; cf. Profili 1983; Katsoyannou 1995; Manolessou 2005; Petropoulou 2007; Stamuli 2008 a.o.). Henceforth the IG dialects of Calabria and Salento are referred to as CIG and SIG, respectively. The regions where CIG and SIG are spoken are shown in the map in (1) (Rohlfs 1977, appendix).

(1) Greek-speaking zones in Southern Italy



[1] *Rize Grike* https://www.rizegrike.com/

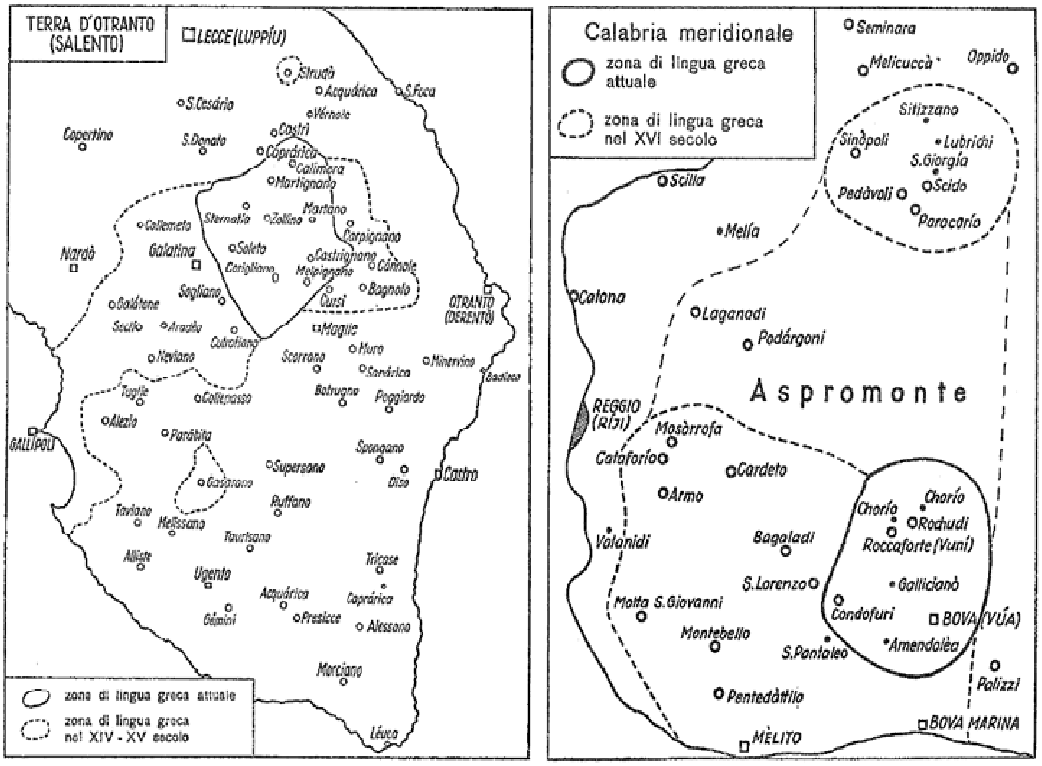
All Modern Greek dialects, with the possible exception of Tsakonian, stem from Medieval Greek (MedG), i.e. a continuation of Koine[2] more or less uniform across the Greek-speaking territory (see Tzitzilis in press for an overview). IG has been claimed to be another exception, mainly in light of certain archaisms it preserved (Rohlfs 1924 et seq.; see also Hatzidakis 1892; Kapsomenos 1953; Caratzas 1958; Tsopanakis 1968, 1981; Karanastassis 1991). In particular, the so-called *continuity* hypothesis suggests that Greek has been spoken in Apulia and Calabria without interruption since antiquity and current IG is a direct descendant of the Ancient Greek dialects of the respective areas and has not gone through koineization. However, this claim is not unanimously adopted. In fact, there have been proposed two additional hypotheses regarding how far back the presence of IG dialects in Italy goes. The *Byzantine* hypothesis (Morosi 1870; Battisti 1927; Parlangeli 1953; Spano 1965; Falcone 1973; a.o.) takes Ancient Greek dialects to have been gradually eradicated in the Italian peninsula after the Roman conquest; in turn, MedG was imported in Italy during the Byzantine era. The *revised continuity* hypothesis (Fanciullo 1996, 2001) resides somewhere in the middle: it argues that, after the fall of Magna Graecia, Greek continued being spoken next to Romance and new immigration waves during the Byzantine era acted as a major booster for the robustness of Greek in the area. The interested reader is referred to Manolessou (2005) for a detailed overview, arguments for and against the first two hypotheses and more references (see also Squillaci 2017a: 7–9). For the purposes of the present thesis, it suffices to say that the revised continuity hypothesis seems to be well supported at least for CIG. There is, on the other hand, scarce evidence that SIG has been preserved since ancient times; rather, sources point to the abandonment of Ancient Greek and the subsequent reimportation of MedG in Apulia. Importantly, along the lines of the revised continuity hypothesis, MedG seems to have prevailed in both enclaves before the rise of dialectal branches, independently of whether a more archaic version still survived. In this spirit, throughout the thesis I take MedG to be the immediate predecessor of both SIG and CIG.

The once considerably large Greek-speaking areas have shrunk significantly over the centuries. Already in the 16th century AD Greek was spoken in an extremely diminished area compared to Magna Graecia. In the beginning of the 20th century, SIG survived in the villages of Sternatia (capital of Grecia Salentina), Calimera, Castrignano dei Greci, Corrigliano d' Otranto, Martano, Martignano, Zollino, Melpignano, and Soleto, and CIG was spoken in Vua

[2] *Koine Greek* ('common' Greek) was formed in the Hellenistic period and continued being spoken as lingua franca in the entire Greek-speaking world until early Byzantine times. The formation of Koine led to drastic levelling of Ancient Greek dialects (Bubenik 2007).

(or Bova; capital of Greek-speaking Calabria), Jalo tu Vua (or Bova Marina), Amendolea, Galliciano, Condofuri, Roghudi, Chorio tu Roghudiu, Vuni (or Roccaforte), and Chorio tu Vuniu (Chorio di Roccaforte) (Rohlfs 1930; Karanastassis 1984–1992). Consider the maps in (2), designed by Rohlfs in the first half of the 20th century (taken from Rohlfs 1977, appendix). The broken lines demarcate the Greek-speaking zones in the 14th–15th century for Apulia (left) and in the 16th century for Calabria (right). The solid lines circle the areas in which SIG and CIG were spoken in early 20th century.

(2) Shrinking of Greek-speaking zones in Apulia (left) and Calabria (right)



Nowadays the linguistic pockets have been even further reduced and both IG dialects are currently ranked as severely endangered in the *Atlas of the World's Languages in Danger* (Moseley 2010). Since mid-20th century, CIG is abandoned in Amendolea, Condofuri, Vuni, and Chorio tu Vuniu. The villages Roghudi and Chorio tu Roghudiu were evacuated due to natural disasters in early 70s, yet the variety was preserved (Petropoulou 2007). The CIG varieties of Galliciano and Bova are also still spoken. According to the last official census, in 1921 there were 3639 speakers of CIG (Spano 1965), a number that was reduced to approximately 500 in the 90s (Katsoyannou 1995), whereas Squillaci (2017a) estimates that no more than 300 speakers, all above 60 years old, remain in the 21st century. In Salento the situation is less dire and SIG is still heard in almost all villages, even though the main core of SIG is Sternatia. Manolessou (2005) reports 20.000 speakers, but the actual number today is considered significantly lower according to language activists (p.c.) and keeps decreasing with a dramatic pace.

The rapid decline of IG after the 15th century has been associated with political, socioeconomical, and sociolinguistic factors (see Manolessou 2005 and Squillaci 2017a for thorough overviews, Squillaci 2017b). Most importantly, speaking IG alongside the local Romance dialect and Standard Italian became interwoven with inferiority stemming from low social status, income, level of education, etc. Bilingualism was frowned upon, as it was thought to inhibit proficiency in both languages; in the longer term, it would entail failure to integrate into the Italian-speaking society, accomplish higher education, and climb the career ladder, thus leaving behind the poor, uneducated, agricultural community (see Squillaci 2003). Therefore, most speakers ceased to transmit the language to their children in an attempt to ensure that these will excel in Italian, hoping that this will guarantee a better future for them. Inevitably, this led to the deliberate complete abandonment of the dialects on behalf of the new generations. Consequently, IG is in fact committing language suicide (Manolessou 2005). Recent revitalization attempts (see Petropoulou 2007; Squillaci 2017a) have not managed to save the dialects, as all revival efforts “merely prolonged the night of IG” (anonymous CIG speaker, p.c.). In fact, at the current time the true native speakers, i.e. those who acquired IG as first language and never ceased to speak it, are extremely few and above 75 years of age. Today there is no monolingual speaker of IG and the vast majority of the people who claim to be fluent enough has either abandoned their native dialect for a long period for the sake of Italian, which had substantial impact on their linguistic capacity, or learned it later in their life, because they felt intrigued by the language of their ancestors. In other words, it is more accurate to describe most of today’s IG speakers as ‘semi-speakers’ (see Guardiano 2014; Guardiano et al. 2016; Squillaci 2017a).

The centuries-long coexistence of IG and Romance inevitably influenced both languages. Contact-induced changes have sparked the interest of a growing body of recent research (Baldissera 2013; Golovko & Panov 2013; Ledgeway 2013; Lekakou et al. 2013; Melissaropoulou 2011, 2012; Guardiano 2014; Guardiano & Stavrou 2014, 2019; Ralli 2014, 2019; Marinis & Ralli 2015; Guardiano et al. 2016; Lekakou & Quer 2016; Schifano et al. 2016; Squillaci 2017a; Höhn et al. 2017; Malafarina 2019; Ralli 2019; Zimianiti 2021), which primarily focuses on morphological and syntactic structures or the lexicon. The impact of Romance on the phonology of IG is frequently noted as a general fact in the few works exploring the phonological system of SIG (Profili 1983; Lambrinos 1994) and CIG (Katsoyannou 1995) as well as in other works (e.g. Manolessou 2005; Petropoulou 2007; Malafarina 2019). To advance this program, what is needed is a close examination of the diachronic phenomena that differentiate IG from its closest ancestor, i.e. MedG, and a formal approach of the changes IG has undergone which could be attributed to language contact.

The principal objective of this dissertation is to offer a formal account of the typological changes that have resulted in the rich cross- and intra-dialectal variation found in the phonological structures of contemporary IG. Within the framework of Optimality Theory (OT, Prince & Smolensky 1993/2004) and utilizing the theoretical tools offered by Property Theory (Alber & Prince 2015; in prep.), the dissertation pursues a typological analysis of two big-picture phenomena related to syllable structure:

(a) the gradual shrinking of the segment inventory that can be hosted by the preconsonantal coda position, in terms of (i) place of articulation and (ii) manner of articulation, which becomes evident through place shifts, metathesis, and changes in manner features.

(b) the avoidance of non-initial complex onsets via long-distance metathesis of liquids to the first onset of the root.

Given the long-standing contact between IG and Romance, I hypothesize that the changes with respect to the above phenomena have shaped language systems that are typologically closer to Romance than to Greek. Through the lens of Property Theory, the grammar of IG will be compared to the grammar of MedG as well as other modern Greek dialects, on the one hand, and Romance languages, on the other hand. With a view to identifying the overarching patterns, the typological analysis will ignore idiosyncrasies pertinent to specific environments and will be based on abstract representations. The manifestation of specific clusters participating in the phenomena described in (a) and (b) above in each IG variety as well as the clusters that display discrepancies from the core patterns due to independent factors will be addressed separately within OT.

A prerequisite for a reliable analysis is that it is based on accurate data. Even though extant literature, especially the fieldwork-based doctoral dissertations by Profili (1983), Lambrinos (1994), and Katsoyannou (1995), offers valuable descriptions and insights into the sounds of IG varieties, the substantiation for the proposed phonemic inventories and the presentation of phonological processes is not always convincing. Thus, a side goal of this work is to provide an up-to-date picture of the contemporary phonological system (note that nearly three decades have passed since the most recent description).

The description of the sound systems as they survive today is mainly based on oral data I collected during my fieldwork (FW) in both Greek-speaking areas in the summer of 2019. In particular, I interviewed informants speaking Sternatia SIG, Calimera SIG, Martano SIG, Zollino SIG, Bova CIG, Roghudi CIG, and Galliciano CIG. In addition, I recorded free speech produced by speakers of Corigliano d'Otranto SIG.

Due to the limited number of (near)-native speakers, being especially selective with respect to criteria such as age, sex, or education was not a viable choice for picking interviewees. Therefore, I interviewed ten speakers about whom I had confirmation (based on their own or someone else's statement) that they are sufficiently fluent in the dialect, even though most of them did not acquire it as children and/or did not continue speaking it uninterruptedly throughout their life. During my on-site research I benefited from the summer school on CIG organized on a yearly basis in Calabria, where I took advanced language classes of CIG and had the change to converse with more speakers.

I collected material via a translation task as well as free production. The task included 44 sentences in Standard Italian, presented in written form to the informants with the request that they translate them in IG. During the task I also elicited additional forms (e.g. synonyms, inflectional paradigms) and metalinguistic observations via clarification questions. After completing the translation task, the informants were asked to narrate stories describing their childhood and course of life, their own and their parents' and (grand)children's relationship with the dialect, cultural events, etc. All communication, including further instructions on the task or questions stimulating free production, was made in Greek (mainly Standard, but also IG) and, complementarily, in Standard Italian.

For the compilation of the questionnaire used in the translation task, I relied heavily on the landmark fieldwork-based etymological dictionaries and the historical grammars by Gerhard Rohlfs (1930; 1950; see also 1962, 1974, 1977) and Anastassios Karanastassis (1984–1992, 1997). Moreover, I consulted the following descriptive works on specific IG varieties:

(a) Doctoral dissertations

- Profili (1983) on Corigliano d'Otranto SIG
- Lambrinos (1994) on SIG
- Katsoyannou (1995) on Galliciano CIG

(b) Printed grammars and dictionaries

- Crupi (1980): grammar of Bova CIG
- Greco & Lambrogiorgou (2001): dictionary of Sternatia SIG

(c) Digital sources

- Squillaci & Squillaci (2016): dictionary of CIG (mobile app)
- *Rize Grike*: online dictionary, grammar, and recordings of Martano SIG (https://www.rizegrike.com/)

The dissertation unfolds as follows: In chapter 2 I present the phonological system of IG as it is currently spoken and I underscore the different evolutions observed cross- and intra-dialectally with respect to certain consonants and clusters. The next chapter (3) focuses on phenomena that constitute points of divergence between MedG and IG and compares other Greek dialects with Romance dialects, with the aim to draw the line between endogenous and contact-induced changes. Chapters 4 and 5 are devoted to the typological analysis of general patterns observed in the diachrony of IG and the substantiation of the claim that IG phonology, and, more specifically, syllable structure, obeys rules similar to those of a Romance system rather than a Greek one. Chapter 4 provides background on the theoretical model I use, i.e. Property Theory, and then accounts for the typological changes affecting the place and manner features admitted in coda position, and chapter 5 investigates the typology of long-distance metathesis. Chapter 6 proceeds with the OT analysis of the specific clusters involved in the changes addressed in the two previous chapters. Chapter 7 summarizes the conclusions of the dissertation.

CHAPTER 2

The phonological system of IG

In this chapter I describe the phonological system of IG as it has survived to date in the speech of a handful of competent native speakers, and, mostly, of semi-speakers. The chapter is organized as follows:

Section 1 is dedicated to the vowel inventory as well as processes affecting vocalic sequences (section 1.1). Vowels and the processes affecting them are not further explored in the remainder of this dissertation.

Section 2 investigates the consonant inventory and presents arguments for and against the phonemic status of each segment. The section begins with the liquid (2.1) and the nasal consonants (2.2) and proceeds with obstruents (2.3), which are examined in terms of manner (2.3.1) and place (2.3.2) contrasts. Regarding place, in particular, I investigate separately the post-alveolar segments (2.3.2.1) and the labio-velar sound [g^w] (2.3.2.2). The section closes with a discussion on surface geminates and their controversial phonemic status (2.4).

Section 3 focuses on the syllable. After outlining the syllabification rules in IG (3.1), I examine phenomena which I take to be motivated by certain restrictions on syllable structure. These are long-distance metathesis of liquids found in medial complex onsets (3.2), lenition of intervocalic onsets (3.3), manner and place features that are admissible in the coda (3.4 and 3.5, respectively), (de)voicing processes (3.6), issues centering around word-final codas (3.7), and cases of word-initial sequences not comforming to the sonority sequencing principle (3.8). Additionally, section 3.9 addresses the manifestation of word-final and word-initial segments in external sandhi.

Lastly, section 4 offers an overview of the stress properties of IG.

1. Vowels

The phonological distinction between short and long vowels was eliminated in Greek already by mid 2nd century BC (Browning 1983; Horrocks 2010: 167). Since approximately the 11th century, when the Koine /y/ finally merged with /i/, most offspring Greek dialects share, in principle, a common vowel inventory, comprised of five vowels /i, ɛ, ɐ, o, u/ (henceforth transcribed ‘i, e, a, o, u’ for convenience), contrasting with each other with respect to height and backness, but not length (see Holton et al. 2019 for a comprehensive overview).[1] IG does not depart from this template: both linguistic enclaves encompass the same five-vowel system, defined by the contrastive features [±high], [±low], and [±back]:

(1) Vowels in IG

	[±high]	[±low]	[±back]
i	+	–	–
e	–	–	–
a	–	+	+
o	–	–	+
u	+	–	+

All five vowels are instantiated at the right edge of inflected nominals,[2] offering a full set of minimal pairs. The pattern of contrast holds independently of stress. For instance, it can be detected in the inflectional paradigm of adjectives with ultimate and penultimate stress, as shown in (2) and (3), respectively (for more examples see Profili 1985; Katsoyannou 1995).[3]

(2) Minimal pairs: stressed vowels

a. kal-**í** good-PL.M.NOM
b. kal-**é** good-PL.F.NOM
c. kal-**á** good-PL.N.NOM
d. kal-**ó** good-SG.N.NOM
e. kal-**ú** good-SG.M.GEN

(3) Minimal pairs: unstressed vowels

a. grík-**i** griko-PL.M.NOM
b. grík-**e** griko-PL.F.NOM
c. grík-**a** griko-PL.N.NOM

[1] The same vocalic system is also found in all the Romance dialects of the “Mezzogiorno” (Rohlfs 1966: 10–11; Fanciullo & Librandi 2002; Loporcaro 2009; Romano 2011).

[2] The vowels can be taken to constitute either monosegmental inflectional affixes or theme vowels. Here the precise morphological structure in (2) and (3) is simplified and the examples are presented in the form [root-affix].

[3] Unless specified otherwise, all examples provided in this chapter are consistent with (almost) all sources of data.

d.	grík-**o**	griko-SG.M.NOM
e.	grík-**u**	griko-SG.M.GEN

From a historical point of view, in the vast majority of lexical environments there is no significant difference between MedG and IG with respect to the vowels. In a limited number of lexical items, though, IG retains relics of archaic, i.e. pre-Koine, features, such as the residual Doric /a/[4] (4) and the ancient pronunciation of <Y>, i.e. /u/[5] (5) (for an overview and references see Holton et al. 2019). Compare the IG forms (first column) with their counterparts as found in most Modern Greek dialects, e.g. Standard (second column):

(4) Doric /a/ in IG vs. /i/ in Standard Greek

a.	l**a**nó	l**i**nós	'wine press'
b.	**a**lakáti	il**a**káti	'distaff'
c.	n**a**sída	n**i**síða	'little island'
d.	ás**a**mo	ás**i**mos	'unbranded'

(5) Pronunciation /u/ in IG vs. /i/ in Standard

a.	es**ú**	es**í**	'you (sg)'
b.	s**ú**ko	s**í**ko	'fig'
c.	xr**u**sáfi	xr**i**sáfi	'gold'
d.	t͡ʃ**ú**ɾi	c**í**ris	IG 'father'; SMG 'master'

[4] Koine was in principle based on Attic Greek, the inventory of which included a long open mid vowel /ɛ:/ orthographically represented by <H>. During the period of koineization, the length distinctions were lost and the old /ɛ/ was raised to /i/ (Tsopanakis 1981; Horrocks 2010). The respective Doric phoneme /a:/ was preserved as a relic /a/ in a handful of Modern Greek dialects relatively isolated from the rest of the Greek-speaking realm, the most prominent among which are Tsakonian and, secondarily, IG (Tzitzilis in press).

[5] The AG /u(:)/ was fronted to /y(:)/ already before the 5th cent. B.C. and then merged with /i/ around the 11th cent A.D. (Horrocks 2010; Holton et al. 2019). The Koine /u/, which was later retained in all Modern Greek dialects, dates back to /o(:)/, which resulted from the early monophthongization of AG /ou/ (Browning 1983). The rare instances of velar fronting before /u/ in certain words of some Modern Greek dialects (e.g. 5d) (see Newton 1972; Kappa 2007), have sparked a debate among scholars about the evolution of /u/ that is not pertinent to the present thesis (for a summary and references see Holton et al. 2019: 13–14).

Changes in the quality of MedG vowels are found in a small number of cases of dissimilation affecting identical vowels in consecutive syllables (6) or assimilation of non-adjacent vowels (7) (Rohlfs 1950). Both processes target the first of the two successive vowels. Interestingly enough, though, the outcome of dissimilation constitutes a potential target for assimilation and vice versa. Therefore, given the above contradiction as well as the paucity of evidence and the lack of a clearly discernible pattern with respect to the result of dissimilation (compare *a…a* > *o…a* (6a, c) with *a…a* > *e…a* (6b)), these processes should not be considered particularly productive or even systematic in IG.

(6) Vowel dissimilation: a > o, e

a.	asp**a**ráʝi	> sp**o**ráʝi	'asparangus'
b.	v**a**láni	> v**e**láni	'acorn'
c.	asp**á**laθos	> sp**ó**lasso	'furze'

(7) Vowel assimilation: o, e > a

a.	l**e**káni	> l**a**káni	'basin'
b.	m**e**táksi	> m**a**táfsi	'silk'
c.	m**o**naxó	> m**a**naxó	'alone'
d.	k**a**turó	> k**u**turó	'I urinate'
e.	ks**á**ðerfos	> ʃ**e**derfó	'cousin'
f.	kr**o**mmíði	> kr**i**mbídi	'onion'

IG belongs to the Southern group of Greek dialects, in which vowel height at surface level is largely independent of stress. More specifically, in IG, mid vowels /e, o/ are not raised to high [i, u] and high vowels /i, u/ are not deleted in unstressed syllables (cf. Northern dialects spoken in Greece, Hatzidakis 1892; Kontossopoulos 1994/2008; Newton 1972; Trudgill 2003). Nevertheless, tendencies have been reported that relate stress with the realization of non-low vowels. Regarding the Galliciano CIG variety, Katsoyannou (1995: 86, 91) mentions cases of neutralization between /e~i/ in internal, unaccented syllables, especially regarding the thematic vowel of verbs, e.g. [dén-**e**-te] ~ [dén-**i**-te] tie-TH-2.PL 'you tie' (1995: 286), and between /o~u/ word-internally and word-finally, e.g. [apán**o**] ~ [apán**u**] 'above', [éna krón**o**] ~ [éna krón**u**] 'one year' (1995: 88). However, she notices that, especially regarding the latter case, variation is mainly dependent on the speaker (1995: 89).

An exception among CIG varieties is the extinct Cardeto dialect, where vowel raising used to be encountered consistently. According to Rohlfs (1950: 19–20), in Cardeto CIG, unstressed /e/ had been raised to a great extent, e.g. [t͡ʃ**i**fáli] (cf. Bova CIG [t͡ʃ**e**fáli]) ‘head’, [pénd**i**] (cf. [pénd**e**]) ‘five’, [él**i**ɣa] (cf. [él**e**ɣa]) ‘I was saying’. Furthermore, /o/ has turned to /u/ regardless of the position of stress, e.g. [sik**ú**ti] (cf. [sik**ó**ti]) ‘liver’, [r**u**t**ú**] (cf. [r**o**t**ó**]) ‘I ask’, [k**ú**mb**u**] (cf. [k**ó**mb**o**]) ‘knot’, although forms showing immunity to raising are also found, e.g. [gl**ó**ssa] ‘language’, [kl**éo**] ‘I cry’. In what remains, this particularly idiosyncratic, lost dialect is not taken into consideration.

Regarding SIG, Lambrinos (1994: 82) reports that in Calimera, Castrignano, Martano, and Martignano SIG, a tendency that unstressed /i/ is lowered is observed, e.g. [m**e**rodía] ‘scent’, [tr**e**feró] ‘tender’, [**e**méra] ‘day’, [**e**trónno] ‘I sweat’ (cf. [m**i**rodía], [tr**i**feró], [**i**méra], [**i**trónno], respectively, in Sternatia, Corigliano, d’Otranto, Melpignano, Zollino). In a different vein, Profili (1986: 74–75) pinpoints the allophonic variation in the realization of /e/ in the variety of Corigliano d’Otranto SIG with reference to the stressed syllable and the position of the vowel in the word. Specifically, she reports an open-mid [ɛ] in stressed positions as well as word-initially and word-finally, independently of stress, and a close-mid [e] in unstressed, medial syllables. Even if the distribution between the two sounds was predictable in the period during which Profili carried out her on-site research, at the present time no noticeable difference appears to exist in a systematic fashion in Corigliano d’Otranto or any other IG variety; rather, variation seems to hinge on the personal preferences of each speaker (FW). Regional variation with respect to the degree of aperture may indeed exist (see e.g. Romano 2011, who investigates the tendency for a slightly more closed front mid vowel in Calimera SIG), yet the openness of vowels should not be correlated with any phonological properties.

1.1 Vowel sequences

Sequences of up to two heterosyllabic vowels are allowed in IG. In principle, one of them is stressed. In both IG dialects, we find numerous instances of etymological /V́V/ and /VV́/, for example:

(8) Etymological V́V and VV́

a. t**eó** < θ**eó**s ‘God’

b.	st**éo**	< ost**éo**	‘bone’
c.	kr**éa**	< kr**éa**s	‘meat’
d.	x**áo**	< x**áo**s	‘hole, abyss’
e.	fil**ía**	< fil**ía**	‘friendship’
f.	n**ói**ma	< n**ói**ma	‘meaning’
g.	fs**ío**	< ks**ío**	‘I itch’

A few exceptions of root-internal unstressed /VV/ sequences are attested, mainly including indirect borrowings from AG considered of elevated register.

(9) Unstressed VV

a.	bibbl**io**téka	‘library’
b.	t**eo**ría	‘theory’

In SIG, a number of vowel hiatus cases results from consonant elision due to lenition targeting intervocalic obstruents (see section 3.3). Examples of such derived hiatus are given in (10). The MedG (10a) or CIG (10b–k) cognates, which are not affected by a similar process, are given for comparison.

(10) Novel VV due to lenition in SIG

a.	f**óo**	cf. fó**v**os	‘fear’
b.	str**aó**	cf. stra**v**ó	‘crooked’
c.	pr**óa**to	cf. pró**v**ato	‘sheep’
d.	(a)vl**oó**	cf. vlo**ɣ**áo	‘I bless’
e.	m**éa**	cf. mé**ɣ**a	‘big (M/N)’
f.	p**áo**	cf. pá**ɣ**o	‘frost’
g.	al**ái**	cf. alá**ð**i	‘oil’
h.	dem**ái**	cf. demá**t**i	‘sheaf’
i.	gom**áo**	cf. ʝomá**t**o	‘full’
j.	k**aí**d͡zo	cf. ka**θ**ínno ~ ka**s**ínno	‘I sit’
k.	puɖɖ**ái**	cf. puɖɖá**t͡ʃ**i	‘little bird’

Derived hiatus may optionally be resolved via subsequent vowel deletion, as shown in (11). If one of the consecutive vowels bears stress, it is always the one that survives (e.g. 11e). The same strategy has applied to loans, e.g. *préo* < *pro***v***éo* < Rom. *póvo* ‘I try’ (FW).

(11) Optional hiatus resolution

a.	fó(o)	Cf. MedG fó**v**os	‘fear’
b.	stráta ~ strá(a)	Cf. CIG stra**t**ía	‘road’
c.	addomá(a)	Cf. MedG evðomá**ð**a	‘week’
d.	pr(o)atína	Cf. CIG pro**v**atína	‘ewe’
e.	m(e)áli	Cf. CIG me**ɣ**áli	‘big (F)’

Another strategy optionally employed to repair vowel hiatus in IG is glide formation, which primarily affects high vowels and deprives them of their vocalic status. Glided vowels are syllabified in the margins of the syllable, i.e. in the onset when they are prevocalic and in the coda in the rare cases when they occur post-vocalically. The back high /u/ can surface as either a full vowel [u] or a labio-velar approximant [w] before another vowel, as shown in its rare instantiations in inflectional paradigms, when stress is shifted (compare 12a–b).[6]

(12) Glide formation: /u/ → [w]

a.	ak**ú**o	‘I hear’
b.	ík**u**a ~ ígʷona	‘I was hearing’

Gliding of an unstressed pre-vocalic /i/ is observed on a much more frequent basis. At least as early as the Koine period, a pre-vocalic unstressed /i/ consistently surfaces as an approximant [j], which tends to strengthen to a palatal fricative (Browning 1983; Holton et al. 2019). Word-initially, the semivowel is in principle palatalized to [ɟ] (13; IG data in the first column; previous versions in the second column). The process appears to be active in contemporary IG, given the tendency of native speakers to adopt a [ɟ] realization when pronouncing Standard Greek proper names including an unstressed prevocalic /i/ (13e, FW).

[6] A vocalic realization in [íkua] is presupposed in order for antepenultimate stress, an exponent of the past tense (see section 4), to be ensured.

(13) Glide formation: /i/ → [j] → [j̞]

a.	**j̞**alí (~ **j**alí)	cf. **i**elíon	‘mirror’
b.	**j̞**atró (~ **j**atró)	cf. **i**atrós	‘doctor’
c.	**j̞**ó (~ **j**ó)	cf. **i**ós	‘son’
d.	**j̞**érako (~ **j**érako)	cf. **i**éraks	‘falcon’
e.	**j̞**ó (~ **j**ó)	cf. **i**ó	‘Io (proper name)’

In a /CiV/ context, the fate of an unstressed /i/ may range from mere glide formation to full absorption by the preceding consonant. As shown in (14), after the coronal obstruents /ð/ (realized as [d] in the examples here) and /t/, the following allophones of /i/ are found: (a) approximant [j]; (b) palatal stop [ɟ] or [c], respectively, through coalescence with the preceding consonant, possibly geminated when not phrase-initial. The voiced [ɟ] has a lenis variant [j̞], especially in SIG (see section 3.3).[7]

(14) Absorption of prevocalic /i/ by preceding coronal stop

a.	**dj**avénno ~ **ɟ**avénno ~ **j̞**avénno	‘I pass by’
b.	mu en**dj**ád͡zete > mu ŋ**ɟ**ád͡zete	‘I need’
c.	**ti**ɣatéra > **tj**atéra > **c**atéra	‘daughter’
d.	o **ttj**ári ~ o **cc**ári	‘the shovel’

The unstressed vowel /i/ is productively glided in the inflectional paradigm of neuter nouns when it constitutes a theme vowel (TH) (see Markopoulos 2018; Apostolopoulou 2018; cf. Ralli 2005). These nouns form the plural by attaching the suffix /a/ ‘NOM.PL’ immediately after the TH /i/. If bearing stress, the /i/ is protected from losing its vocalic status (15a–b). If, however, the stress falls within the root, as a general rule the /i/ is realized as a non-vocalic segment [j] (15c–d). By contrast, in the nominative form of the singular, the inflectional suffix encoding case and number is not overtly expressed, i.e. /∅/ ‘NOM.SG’; therefore, the TH /i/ is the rightmost phonetically expressed element of the nominal stem and, given that it is preceded by a root-final consonant, it retains its vocalic status independently of stress (15a′–d′).

[7] The [tia] sequence in (14c) has resulted from the elision of /ɣ/ due to lenition (see 3.3). A counterexample is [tiɣáni] ~ [tiáni] ~ *[cáni] ‘pan’. Probably the process applied to unstressed vocalic sequences.

(15) [i] vs. [j] in nominal inflection

a.	ped-**í-a** child-TH-NOM.PL	ped**ía**	‘children’
a´.	peð-**í**-∅ child-TH-NOM.SG	peð**í**	‘child’
b.	xart-**í**-a paper-TH-NOM.PL	xart**ía**	‘papers’
b´.	xart-**í**-∅ paper-TH-NOM.SG	xart**í**	‘paper’
c.	vuð-**i**-a ox-TH-NOM.PL	vúð**j**a	‘oxen’ (CIG)
c´.	vúð-**i**-∅ ox-TH-NOM.SG	vúð**i**	‘ox’
d.	demat-**i**-a sheaf-TH-NOM.PL	demát**j**a	‘sheaves’
d´.	demát-**i**-∅ sheaf-TH-NOM.SG	demát**i**	‘sheaf’

Katsoyannou (1995) reports a strengthened variant, i.e. a palatal fricative agreeing with the preceding consonant with respect to [±voice] for CIG, i.e. [vúð**ʝ**a], [mát**ç**a]. This is not strongly corroborated by the data I collected, and, given that the palatal fricatives [ʝ] and [ç] coincide with the most typical realization of the TH at hand in Standard Greek, these variants could be attributed to hypercorrection aiming at productions closer to a language of prestige.

After /n/, two possible realizations of unstressed prevocalic /i/ are observed (16). First, an approximant [j] may occur after an alveolar [n]. Second, the glided /i/ may trigger palatalization of the preceding nasal that yields a –usually geminated– [ɲɲ] (see also section 3.3 on degemination due to lenition). The latter process also targets /liV/ sequences and results in a palatal [ʎʎ] (17) (see section 2.1).

(16) Coalescence of prevocalic /ni/

a.	/asime**ni**o/	asimé**nj**o ~ asimé**ɲɲ**o	‘silver’
b.	/ste**ni**a/	sté**nj**a ~ sté**ɲɲ**a	‘combs’
cf.	/ste**ni**/	sté**ni**	‘comb’

(17) Coalescence of prevocalic /li/

a.	/i**li**os/	í**ɟɟ**o	'sun'
b.	/stafi**li**a/	stafí**ɟɟ**a	'grapes'
cf.	/stafi**li**/	stafí**li**	'grape'

A prevocalic /i/ coalesces with the preceding dorsal fricatives /x/ or /ɣ/, resulting in the palatal [ç] (18a–c) or [ʝ] (18d–e), respectively (see section 2.3.2.1). Before non-prevocalic fron vowels, /x/ may be only slightly fronted, but in general the velar realization is retained (for more details see section 2.3.2).

(18) Coalescence of prevocalic /i/ with dorsal fricatives

a.	/**xi**oni/	**ç**óni ~**xj**óni	'son'
b.	/ní**xi**a/	ní**ç**a ~ ní**xj**a	'nails'
c.	/ní**xi**/	ní**xi**	'nail'
d.	/a**ɣi**o/	á**ʝ**o	'saint'
e.	/lo**ɣi**a/	ló**ʝ**a	'words'
e´.	cf. /lo**ɣo**/[8]	ló**ɣo**	'word'

Finally, [j] does not merge with labials.[9]

(19) Glide formation after labials

a.	**pj**ánno	'I catch'
b.	korá**fj**a	'fields'
b´.	cf. korá**fi**	'field'
c.	**vj**áta	'always'
d.	kará**vj**a	'boats'
d´.	cf. kará**vi**	'boat'
e.	a**mj**aló	'brain'

[8] Masculine in the singular, neuter in the plural (word-TH-NOM.PL).

[9] A palatal variant which assimilates to the preceding consonant with respect to the features [±voice] and [±nasal] is again reported for CIG (Katsoyannou 1995), e.g. [pçánno] (19a), [vʝáta] (19c), [amɲaló] (19e). These variants were not confirmed by my FW data; in fact, in the case of /miV/, the realization [mɲV] was consciously rejected by an informant, the metalinguistic explanation being that [ɲ] would emerge only if a /n/ preceded.

f.	kalá**mj**a	‘canes’
f′.	cf. kalá**mi**	‘cane’

Post-vocalic [j] is no longer found within a root. In the few relevant cases, the unstressed post-vocalic /i/ was deleted in IG (in contrast to other dialects, e.g. Standard Greek) (20). This tendency was also observed in integrated loans from Romance (20e).

(20) Deletion of unstressed post-vocalic /i/

a.	adóni (obsolete)	< a**j**ðóni	‘nightingale’
b.	próma	< pró**j**ma	‘prematurely’
c.	gádaro	< ɣá**j**ðaros	‘donkey’
d.	naráda	< nerá**j**ða	‘fairy’
e.	ákula	< áku**j**la	‘eagle’

When a surface vowel is adjacent to an unstressed /i/ belonging to a different morpheme, though, it is possible that [Vj] emerges. Consider, for instance, the verbal forms for the third singular person, where the right edge of a verbal stem ending in a vowel meets the inflectional suffix /i/ ‘3SG’ (21a–b). Another example comes again from neuter nouns with TH /i/, in those cases that the root-final consonant is lenited to zero (21c–d) (see section 3.3).

(21) Optional [i] ~ [j] alternation in postvocalic position

a.	kle-**i** cry-3SG	klé**i** ~ klé**j**	‘s/he cries’
b.	tró- **i** eat-3SG	tró**i** ~ tró**j**	‘s/he eats’
c.	alád- **i** oil-TH	alá**i** ~ alá**j**	‘oil’
d.	arn-at͡ʃ- **i** lamb-DIM-TH	arná**i** ~ arná**j**	‘little lamb’

2. Consonants

IG varieties possess a series of plosives, fricatives, affricates, nasals, and liquids that have either been bequeathed by MedG or developed over the course of time, after the divergence from the ancestral language. The surface forms that are attested across IG are the following (marginal sounds are presented in parenthesis):

(22) Surface consonant inventory in IG

	Bilabial	**Labiodental**	**Dental**	**Alveolar**	**Postalveolar**	**Retroflex**	**Palatal**	**Velar**
Plosive	p b			t d		ʈ ɖ	c ɟ	k g g^w
	pp pp^h bb			tt tt^h dd		ɖɖ	ɟɟ	kk kk^h gg
Nasal	m			n			ɲ	ŋ
	mm			nn			ɲɲ	
Trill				r(r)				
Tap				ɾ		ɽ		
Fricative	β	f v	θ ð	s z	ʃ ʒ	ʂ	ç ʝ	x ɣ
		ff	θθ	ss	ʃʃ			xx
Affricate				t͡s d͡z	t͡ʃ d͡ʒ	t͡ɽ ~ t͡ʂ		
				tt͡s dd͡z	tt͡ʃ dd͡ʒ			
Lateral				l			(ʎ)	
				(ll)			(ʎʎ)	

Although the sound inventories vary slightly across the IG dialects, it seems that the underlying systems are not that different from each other. After taking into consideration allophonic variation, lenition, and processes that derive geminates from clusters, we can reconstruct a significantly small basic inventory of the IG phonemes (23). Both dialects possess a set of voiceless non-sibilant obstruents of all three major Places of Articulation (PoA) that contrast as to [±cont], i.e. /p, v, t, θ, k, x/. Within voiced obstruents, on the other hand, there is no distinction with respect to Manner of Articulation (MoA). For historical reasons, the underlying form of these consonants is represented by fricatives, i.e. /v, ð, ɣ /. Additionally, all IG varieties have two nasals, i.e. /m, n/, and two liquid phonemes, i.e. /r, l/. As for sibilants, the phonemic status of the alveolar fricative /s/ and the alveolar affricate /d͡z/ is uncontroversial. The post-alveolar /t͡ʃ/ and /ʃ/ (in parentheses), although derivable, seem to have acquired an underlying status in contemporary IG. Finally, /b/ and /d͡ʒ/ (in double parentheses) should be included as marginal phonemes appearing mainly in loanwords.

(23) Phonemic consonant inventory in IG

	Labial	***Coronal***		***Dorsal***	
		Dental	***Alveolar***	***Postalveolar***	***Velar***
Plosive	p ((b))		t		k
Fricative	f v	θ ð	s	(ʃ)	x ɣ
Affricate			d͡z	(t͡ʃ) ((d͡ʒ))	
Nasal	m		n		
Trill			r		
Lateral			l		

The sections to follow elaborate on the phonological distinctions that are crucial in order to reconstruct the IG phonemic inventory and the distribution of each phoneme.

2.1 Liquids

IG has two liquid consonants, a rhotic /r/ and a lateral /l/, which are contrastive in word-initial, intervocalic, and post-consonantal positions, as showcased with the help of the minimal pairs below:

(24) Contrast between liquids: initial position

a.	**l**éo	'I say'
b.	**r**éo	'I slide, I flow'

(25) Contrast between liquids: intervocalic position

a.	mí**l**a	'apples'
b.	mí**r**a	'portion'

(26) Contrast between liquids: postconsonantal position

a.	p**l**óma	'stretching'
b.	p**r**óma	'prematurely'

The phonological contrast between the two liquids is taken to lie in their PoA specification. Following Walsh-Dickey 1997 (see also Kappa 2021), I take /r/ to be a coronal segment, whereas /l/ additionally bears the feature [dorsal]. The reasoning behind this assumption is explicated in section 3.5.

The vast majority of obstruent-liquid (OL) clusters is inherited directly from MedG. Rarely, an innovative OL cluster (27, second column) may date back to obstruent-nasal (ON) (27, first column), alongside other variants (27, third column) (see sections 2.2 and 2.4 for further details on the evolution of ON):

(27) Innovative OL clusters (stemming from ON)

a.	ðá**fn**i >	dá**fr**i ~ dá**fl**i	~ dá**nn**i ~ dá**fin**i	'laurel'
b.	í**pn**os >	í**pl**o	~ í**nn**o ~ í**pun**o	'sleep'

In extremely few cases, a post-consonantal liquid has been replaced by the other one (other phonological changes are ignored at this point):[10]

(28) Interchange of liquids: /r/ > /l/

a.	ðák**r**i	= dák**r**i (SIG)	'tear'
b.	ðák**r**i	> ðák**l**i (CIG)	'tear'

[10] (28) is taken from Squillaci & Squillaci (2016); (29) is taken from Greco & Lambrogiorgou (2001).

(29) Interchange of liquids: /l/ > /r/

a. p**l**úsios = p**l**ússio (CIG, SIG) ‘rich’

b. p**l**úsios > p**r**ússio (Sternatia SIG) ‘rich’

Pre-consonantally, only rhotics are encountered. Rhotacisation of pre-consonantal /l/ had started already in MedG (Manolessou & Toufexis 2009), with the affected words being later bequeathed to IG containing /rC/. Alternatively, the /lm/ cluster in particular was either transformed into a geminate [mm] (30e–f) or split via vowel insertion (30g).

(30) Evolution of MedG pre-consonantal /l/ in IG

a. ade**l**fós > ade**r**fós ‘brother’

b. a**l**mirós > a**r**mirós ‘salty’

c. vá**l**samo > vá**r**samo ‘balsam’

d. í**l**θa > í**r**ta ‘I came’

e. ofθá**l**mi > artá**m**mi ~ artá**r**mi ‘eye’

f. sta**l**méno > ste**m**méno ‘sent’

g. vɣa**l**méno > g^w^a**lo**meno ‘taken out’

A final source of pre-consonantal rhotics is detected in obstruents that were optionally rhotacized (see section 2.1), thus leading to non-etymological [rC] clusters next to other variants (31) (31g is from Lambrinos 1994; 31e is from Karanastassis 1984–1992).

(31) Innovative pre-consonantal /r/ stemming from non-liquid consonants

a. a**r**déɖɖa ~ a**d**déɖɖa < **v**ðélla ‘leech’

b. a**r**tá**m**mi ~ a**r**tá**r**mi (CIG) < o**f**θá**l**mi ‘eye’

c. a**r**faló ~ a**f**falo < o**ɱ**falós ‘belly button’

d. do**r**tsío ~ do**f**sío ~ do**f**t͡sío ~ do**t**t͡sío ~ do**ʃ**ʃío < ðe**k**siós ‘right’

f. e**r**tá ~ e**s**tá ~ e**θ**tá ~ e**t**tá < e**f**tá ‘seven’

g. sta**r**ní ~ sta**n**ní < sta**m**ní ‘clay pot’

e. a**r**tarida (Bova CIG) < ni**x**terída ‘bat’

/rC/ clusters typically survive intact. Exceptionally, the sequence /rn/, aside from the faithful realization [rn], has an alternative realization [rr] (32).

(32)	Variable evolution of /rn/			
	a.	a**rn**í	= a**rn**í	‘lamb’
	b.	fté**rn**a	> sté**rn**a ~ sté**rr**a	‘heel’
	c.	/spe**r**-**n**-o/ sow-IPFV-1SG	> spé**rn**o ~ spé**rr**o	‘I sow’
	d.	/se**r**-**n**-o/ drag-IPFV-1SG	> sé**rn**o ~ sé**rr**o	‘I drag’
	e.	/fe**r**-**n**-o/ bring-IPFV-1SG	> fé**rn**o ~ fé**rr**o	‘I bring’

Strictly speaking, it would not be accurate to maintain that /r/ follows rigid rules regarding its exact phonetic realization. Nonetheless, certain tendencies in specific phonological environments can be detected. First, /r/ is typically realized as a trill [r] in phrase-initial and pre-consonantal position; however, a pronunciation as a tap is not excluded (33). Word-initially after a word-final vowel (33c), or when flanked by two word-internal vowels (33d), the pronunciation of a (singleton) rhotic is usually closer to a tap [ɾ].

(33)	Initial and post-vocalic rhotics in IG		
	a.	**r**éo (~ **ɾ**éo)	‘I slide’
	b.	xó**r**to (~ xó**ɾ**to)	‘grass’
	c.	eɣó **r**éo ~ eɣó **ɾ**éo	‘I slide’ (overt pronoun)
	d.	ne**ɾ**ó	‘water’

Post-consonantally, the trill and the tap usually alternate freely (34). Especially after /t/, /r/ often appears retroflected (35). The [–distributed] feature of the retroflex may spread regressively to the preceding coronal(s) (e.g. to both /t/ and /s/, 35b), especially in SIG. The result is considered an affricate (see also section 3.2).

(34)	Post-consonantal rhotics in IG		
	a.	k**r**éa ~ k**ɾ**éa	‘meat’
	b.	p**r**óto ~ p**ɾ**óto	‘first’

(35) Retroflexion of /tr/

a. t**ɽ**ía ~ **ʈɽ**ía (~ t**ɾ**ía) ‘three’

b. st**ɽ**avó ~ s**ʈɽ**avó ~ **ʂʈɽ**avó (~ st**ɾ**avó) ‘crooked’

In what follows, the symbol [r] is used in all positions for the sake of simplicity, unless a special need to distinguish between pronunciations arises.

The lateral /l/ is realized as an alveolar [l] in word-initial, intervocalic, and post-consonantal positions (see 24–26a, respectively). As a geminate, though, it surfaces as a retroflex stop (36). Specifically, following a parallel evolution of the respective configuration in Romance, the old geminate /ll/ has evolved in [ɖɖ] (arguably through an intermediate stage [ɭɭ], see Recasens 2011: 192 and Rohlfs 1966: 329 for Romance). Rarely, the lateral [ll] still emerges as a variant of [ɖɖ] in the speech of some speakers (36a′–b′)[11] (FW). This preservation, however, cannot be regarded as proof that a lateral segment still exists at underlying level, as the conservative pronunciations could equally well be attributed to interferences from Standard Greek. Nevertheless, the alternations at hand suggest a degree of awareness in the mind of speakers regarding the association of [ɖɖ] with [ll].

(36) Retroflexion of etymological /ll/ in IG

a. á**ɖɖ**o ‘other’

a′. ~ á**ll**o

b. ko**ɖɖ**ó ‘I glue’

b′. ~ ko**ll**ó

The productiveness of the retroflexion process targeting /ll/ is manifested more robustly by cases of optional gemination of /l/, which results in [ɖɖ] rather than [ll]:[12]

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[11] [ll] is also the sole option for the word *Elláda* ‘Greece’. It should be clarified that phonotactics would most likely not exclude *[eɖɖáda], e.g. due to the presence of [d], as examples like [addéɖɖa] ‘leech’ prove that the coexistence of retroflexes and dentals in the same root is possible. The persistence in the lateral sound is rather to be attributed to social factors, e.g. the abidance by the historical connection with the Greek culture through a conservative linguistic choice that more closely reflects the original sound of an important place name, such as the name of the main Greek-speaking country.

[12] Gemination may occur due to analogy with nouns in *-úɖɖi*, which contain the diminutive suffix *-úɖɖ-* (loan from Romance *-ull-*)

(37) Retrofexion of innovative /ll/ in IG

a. stafí**l**i ~ stafí**ɖɖ**i ‘grape’

b. kuné**l**i ~ kuné**ɖɖ**i ‘rabbit’

On the other hand, when [ɖɖ] is degeminated due to lenition (see section 3.3), a singleton [ɖ] arises (Katsoyannou 1995).

(38) Degemination of retroflected /ll/

a. fí**ɖɖ**o ~ fí**ɖ**o ‘leaf’

b. á**ɖɖ**o ~ á**ɖ**o ‘other’

Another manifestation of /l/ as an obstruent is found in the context /_iV/, where /i/ does not bear stress. As discussed in section 1.1, when an unstressed /i/ precedes another vowel, glide formation applies, which may be followed by palatalization. In the case of /liV/, /l/ merged with the glided /i/, initially yielding a palatal lateral [ʎ], which was largely replaced by the plosive [ɟɟ] and also has lenis variants, i.e. [ɟ] (degeminated) and [ʝ] (spirantized). Today, [ʎ] is considered marginal, although not entirely obsolete. Specifically regarding the data obtained through my FW, the same informants (one of Sternatia SIG, one of Martano SIG, one of Bova CIG) that retained a lateral [ll] instead of a retroflex [ɖɖ] usually also preferred [ʎ] over [ɟ(ɟ)]. Remarkably, at least one of them is not fluent in SG, where laterals constitute the only available option, thus their choice is not driven by interference.

(39) Coalescence and palatalization of pre-vocalic /li/

a. í**ɟ(ɟ)**o ~ í**ʝ**o (~í**ʎ**o) < **ili**os ‘sun’

b. xí**ɟ(ɟ)**a ~ xí**ʝ**a (~xí**ʎ**a) < xi**li**a ‘thousand’

Evidence that coalescence is still active in IG is offered by derived environments. For instance, consider the inflectional paradigm of the noun /stafili/ ‘grape’. In the absence of a phonetically expressed inflectional suffix, /l/ is realized as [l] (40a). However, the overt suffix /a/ creates a context that triggers glide formation, which in turn gives rise to a palatal (40b). Again, [ʎ] is by far the least frequent variant.

(40) Productiveness of /li/ palatalization: nominal inflection

a. /stafi**l**-**i**-Ø/ stafí**li** ‘grape’

b. /stafi**l**-**i**-a/ stafí**ɟ(ɟ)**a ~ stafí**ʝ**a (~ stafíʎa) ‘grapes’

Another alternation between [lj] and [ɟ] revealing some degree of productiveness is exemplified by the realizations of the root /pale/ ‘old’ (FW; Squillaci & Squillaci 2016). In a standalone adjective, the /l/ is pronounced as an alveolar lateral [l] preceding the stressed non-low /e/ (41a). When /pale/ is the first member of a compound, e.g. /pale-o-ɣal-o/ (old-CMPD-milk-TH ‘breast milk at the last stage before the end of lactation’), the stress shifts rightwards to the antepenult in order to occur within the three-syllable window from the right edge of the word (see section 3.2). As a result, the /l/ precedes an unstressed pre-vocalic vowel /e/, which may surface as [le] (41b). However, the stress shift may trigger glide formation at first (41c) and coalescence of [j] with the preceding lateral at a second stage (41d). A further development is again a plosive [ɟ] (41e) and its lenis variant [ʝ] (41f).

(41) Productiveness of /le/ palatalization after stress shift

a. pa**lé**o ‘old’

b. pa**le**óɣalo ‘breast milk at the last stage before the end of lactation’

c. pa**lj**óɣalo

d. pa**ʎ**óɣalo

e. pa**ɟ**óɣalo

f. pa**ʝ**óɣalo

In previous literature (Profili 1983; see also Katsoyannou 1995), [l], [ɖɖ], and [ɟ] are mapped onto separate phonemes /l/, /ɖɖ/, and /ɟ/, respectively. However, given that the allophonic realizations are in principle predictable, one can also posit that both the retroflex [ɖɖ] and the palatal [ɟ] are manifestations of a single phoneme /l/.

2.2 Nasals

Two nasals, i.e. the labial /m/ and the coronal /n/ are included in the phonemic inventory of IG. In word-initial (42) and intervocalic positions (43), they contrast with respect to PoA, i.e. they are realized as a bilabial [m] and an alveolar [n], respectively.

(42) Contrast between nasals: initial position

a.	**m**éro	'place'
b.	**n**eró	'water'

(43) Contrast between nasals: intervocalic position

a.	ftí**m**a	'spit'
b.	ftí**n**o	'beast'

The nasal /n/ can precede plosives. In this environment, /n/ acquires the PoA features of the following obstruent. Specifically, [m] is found before labials (44a–b), [n] occurs before coronals (44c–d), and [ŋ] emerges before velars and palatals (44e–f).

(44) Place agreement in nasal–obstruent clusters

a.	a**mp**ʰéli	'vineyard' (SIG)
b.	gra**mb**ó	'brother-in-law'
c.	pé**nt**ʰe	'five' (SIG)
d.	á**nd**ra	'man'
e.	á**ŋg**ona	'elbow'
f.	e**ɲɟ**íd͡zo	'I touch'

In SIG one encounters forms in which the nasal has been entirely absorbed by the following voiceless segment. Compare the NO ~ OO alternants in SIG (first column) with the single variant containing NO in CIG (second column).

(45) Evolution of NO[–cont] into OO geminates in SIG

a.	a**mp**ʰéli ~ a**pp**ʰéli	ambéli	'vineyard'
b.	pé**nt**ʰe ~ pé**tt**ʰe	pénde	'five'
c.	da**ŋk**ʰánno ~ da**kk**ʰáno	daŋgánno	'I bite'

Moreover, this fate is reserved for nasals in both dialects when they precede fricatives. A NO[+cont, –str] cluster is unexceptionally replaced by a geminate (46). The derived geminate [θθ] may also surface as a geminate stop or a singleton aspirated stop aspiration in SIG and Galliciano CIG, respectively, where the sound [θ] is not encountered (see 46b–c). Note that /n/

may also turn to [r] (see 46a). /n/ is deleted before /s/, as shown via reproductions of Standard Greek words by native speakers of IG (46f) (FW).

(46) Evolution of MedG NO$_{[+cont]}$ into OO geminates in IG

a.	o**ɱf**alós	> a**ff**aló (~a**rf**aló)	‘belly button’
b.	pe**n̪θ**erá	> pe**θθ**erá ~ pe**tt**erá ~ pe**tʰ**erá	‘mother-in-law’
c.	á**n̪θ**os	> á**θθ**o ~ á**tt**o ~ á**tʰ**o	‘flower’ (obsolete)
d.	si**ŋx**oró	> si**xx**oró	‘I forgive’
e.	e**ŋç**iró	> a**xx**erónno	‘I commence’(CIG)
f.	ðiéfθi**ns**i	> ðjéfti**Øs**i	‘address’

A handful of labial NC clusters, mainly in SIG, do not go back to an identical MedG sequence. The source of these rare non-etymological NC is former geminates that were dissimilated (47).

(47) Dissimilation of etymological labial geminates into NO clusters

a.	a**mp**ári	< i**pp**ário	‘horse’
b.	kri**mb**ídi	< kro**mm**ídi	‘onion’
c.	sí**mb**eri	< sí**mm**eri	‘today’
d.	sá**mb**a	< sá**bb**ato	‘Saturday’

Innovative NC appear also as marginal alternatives of other clusters. For instance, although the typical evolution of /ɣð/ and /ks/ in most SIG varieties is [dd] and [t͡ts], respectively (see sections 3.4 and 4.5), [nd], or even the marginal variant [ns] and [nts], are also reported (48) (Karanastassis 1984–1992; Rohlfs 1930; Lambrinos 1994). However, these should be attributed to influence of the Romance *mandorla* (48a) and *nsartu* ~ *nzartu* (48b) (Lambrinos 1994).

(48) Rare innovative pre-consonantal N stemming from O

a.	ami**ɣ**ðaléa	mi**d**dalía	‘almond tree’
		me**n**duléa	
b.	e**k**sárti	a͡tsárti	‘rigging’
		a**n**(t)sárti	

MedG post-consonantal nasals (49–50, first column) are preserved in very few IG varieties. To begin with clusters including the coronal nasal [n], today, in almost every variety one witnesses the overwhelming presence of a geminate [nn] in the place of old [pn], [fn], [kn], [xn], and [ɣn] (49–50, second column). However, Martano SIG (49–50, third column) retains [fn] ~ [vn], stemming from either [$C_{[lab]}$n] (49) or [$C_{[dor]}$n] (50).[13]

(49) Evolution of labial O preceding N

a.	ka**pn**ós	ka**nn**ó	ka**vn**ó ~ ka**nn**ó[14]	‘smoke’
b.	dá**fn**i	dá**nn**i	(dá**vn**i) ~ dá**nn**i	‘laurel’

(50) Evolution of labial dorsal O preceding N

a.	pi**kn**ós	pi**nn**ó	pi**vn**ó ~ pi**nn**ó	‘thick’
b.	lí**xn**o	lí**nn**o	lí**fn**o ~ lí**vn**o ~ lí**nn**o	‘lamp’
c.	ste**ɣn**ó	ste**nn**ó	ste**vn**ó ~ ste**nn**ó	‘dry’

The nasal cluster /mn/ also transformed into /nn/:

(51) Evolution of /mn/ into [nn]

a.	ɟi**mn**ós	> ɟu**nn**ó	‘naked’
b.	ska**mn**í	> ska**nn**í	‘stool’
c.	ká**mn**o	> ká**nn**o	‘I do’

In the cases where language change has affected root-internal clusters, the transformation from [Cn] to [nn] is synchronically opaque outside Martano SIG, where the alternation [Cn]~[nn] guarantees, to some extent, access to the underlying cluster. Moreover, traces of the old clusters are still detectable in light of alternative strategies that were employed to avoid [Cn], such as rhoticism/lateralization of the nasal or vowel insertion.

[13] The only coronal obstruent that preceded /n/ in MedG is /θ/. /θn/ is encountered only in one root, i.e. /eθn/ ‘nation’, that is not inherited by IG, and in the zero ablaut grade of /θVn/ ‘death’ (*Dictionary of Modern Greek*). The latter has one instance in SIG, i.e. the verb *apesinisko* ‘I die’ (see –Learned– MedG *apoθnísko*; cf. CIG *peténo ~ peséno*, Standard Greek *peθéno*).

[14] Also [kafníd͡zo] ‘I smoke’, Martano SIG (*Rize Grike*).

(52) Alternative evolutions of ON

a.	í**pn**os	í**nn**o ~ í**pl**o ~ í**pun**o	'sleep'
b.	dá**fn**i	dá**nn**i ~ dá**fin**i ~ dá**fr**i ~ dá**fl**i	'laurel'
c.	li**xn**ári	li**nn**ári ~ li**xin**ári	'lamp'
d.	lí**mn**i	lí**nn**i ~ lí**min**i	'lake'

Regarding /Cm/ clusters, the realization [mm] has taken over, with the exception of /rm/ (see 2.1 above) and partially of /sm/, e.g. [**zm**íŋgo] ~ [**mm**íŋgo] 'I unite' (see also 2.3.3 above). Note that [zm]~[mm] may also result from the combination of another coronal with /m/ through morphological processes, e.g. /aleθ-men-o/ grind-PTCP-N.NOM → [ale**zm**éno] ~ [ale**mm**éno] 'ground'. The majority of the available examples demonstrating the evolution of [$C_{[dor]}$m] and [$C_{[lab]}$m] clusters comes from the morphological boundary between a verbal stem and the morpheme denoting the past participle, i.e. /men/. As shown below, unlike MedG, which allows [ɣm], the dorsal is assimilated to [m] in IG (53a). [vm] on the other hand is avoided in both varieties (53b), yet via different strategies: MedG does not allow geminates, thus /v/ is dropped, whereas in IG it assimilates just like /ɣ/.

(53) /Om/ → [mm] at morphological boundaries

a.	/ani**ɣ**-**m**en-o/ open-PTCP-N.NOM	→	ani**ɣm**éno (MedG)	'opened'
		→	ani**mm**éno (IG)	
b.	/klað-e**v**-**m**en-o/ branch-VBZ-PTCP-N.NOM	→	klaðe**m**éno (MedG)	'pruned'
		→	klaðe**mm**éno (IG)	

2.3 Obstruents

Regarding the obstruents in IG, distinctions based on the MoA feature [±continuant], the major PoA features, i.e. [labial], [coronal], and [dorsal],[15] and the feature [±voice] are implemented. The following sections provide more details.

[15] The PoA specification is to be revised in chapter 4.

2.3.1 MoA distinctions

Since the end of the 4th century AD (Horrocks 2010: 170–171), the AncG voiceless aspirated plosives /pʰ, tʰ, kʰ/ have turned into fricatives /f, θ, x/, which in most Modern Greek dialects contrast with the preserved /p, t, k/ with respect to [±continuant]. To begin with voiceless labial consonants, a phonological distinction between plosives and fricatives exists in both IG dialects word-initially before a vowel (54), intervocalically (55), before a liquid (56), and after a liquid (57), as shown via the (near-)minimal pairs below:

(54) Contrast between labial O with respect to continuancy: initial prevocalic position

a. **p**érno ‘I take’

b. **f**érno ‘I bring’

(55) Contrast between labial O with respect to continuancy: intervocalic position

a. a**p**íssu ‘behind’

b. a**f**ínno ‘I let’

(56) Contrast between labial O with respect to continuancy: pre-consonantal position

a. **p**ríta ‘earlier’

b. (a)**f**rídi ‘eyebrow’

(57) Contrast between labial O with respect to continuancy: post-consonantal position

a. kar**p**ó ‘fruit’

b. kar**f**ónno ‘I nail’

Similarly, the contrast between the dorsals /k/ ([–cont]) and /x/ ([+cont]) is maintained in the pre-vocalic word-initial (58), intervocalic (59), and pre-liquid position (60) (on the pre-consonantal position see section 3.4):

(58) Contrast between dorsal O with respect to continuancy: initial position

a. **k**ánno ‘I do’

b. **x**ánno ‘I lose’

(59) Contrast between dorsal O with respect to continuancy: intervocalic position

a.	a**k**óni	'whetstone'
b.	a**x**ó	'sound'

(60) Contrast between dorsal O with respect to continuancy: pre-consonantal position

a.	**k**léo	'I cry'
b.	**x**léno	'I heat up'

In Bova and Roghudi CIG, /θ/ preserved its continuancy, thus rendering visible the phonological distinction between /θ/ and /t/, illustrated by the near-minimal pairs in (61) (on the pre-consonantal position see section 3.4).

(61) Contrast between coronal O with respect to continuancy in CIG

a.	**θ**ilikó	'feminine'
b.	**t**ilígo	'I wrap'
c.	má**θ**ima	'lesson'
d.	má**t**i	'skirt'
e.	ála**t**ro	'plow'
f.	á**θ**ropo	'man'

The surface inventory of SIG and Galliciano CIG, on the other hand, typically lacks a fricative [θ]. The words containing an old /θ/ currently display [t] in word-initial positions and [s] intervocalically, although the possibility that the two forms are used interchangeably is not entirely excluded (62–63, first column). Note that free variation between [θ] and [s] is possible also in CIG, especially in word-medial positions (62–63, second column).

(62) Cross-dialectal difference with respect to /θ/: initial position

a.	**t**álassa	**θ**álassa	'sea'
b.	**t**eó ~ **s**eó	**θ**eó ~ **s**eó	'God'

(63) Cross-dialectal difference with respect to /θ/: intervocalic position

a.	li**t**ári ~ li**s**ári	li**θ**ári ~ li**s**ári	'stone'

b.	pe**t**éno ~ pe**s**éno[16]	pe**θ**éno ~ pe**s**éno	'I die'
c.	ru**t**úni ~ ru**s**úni	ru**θ**úni ~ ru**s**úni	'nostril'

One could postulate that the above instantiations of [t] and [s] have been "absorbed" by /t/ and /s/, respectively. However, as shown above, there still exist alternations supporting the argument that these realizations constitute allophonic variants of a separate phoneme /θ/. Another example comes from the inflectional paradigm of the verb [télo] (~ [sélo]) (CIG [θélo]) 'I want', which forms the singular of the progressive past tense by the addition of an augment [i] to achieve antepenultimate stress (see section 4). In this case, the root-initial consonant, which is intervocalic, fluctuates between [t] and [s], i.e. [ítela] ~ [ísela] 'I used to want' (but cf. the non-progressive past tense [etélisa] 'I wanted'). Importantly, the instances of [t] and [s] that do not go back to /θ/ never alternate among each other, e.g. [**t**irí] *[**s**irí] 'cheese', [**s**óma] *[**t**óma] 'body'.

Regarding the voiced obstruents, no phonological distinction exists between voiced stops and fricatives, i.e. /b, v/, /d, ð/, and /g, ɣ/ in the native IG vocabulary. Although all these sounds are instantiated in the native vocabulary of both IG dialects, they in fact constitute allophones of one voiced consonant per place. For historical reasons as well as for the sake of symmetry, the representations /v, ð, ɣ/ will be used.[17] In both IG dialects, the labial voiced consonant is typically realized as a fricative [v]. The coronal and dorsal voiced consonants, on the other hand, are variably realized as either stops or fricatives. Regional preferences are detected: in SIG, /ð/ and /ɣ/ are most often realized as stops, i.e. [d], [g, ɟ], while in CIG the [+cont] feature is retained to a great extent, i.e. [ð, ɣ, ʝ] (for further remarks on neutralization of manner distinctions resulting from lenition processes, see section 3.3).[18]

(64) Voiced O in IG

a.	**v**áɖɖo	'I put'
b.	**v**réxi	'it rains'
c.	**ð**énno ~ **d**énno	'I tie'

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[16] Profili (1983) also reports the alternation *na pe[t]áno ~ na pe[θ]áno* 'that I die'.

[17] AG did not possess voiced fricatives. The old voiced /b, d, g/ had switched their value of [±continuant] around the 4th century AD (Horrocks 2010), with the exception of post-nasal stops, that retained their [–cont] value].

[18] In one case, the realization [b] as a free variant of [v] is documented before /r/, i.e. [vrúθako] ~ [brúθako] 'frog' (Squillaci & Squillaci 2016).

d.	**ð**ráko ~ **d**ráko	‘dragon’
e.	**ɣ**ála ~ **g**ála	‘milk’
f.	**ʝ**etonía ~ **ɟ**etonía	‘neighborhood’
g.	**ɣ**lóssa ~ **g**lóssa	‘language’
h.	**ɣ**ráfo ~ **g**ráfo	‘I write’

Finally, based on words not belonging to the native IG lexicon (65), an additional marginal phoneme /b/, realized as a plosive [b] (65a–b) or [bb] (65c–d), should be postulated. The particular surface form could not be mapped on the native /v/, which is realized as a fricative [v] in all cases.

(65) /b/ in loanwords

a.	**b**iskótto	< It. biscotto	‘biscuit’
b.	**b**ár**b**a	< It. **b**ar**b**a	‘beard’
c.	a**bb**adéo	< It. **b**adare	‘I look after’
d.	**b**i**bb**liotéka	< It. **b**i**b**lioteca	‘library’

2.3.2 PoA distinctions

Examples demonstrating PoA contrasts among voiceless plosives and fricatives are given through the (near-)minimal pairs in (66) and (67), respectively.

(66) (Near-)minimal pairs: voiceless plosives

a.	**p**ósso	‘how much’	[labial]
b.	**t**ósso	‘this much’	[coronal]
c.	**k**óʃʃino	‘sieve’	[dorsal]

(67) (Near-)minimal pairs: voiceless fricatives

a.	**f**orá	‘time’	[labial]
b.	**θ**oró	‘I see’ (CG)	[coronal]
c.	**x**óra	‘capital village’	[dorsal]

Normally, plosives specified as [labial] surface as bilabials, i.e. [p], [b], and fricatives are realized as labiodentals, i.e. [f], [v]. However, it is possible that a realization as bilabial fricative [β], corresponding to any underlyingly labial consonant, emerges in intervocalic positions as a result of lenition, e.g. intervocalic /p/: [o peðí] ~ [o βeðí] 'the child' (Profili 1983) (see section 3.3).

The coronal consonants are typically realized as alveolars in the case of stops, i.e. [t], [d], and as dentals in the case of fricatives, i.e. [θ], [ð]. Moreover, IG has inherited a sibilant /s/ which is realized as an alveolar [s] (68a) (see section 2.3.3 for the voiced counterpart [z]) as well as an affricate /d͡z/ (68b) (see sections 3.4 and 3.5 for the voiceless affricate [ts]), which preserves the pronunciation of the AG <Z> as [d͡z], in contrast to almost all other Modern Greek dialects, where <Z> has become a voiced fricative /z/ (Rohlfs 1950; Karanastassis 1997). A near-minimal pair is presented below:

(68) Contrast between /s/ and /d͡z/

a.	**s**óma	'body'
b.	**d͡z**onári	'belt'

As mentioned above (see 35), /t/ and the preceding /s/ is often retroflected in the presence of /r/:

(69) Retroflexion of /(s)tr/

a.	st**ɽ**avó ~ s**ʈɽ**avó ~ **ʂʈɽ**avó (~ stɾavó)	'crooked'
b.	**ʈɽ**í (~ lenited **ɖɽ**í)	'three'

Finally, a few cases of free variation between forms with different PoA are attested, especially in CIG (70; first column corresponds to the original sequences, second column presents the innovative forms). Voiced consonants may have a voiceless variant with either the etymological PoA feature or the changed one (e.g. see 70a, g, h) (see also section 3.3).

(70) Free variation as to PoA

a.	**v**oréa	**f**oréa ~ **x**oréa	'North wind'
b.	**θ**imonía	**x**imonía	'haystack'
c.	**θ**oló	**x**oló	'dim'

d.	**θ**ilikó	**f**ilikó	‘feminine’
e.	**x**oríο	**f**orío	‘village’
f.	**x**úma	**f**úma	‘soil’
g.	tilí**g**o	tilí**x**o ~ tilí**f**o	‘I wrap’
h.	a**ɣ**orád͡zo	a**v**orád͡zo ~ a**f**orád͡zo	‘I buy’
i.	ɣrí**ɣ**ora	ɣlí**v**ora	‘quickly’

Moreover, in SIG (71, first column) some etymological /ɣ/ have permanently turned to [v] in an intervocalic position (cf. CIG, right column). The change is mostly observed before back vowels (71a–c), although Lambrinos (1994) reports one example of *j* > *v* before a front vowel (71d).

(71) Realization of intervocalic /ɣ/ as [v] in SIG

a.	e**v**ó	< e**ɣ**ó	‘I’
b.	tra**v**údi	< tra**ɣ**údi	‘song’
c.	a**v**orád͡zo	< a**ɣ**orád͡zo	‘I buy’
d.	a**v**eláta	< a**j**eláða (MedG)	‘cow’ (Lambrinos 1994)

2.3.2.1 Post-alveolars

In the diachrony of IG, different degrees of velar fronting are witnessed. To begin with, the plosive /k/ invariably surfaces as a velar [k] before back vowels and consonants (72), and it was turned into an affricate [t͡ʃ] when preceding the vowels /e/ and /i/ through Assibilating Stop Palatalisation (ASP) (73) (see Recasens 2020).

(72) Velar allophones of /k/ before back vowels

a.	**k**aló	‘good’
b.	**k**ózmo	‘world’
c.	**k**utáli	‘spoon’
d.	**k**rasí	‘wine’

(73) Assibilated palatal allophones of /k/ before front vowels

a.	kalo**t͡ʃ**éri	‘summer’
b.	arná**t͡ʃ**i	‘lamb (dimin.)’

Very few exceptions did not follow this rule, e.g. [cispála] *[t͡ʃispala] ‘hive’ (however, here the /i/ stems from an etymological /u/); CIG [keró] ‘weather’ (cf. [kalot͡ʃéɾi] ‘summer’, lit. ‘good weather’; also SIG [t͡ʃeró]). Moreover, in a scarce number of words, ASP is attested before /u/, e.g. t͡ʃúɾi ‘father’, cf. SMG [círis].

ASP targeting /k/ operated exclusively within stems, but was blocked at the morphological boundary between a stem and an inflectional suffix. Consider, for instance, the following examples that derive from the root /lik/. The inflectional paradigm of the noun *lìko* ‘wolf’ is formed by the attachment of inflectional suffixes encoding number and case to the nominal stem /lik-o/, comprised of the root /lik/ and a TH /o/ that remains null ([∅]) when adjacent to another vowel. As demonstrated in (74), /k/ is realized as a velar (which may sound slightly fronted) or, rarely, is palatalized to [c] before a front vowel belonging to an inflectional suffix (74c–d; cf. a–b).[19]

(74) No ASP before inflectional suffix: nominal inflection

a.	li**k**-o-s	lí**k**o	‘wolf (nom/acc)’
b.	li**k**-∅-u	lí**k**u	‘wolf (gen)’
c.	li**k**-∅-i	lí**k**i (~ lí**c**i)	‘wolves (nom)’
d.	li**k**-∅-e	lí**k**e (~ lí**c**e)	‘wolf (voc)’

Similarly, a verbal stem ending in /k/ is transformed accordingly depending on the suffix-initial vowel that follows (for the sake of simplicity, the [c] variant is henceforth not mentioned):

(75) No ASP before inflectional suffix: verbal inflection

a.	ste**k**-o stand-1SG	sté**k**o	‘I stand’
b.	ste**k**-i	sté**k**i	‘s/he stands’

[19] Specifically, the TH /o/ is taken to be deleted once the inflectional suffix is attached, i.e. /lik-o-i/ → /lik-i/. In this case, the morphological boundary between the stem and the inflectional suffix is what blocks ASP; therefore phonology realizes /k/ as [k].

stand-3SG

However, a root-final /k/ that precedes a front vowel belonging to a derivational suffix, e.g. /en/ 'F' (76a), /in/ 'ADJ' (76b) (also found as /an/, 76c), turned into an affricate (note the [t͡ʃ]~[k] alternation in the two lexical variants in 76b–c).[20]

(76) Stem-internal ASP (before derivational suffix)

a.	li**k**-en-a	lí**t͡ʃ**ena (SIG)	'she-wolf'
b.	li**k**-in-o	lí**t͡ʃ**ino	'wolf-colored'
c.	li**k**-an-ó	li**k**anó	'wolf-colored'

There are very few additional cases of predictable alternation between [k] and [t͡ʃ] stem-internally, e.g. in the root /vrak/ (77). It is of particular interest, though, that free variation between [k] and [t͡ʃ], i.e. [glikáda] (inherited) ~ [glit͡ʃáda] (innovative) (78b–c), is observed in an environment where only the velar allophone is expected, i.e. before a back vowel /a/.

(77) Allophony [t͡ʃ] ~ [k] at morpheme boundaries (stem-internally)

a.	/vra**k**-i-Ø/ pants-TH-NOM	vra**t͡ʃ**í	'underpants'
b.	/vra**k**-on-n-o/ pants-VBZ-IPFV-1SG/	vra**k**ónno	'I put on underpants/pants'

(78) Free variation [t͡ʃ] ~ [k] via opaque ASP

a.	/ɣli**k**-e-o/	gli**t͡ʃ**éo	'sweet'
b.	/ɣli**k**-að-a/	gli**k**áda	'sweetness'
c.	/ɣli**k**-að-a/?	gli**t͡ʃ**áda	'sweetness'

This innovation arguably hints at the reanalysis of [t͡ʃ] and the emergence of a new phoneme /t͡ʃ/, the realization of which does not depend on the backness of the following vowel. Another argument showing that the process ceased to be active early on comes from cases of stem-internal [$kV_{[-back]}$] sequences formed after a previously intervening rhotic migrated to a

[20] The inflectional suffixes, which are phonetically unexpressed in the examples at hand, are omitted for the sake of simplicity.

different syllable via long-distance metathesis (LDM) (see section 3.3), e.g. *prikía* ‘bitterness’ (79). This post-metathetic [ki], although within the boundaries of the stem, did not constitute a new target of ASP, which indicates that the instantiations of [t͡ʃ] were probably fossils and the process was no longer productive.

(79) No ASP in the LDM era

pi**k**r̲ía > pr̲i**k**ía *pr̲i**t͡ʃ**ía

Additional evidence against the synchronic validity of /k/ ASP and in favor of the phonemicization of /t͡ʃ/ comes from loan integration. Crucially, the process is not productive when it comes to the adaptation of Romance words to the system of IG. In fact, a near-minimal pair showcasing the contrast between /k/ and /t͡ʃ/ is shown in (80).[21]

(80) Contrast between /k/ and /t͡ʃ/

a. **k**ilo ‘kilo’ (loan)

b. **t͡ʃ**iló ‘I roll’

In a similar vein, we can postulate that reanalysis of [ʃ] that historically originates from the cluster /sk/ generated a new phoneme /ʃ/.[22] Just like the cases of /k/ overviewed above, the realization [sc] before a front vowel was replaced by a post-alveolar fricative [ʃ] –or, optionally, [ʃʃ] intervocalically. Note that the MedG [sc] may also stem from /sx/, through a dissimilation process that targeted sequential obstruents sharing manner specification and resulted in $C_{[+cont]}C_{[–cont]}$ sequences. Traces of the old /sk/ can be detected in a few pairs of words cross-dialectally, e.g. SIG [askó] ~ CIG [aʃʃídi] ‘skin sac’. In the latter case the root /ask/ was suffixed with the diminutive suffix /ið/, thus /sk/ surfaced as [ʃʃ], while in the former the [sk] was preserved before a back vowel.

(81) Palatalization of /sk/ before front vowels

a. **ʃ**íd͡zo < **sc**ízo ‘I tear apart’

b. **ʃ**epád͡zo < **sc**epázo ‘I cover’

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[21] The presence of /t͡ʃ/ in Romance words that were adopted by IG, e.g. [vut͡ʃó] < [bat͡ːʃo] ‘I kiss’, [kat͡ʃatúri] < [kat͡ːʃatore] ‘hunter’ (*Rize Grike*), arguably favored the phonemicization also in the native vocabulary.

[22] Other clusters have also resulted in a post-alveolar affricate [ʃʃ] (see section 3.5).

c.	**ʃ**ád͡zo	< **sc**ázo < **sc**iázo	'I scare'
d.	kó**ʃ(ʃ)**ino	< kó**sc**ino	'sieve'
e.	a**ʃ(ʃ)**ái	< **sc**iádi	'hat'

(82) Palatalization of /sx/ before front vowels

a.	**ʃ**iní	< **sc**iní < **sç**iní	'rope'
b.	á**ʃ(ʃ)**imo	< á**sc**imo < á**sç**imo	'ugly'

Again, ASP does not take place at a morphological boundary between a stem and an inflectional suffix. Consider the examples from verbal inflection below:

(83) No palatalization of /sk/ before inflectional morphemes

a.	/vri**sk**-o/ come-1SG	vrí**sk**o	'I find'
b.	/vri**sk**-i/ come-2SG	vrí**sk**i	'you find'

Like in the case of [t͡ʃ], loan integration offers another piece of evidence showing that /sk/ is no longer productively transformed into [ʃ(ʃ)]. Borrowed words from Romance including /sk/ before a front vowel are integrated retaining the same cluster:

(84) No palatalization of /sk/ in loanwords

a.	**sk**ert͡séo	***ʃ**ert͡séo	< It. scherzo	'I joke'
b.	**sk**jattéo	***ʃ**attéo	< It. schiatto	'I squeak'

In light of this, /ʃ/ can be taken to constitute a new phoneme that contrasts with the alveolar sibilant /s/ with respect to [±anterior] and may be phonetically lengthened in intervocalic positions (compare 85a and 85c). Near-minimal pairs are provided below:

(85) Contrast between /ʃ/ and /s/

a.	**ʃ**immáda	'slot'
b.	**s**imádi	'sign'
c.	á**ʃʃ**imo	'ugly'

d. a**s**ími 'silver'

Unlike /k/, the fricative /x/ as well as /ɣ/ ~ /g/[23] do not undergo ASP. Similarly to MedG and most Modern Greek dialects, the voiced dorsal obstruent may be palatalized to [ʝ] or [ɟ] before /e, i/,[24] as opposed to its realization as a velar [g]/[ɣ] before back vowels and consonants (86–88). Nevertheless, an unfronted [g] may also precede front vowels. The allophony is found both within roots (compare 86 with 87) and in inflectional paradigms (88).

(86) Non-assibilated palatal allophones of /ɣ/

a.	**ʝ**etonía ~ **ɟ**etonía ~ **g**etonía		'neighborhood'
b.	**ʝ**inéka ~ **ɟ**inéka ~ **g**inéka		'woman'

(87) Velar allophones of /ɣ/

a.	**ɣ**ála ~ **g**ala		'milk'
b.	**ɣ**ónato ~ **g**ónato		'knee'
c.	aŋ**g**úri		'cucumber'
d.	**ɣ**rámma ~ **g**rámma		'letter'

(88) No palatalization of /ɣ/ before inflectional suffix

a.	ani**ɣ**-o open-1SG	ani**ɣ**o ~ ani**g**o	'I open'
b.	ani**ɣ**-i open-3SG	aní**ʝ**i ~ aní**g**i	's/he opens'

Coalescence of the voiced dorsal with a glided /i/ adjacent to vowels, which results in a palatal, is observed in the nominal inflection of neuter nouns, as already mentioned in section 1.1. For instance, consider the noun [lóɣo] ~ [lógo] 'word', which, although masculine in the singular, has neuter morphology in the plural (89). In the singular, /ɣ/ is adjacent to a TH consisting of the back vowel /o/, thus it is pronounced as a velar. However, in the plural, the TH is a front vowel /i/ followed by the number/case marker /a/, which gives rise to the palatal allophone of /ɣ/:

[23] See section 2.3.3 for the non-contrastiveness of manner distinctions in voiced obstruents.

[24] The process has also applied before certain instances of /u/, in particular *ʝunnó* ~ *ɟunnó* 'naked'.

(89) Coalescence and palatalization of pre-vocalic /ɣi/

a.	ló**ɣ**-o-∅	ló**ɣ**o ~ ló**g**o	'word'
b.	ló**ɣ**-**i**-a	ló**ʝ**a	'words'

The voiceless fricative /x/ ignores fronting. As a rule, it retains its velarity, i.e. [x] (90e–f, 91b), just like when it precedes a back vowel (90a–c, 91a) or a consonant (90d), even though it is realized slightly fronted before /e, i/.

(90) Velar realization of stem-internal /x/ (no allophony)

a.	**x**áo	'chaos'
b.	**x**oráfi	'field'
c.	**x**úma	'soil'
d.	**x**rusáfi	'gold'
e.	**x**eri	'hand'
f.	**x**iriði	'pig'

(91) Velar realization of /x/ before inflectional suffixes (no allophony)

a.	é**x**-o have-1SG	é**x**o	'I have'
b.	é**x**-i have-3SG	é**x**i	's/he has'

Nevertheless, the palatal [ç] constitutes the most frequent realization of /x/ in a /_iV/ context, even though a (slightly fronted) velar variant [x] is not entirely banished:

(92) Optional poalescence and palatalization of pre-vocalic /xi/

a.	**xi**óni	**ç**óni ~ **xj**óni	'snow'
b.	ní**x**-**i**-∅ nail-TH-NOM.SG	ní**xi**	'nail'
c.	ní**x**-**i**-a nail-TH-NOM.PL	ní**ç**a ~ ní**xj**a	'nails'

Based on the above, it seems redundant to assign a phonemic status to both velars and palatals, i.e. to assume that IG possesses all the phonemes /k, ɣ~g, x, c, j~ɟ, ç/ (cf. Profili 1983; Katsoyannou 1995; Nicholas 2007). In a more economic approach, which is consistent with the general viewpoint that palatals do not constitute autonomous phonemes in Greek, as they stand in complementary distribution with their velar counterparts, we can postulate the dorsal consonants /k, ɣ~g, x/ with two allophones: a velar, i.e. [k, ɣ~g, x], respectively, before consonants and back vowels, and a (possibly fronted) velar or a palatal, i.e. [k~c, j~ɟ, x~ç], respectively, before front vowels.

2.3.2.2 The labio-velar [g^{w}]

In almost all varieties, an optionally geminated voiced velar with secondary articulation, i.e. [g(g)^{w}], is encountered. This sound has its roots to the cluster /vɣ/ and is still found next to other variants, including [vg] in SIG (especially Martano), [gg], and [g] (Rohlfs 1950; Katsoyannou 1995; Nicholas 2007; FW; see also Tsopanakis 1940). Nowadays the realization [g^{w}], through local metathesis of the two segments comprising the old cluster, is by far the most widespread, presumably due to the influence of Romance, which includes the same sound (Nicholas 2007). Indeed, it is found in loans, e.g. [g^{w}érra] (< It. [g^{w}érra]) 'war' (Katsoyannou 1995), [g^{w}ái] (< It. [g^{w}aio]) 'trouble' (*Rize Grike*). Especially in Galliciano CIG, one more often encounters the pronunciation [gg] or the degeminated [g] (93a) (Rohlfs 1950; Katsoyannou 1995). In the context of a front vowel, palatalization of /g/ is reported in Roghudi CIG (93b) (Rohlfs 1950; Nicholas 2007; Hajek & Nicholas 2015; the particular variant was not found in my collected data and should probably be considered obsolete).

(93) Evolutions of /vɣ/ in IG

a.	a**vɣ**ó	>	a**vg**ó ~ a**g(g)**^{w}ó ~ a**g(g)**ó	'egg'
b.	**vj**én(n)o	>	**vɟ**énno ~ **g**^{w}énno ~ **g**énno	'I go out'

Katsoyannou 1995 postulates a rare geminate phoneme /ɣɣ/ onto which the variants at hand map onto. Nicholas (2007), on the other hand, assumes the replacement of /vg/ with a phoneme /g^{w}/ under the pressure of Romance. However, evidence from the realization of a particular verbalizer in different morphological contexts shows that the underlying representation of [g^{w}] and its variants may still be reconstructed as a labial–dorsal sequence. According to traditional dialectologists, IG belongs to those Modern Greek dialects in which epenthesis of /ɣ/ is observed after the verbal suffix /ev/ (Rohlfs 1950; Holton et al. 2019; Tzitzilis in press). From a formal point of view, /ɣ/ is taken to be the exponent of the imperfective aspect. The interaction of the verbal stem with the aspectual suffix /s/ ‘PFV’ shows that the underlying representation of the verbalizer contains a labial segment. Consider the data from Roghudi and Galliciano CIG, where the evolutions of /$C_{[dor]}$s/ and /$C_{[lab]}$s/ were not conflated, at least in the beginning (see section 3.4). We notice that the resulting verbal forms in (94) are consistent with those verbs whereby the aspectual suffix /s/ is attached to a verbal stem ending in a labial (95) and not a dorsal (96).

(94) Verbs in *-égg^w^o*: root-final labial

a.	klaðé**ggʷ**o	‘I prune’
b.	ekláðe**sp**a	‘I pruned’
c.	*ekláðe**ʃʃ**a	

(95) Verbs with root-final labial

a.	kó**v**o	‘I cut (pres.)’
b.	éko**sp**a	‘I cut (past)’

(96) Verbs with root-final dorsal

a.	vré**x**i	‘it rains’
b.	évre**ʃʃ**e	‘it rained’

On this basis, the underlying representation of a verb containing the verbalizer /ev/ is assumed to be /klað-ev-ɣ-o/ branch-VBZ-IPFV-1SG, with the cluster /vɣ/ taking one of the forms demonstrated in (94) at surface level. This lifts the requirement for an additional phoneme.

2.3.3 Voice distinctions

A phonological distinction with respect to [±voice] is in principle maintained. Given the absence of contrast with respect to MoA in voiced consonants, in the examples below one (near-)minimal pair per major PoA is presented, regardless of the value of [±continuant].

(97) Contrast between labials with respect to [±voice]

a.	**f**ídi	‘snake’
b.	**v**ídi	‘ox’

(98) Contrast between coronals with respect to [±voice]

a.	xar**tí**	‘paper’
b.	kar**d**ía	‘heart’

(99) Contrast between dorsals with respect to [±voice]

a.	**k**alá	‘well’
b.	**g**ála	‘milk’

The sibilant /s/ has no voiced counterpart at underlying level. However, regressive voice assimilation is triggered before voiced consonants, thus yielding the allophone [z] (100). The cluster /sm/ in particular, except for the realization [zm], has a [mm] variant, especially in Galliciano CIG. The cluster [zg] appears in a few non-native words, e.g. [zgalabróne] < Romance [kalabróne] ‘wasp’, [zgolúmbriko] < Romance [lúmbriko] ‘worm’ (FW).

(100) Voice assimilation of pre-consonantal /s/

a.	**sp**áθa	‘sword’
b.	**sk**órdo	‘garlic’
c.	**zb**ínno	‘I put out’
d.	**zm**íŋgo ~ **mm**íŋgo	‘I unite’

Contrast with respect to [±voice] is also found between alveolar affricates (101) – at least at surface level, as the phonemic status of [t͡s] is contestable (see sections 3.4 and 3.5).

(101) Contrast between alveolar affricates with respect to [±voice] (surface)

a.	**t͡s**ío	‘scratch’
b.	**d͡z**ío	‘live’

Finally, it should be mentioned that, in post-alveolar affricates there is no clear contrast with respect to voice, i.e. /t͡ʃ/ vs. /d͡ʒ/. At least as far as the native IG system is concerned, a voiced post-alveolar [d͡ʒ] is not even encountered after a nasal, as /t͡ʃ/ seems to be immune to voice assimilation in both IG dialects (102) (but see section 3.9.2).

(102) No voice assimilation of post-alveolar affricates after /n/

a.	a**nt͡ʃ**inári	?a**nd͡ʒ**inári	'artichoke'
b.	ará**nt͡ʃ**i	?ará**nd͡ʒ**i	'orange'
c.	a**nt͡ʃ**iklónno	?a**nd͡ʒ**iklónno	'I wrap'

Nevertheless, [d͡ʒ] features in a few words borrowed by Romance (103) (Profili 1983; FW). In this vein, /d͡ʒ/ could be considered a peripheral phoneme in IG.

(103) /d͡ʒ/ in loanwords

a.	**d͡ʒ**úveno	'young'
b.	**d͡ʒ**údiɣo	'judge'

A handful of cases of free variation between a voiced and a devoiced segment are observed in CIG (the etymological variant is noted first):

(104) Free variation between voiced and voiceless obstruents in CIG

a.	**v**oréa ~ **f**oréa	'North wind'
b.	pá**ɣ**o ~ pá**x**o	'frost'
c.	**g**lífo ~ **k**lífo	'I lick'

2.4 Geminates

The overwhelming presence of surface geminates in IG inevitably raises the question what the underlying status of these consonants is. In fact, previous works assign phonemic status to at least some geminates (e.g. /ɖɖ/, /nn/, Profili 1983; /ss/, /vv/, /ɣɣ/, /mm/, /nn/, /ll/, /rr/, and also /p^h/, /t^h/, /k^h/, Katsoyannou 1995). A quest for pairs showcasing minimal contrast between singletons and geminates exclusively with respect to length proves not particularly fruitful. A scarce number of (near-)minimal pairs is found, and in all cases the minimality of the distinction between the two members is controversial. For instance, in (105) the difference between a singleton and a geminate lateral is demonstrated not just in terms of length but also through place and manner features. In (106), even if we accepted that aspiration is a correlate of length (see Armostis 2011), the minimal pair would hold only for a subset of IG, e.g. in Galliciano CIG, since the geminate [tt^{h}] occurs in a derived environment, i.e. /trif-t-i/ (shred-NMZ-F.SG), and in other varieties it corresponds to clusters, e.g. Bova CIG [trísti] and Roghudi CIG [tríθti]. The distinction presented in (107) also is limited to specific IG varieties, as Martano SIG preserves the older form [stevnó], which contains a cluster. Similarly, the exponent of the imperfective aspect, i.e. /n/ in (108b) is not always assimilated to a preceding stem-final /r/, which renders the alleged minimal contrast with (108a) questionable.

(105)	Minimal pairs: [l] vs. [ɖɖ]		
	a.	fí**l**o	‘friend’
	b.	fí**ɖɖ**o (< fíllo)	‘leaf’
(106)	Minimal pairs: [t] vs. [tt$^{(h)}$]		
	a.	trí**t**i	‘Tuesday’
	b.	trí**tt**$^{(h)}$i	‘stick to break curdled milk’
(107)	Minimal pairs: [n] vs. [n]		
	a.	ste**n**ó	‘narrow’
	b.	ste**nn**ó	‘dry’
(108)	Minimal pairs: [r] vs. [rr]		
	a.	ʃé**r**o	‘I know’
	b.	sé**rr**o ~ sé**rn**o	‘I drag’

Root-internal alternations between a geminate and a cluster are abundantly attested, sometimes even within the same IG dialect, through dissimilation of an etymological geminate (109) as well as through preservation or modification of a cluster (110). Sporadically, the featural makeup up of the consonants comprising an old cluster survives in CVC sequences formed via vowel epenthesis, which also alternate with other variants. Some representative examples are provided below (the evolution of each MedG cluster is discussed at length in sections 3.4 and 3.5).

(109) Dissimilation of geminates

a.	i**pp**ário	a**mp**ári	‘horse’
b.	kro**mm**ídi	kri**mb**ídi	‘onion’

(110) Variation between geminates and non-geminates stemming from clusters

a.	ste**ɣn**ó	ste**vn**ó ~ ste**nn**ó	‘dry’
b.	lí**xn**o	lí**nn**o ~ lí**fn**o ~ lí**vn**o ~ li**xin**ári	‘lamp’
c.	í**pn**os	í**nn**o ~ í**pl**o ~ í**pun**o	‘sleep’
d.	ðá**fn**i	dá**nn**i ~ dá**fr**i ~ dá**fl**i ~ dá**fin**i	‘laurel’
e.	ofθá**lm**i	artá**mm**i ~ artá**rm**i (CIG)	‘eye’
f.	o**ɱf**alós	a**rf**aló ~ a**ff**aló	‘belly button’
g.	sta**mn**í	sta**rn**í ~ sta**nn**í	‘clay pot’
h.	o**xt**ó	o**tt^{h}**ó (Galliciano CIG, SIG)	‘eight’
		o**tt**ó (Sternatia/Calimera SIG)	
		o**ft**ó (Martano SIG)	
		o**θt**ó (Roghudi CIG)	
		o**st**ó (Bova CIG)	
i.	e**ft**á	e**tt^{h}**á (Galliciano CIG, SIG)	‘seven’
		e**tt**á (SIG)	
		e**ft**á (Martano SIG)	
		e**θt**á (Roghudi CIG)	
		e**st**á (Bova CIG)	
		e**rt**á (SIG+)	
j.	é**ks**i	é**fs**e ~ é**ss**e (Martano SIG)	‘six’
		é**t͡ts**e ~ é**ss**e (SIG)	
		é**t͡ts**i (Bova CIG)	
		é**ʃʃ**e (Galliciano & Roghudi CIG)	
k.	**ps**ári	a**fs**ári ~ a**ss**ári (Martano SIG)	‘fish’
		a**t͡ts**ári ~ a**ss**ári (SIG)	
		a**t͡ts**ári (Bova CIG)	
		a**sp**ári (Galliciano & Roghudi CIG)	
l.	a**vɣ**ó	a**vg**ó ~ a**gg**ó ~ a**g^{w}**o ~ a**g**ó	‘egg’

The above data suggest that positing an underlying representation containing two consonants instead of one long segment is justified. More compelling evidence, though, is provided by morphophonological alternations. Geminates may derive from the interaction between consonants at a morphological boundary. Notably, the clusters formed between a verbal stem and a suffix starting with /n/ (e.g. /n/ 'imperfective'; IPFV), /m/ (e.g. /men/ 'participle'; PTCP), /s/ (e.g. /s/ 'perfective'; PFV), /t/ (e.g. /t/ 'adjectivizer'; ADJ), or /ɣ/ (e.g. /ɣ/ 'imperfective'; IPFV) display the same behavior as the respective root-internal clusters.[25] Table (111) illustrates alternations in verbal forms with stem-final sonorants.[26]

(111) Affixed verbal stems ending in sonorants

affix	*exponent*	*Verbal stems*			
		sper	**stel**	**kam**	**ortón**
IPFV	-n-	spé**rn**o ~ spé**rr**o 'I sow'	sté**ɖɖ**o 'I send'	ká**nn**o 'I do'	ortó**nn**o 'I raise'
PFV	-Ø- / -s-	éspi**r**a 'I sowed'	ésti**l**a 'I sent'	éka**m**a 'I did'	órto**s**a 'I raised'
PTCP	-men-	spe**rm**éno 'sown'	ste**mm**éno 'sent'	ka**mom**éno 'done'	orto**m**éno 'raised'

Table (112) shows the derived clusters and geminates emerging in verbs the stem of which contains a final dorsal (/aniɣ/), labial (/ɣraf/, /klaðev/), or coronal obstruent (/aleθ/), in comparison to stems ending in a vowel (/aɣapa/). Note that the phonetically empty exponent of the imperfective is relevant to all examples except for /klaðev/, which takes the suffix /ɣ/.

[25] Naturally, a viable alternative is to postulate separately stored stem allomorphs along the lines of a lexicalistic account (e.g. Ralli 2005). This, though, would translate, apart from an overloaded lexicon, into an inflated phonemic inventory.

[26] Changes in the stem vowel are not pertinent to this discussion.

(112) Affixed verbal stems ending in V or obstruent

affix	*exponent*	*Verbal stems*				
		aɣapa	**aniɣ**	**ɣraf**	**klaðév**	**aleθ**
IPFV	∅ ɣ (in -ev-)	aɣap**á**o ‘I love’	aní**ɣ**o ‘I open’	ɣrá**f**o ‘I write’	klaðé**g(g)(ʷ)**o ‘I prune’	alé**θ**o ‘I grind’
PFV	s	aɣáp**is**a ‘I loved’	áni**fs**a áni**ss**a áni**t͡ts**a áni**ʃʃ**a ‘I opened’	éɣra**fs**a éɣra**ss**a éɣra**t͡ts**a éɣra**sp**a ‘I wrote’	ekláðe**fs**a ~ ekláðe**ss**a ~ ekláðe**t͡ts**a ~ ekláðe**sp**a ‘I pruned’	ále**s**a ‘I ground’
PTCP	men	ɣap**im**éno ‘loved’	ani**mm**éno ‘opened’	ɣra**mm**éno ‘written’	klaðe**mm**éno ‘pruned’	ale**zm**éno ~ ale**mm**éno ‘ground’
ADJ	t	agap**it**ó ‘lovely’	ani**ft**ó ani**ttʰ**ó ani**st**ó ani**θt**ó ‘open’	áɣra**ft**o áɣra**ttʰ**o áɣra**st**o áɣra**θt**o ‘unwritten’	akláðe**ft**o ~ akláðe**ttʰ**o ~ akláðe**st**o ~ akláðe**θt**o ‘unpruned’	(an)álesto ‘unground’

The optional realization of certain sounds as long depending on the position does not necessarily entail that the consonants at hand are underlyingly long. For instance, the gemination of [ʎ]~[ɟ], [ɲ], [t͡s], [t͡ʃ], [ʃ], as well as the non-native [d͡ʒ] in intervocalic positions could be attributed to influence from Italian, in which these particular consonants are considered inherently long intervocalically, but surface as short elsewhere (Canepari 1999; Payne 2005). The geminated realization of the retroflex [ɖɖ], which has replaced [ll], can also be associated with Romance impact (Rohlfs 1950; Recasens 2011; see chapter 3). Importantly, though, all geminated sounds have at least one singleton lenis variant, which suggests that length is not indispensable. Crucially, there is no reason to assume that geminates are moraic in IG. In particular, there is no evidence that syllable weight plays some role in, e.g. stress assignment (see section 4 on stress). Besides, degemination is observed in phrase-initial positions, unlike languages where onset geminates are moraic (see Topintzi 2006). Therefore, it is not imperative that consonant length should be phonological.

Even without available minimal pairs, though, and despite the fact that most cases of gemination can be explained otherwise, there are still a handful of words containing long consonants that are inherited as such from previous stages of the language, for example:

(113) Etymological geminates

a.	pá**pp(**^{h}**)**o	< pá**pp**os	‘grandfather’
b.	lá**kk(**^{h}**)**o	< lá**kk**os	‘pit’
c.	té**ss**era	< té**ss**era	‘four’
d.	á**mm**o	< á**mm**os	‘sand’
e.	e**nn**éa	< e**nn**éa	‘nine’
f.	á**rr**osto	< á**rr**ostos	‘sick’
g.	á**ɖɖ**o	< á**ll**os	‘other’

Moreover, IG is considered to have extended geminates to positions that used to be occupied by a singleton in AncG. This phenomenon has been described by Greek scholars as ‘spontaneous gemination’ (SP) (Newton 1972; Christodoulou 2013; Malikouti 2007, 2008; Davy & Panayotou 2003). In fact, for the vast majority of these cases, the view that gemination took place after IG had already diverged from MedG is disputable. The relevant words are documented with a double consonant in several written sources from the Byzantine era. Therefore, these forms should be treated as inherited geminates.

Most descriptive works revolve around the claim that SP is associated with the post-tonic position (Newton 1972) and, from a formal viewpoint, aims at the enhancement of either the syllable structure or the foot structure (Malikouti 2007; see also Revithiadou 2004). Notably, though, the presence of pre-tonic SP (114b, d) as well as the mere fact that not all stressed syllables are closed in IG force us to look elsewhere for an explanation. I remain agnostic as to what motivated SP in MedG or IG.

(114) Spontaneous gemination

a.	sí**m**eri	> sí**mm**eri	‘today’
b.	a**p**íði	> a**pp**ídi	‘pear’
c.	á**n**iθo	> á**nn**iθo	‘dill’
d.	fo**l**éa	> fo**ɖɖ**éa	‘nest’
e.	tó**s**o	> tó**ss**o	‘that much’
f.	é**r**imo	> é**rr**emo	‘deserted’

Although highly uneconomical, one could posit lexeme-specific underlying geminates to accommodate these few cases of etymological long consonants. I instead postulate an underlying representation of two identical consecutive consonants instead of a single long one.

In this vein, surface geminates map onto an underlying consonant cluster consisting of either the same consonant repeated twice, i.e. /$C_\alpha C_\alpha$/, or two different consonants, i.e. /$C_\alpha C_\beta$/.

3. Syllable structure

This section sheds light on the principles that underlie the structure of syllables in the various historical stages of IG. In all IG varieties, a syllable obligatorily contains a vocalic nucleus, which can be represented by all five vowels of the inventory. The presence of margins, on the other hand, is optional. Syllables may be onsetless or onsetful, with up to two consonants syllabified in the onset. IG reserves only one coda slot per syllable.

Syllabification of clusters is determined on the premises of sonority distance, which are presented in section 3.1. In IG, segmental material is accumulated at the left edge of the root via long-distance metathesis (LDM), which displaces marked structures such as complex onsets to the first syllable. The rules underlying LDM are addressed in section 3.2.

Simplex onsets accommodate the entire set of consonantal phonemes. However, lenition may optionally eliminate contrasts of MoA and voicing in intervocalic positions. Section 3.3 elaborates on lenition phenomena.

Systematic neutralization of contrast with respect to PoA and MoA is extensive in pre-consonantal codas, which host a progressively shrinking consonant inventory. The gradual restrictions imposed on codas are discussed in sections 3.4 and 3.5. Section 3.6 sheds light on issues pertaining to the value of [±voice] emerging in heterosyllabic clusters.

Sections 3.8 and 3.9 are dedicated to consonants in the periphery of words. Section 3.8 describes the strategies employed so that the final syllable of a word be open. Section 3.9 investigates word-initial clusters that do not conform to the sonority requirements for a complex onset. Finally, section 3.9 sheds light on sandhi processes.

3.1 Sonority distance and syllabification of clusters

The criteria determining which bi-consonantal clusters qualify as complex onsets rely on Minimum Sonority Distance (MSD, Vennemann 1972; Steriade 1982; Selkirk 1984; Zec 1995, 2007; Parker 2002, 2011; cf. Clements 1990). I hypothesize that the sonority hierarchy holding in IG is the following (see also Malikouti-Drachman 1984; Kappa 1995) (‘O’ denotes non-strident obstruents, ‘S’ denotes sibilants, ‘N’ denotes nasals, ‘L’ denotes liquids):

(115) Sonority hierarchy in IG

0	0.5	1	2	3
$O_{[-cont]}$	$O_{[+cont]}$	S	N	L

Based on the above scale, the S(onority)D(istance) displayed by the clusters that are phonotactically possible in at least one of the various stages of IG, including MedG, is given in (116):

(116) SD of clusters in IG

a.	$LO_{[-cont]}$	rk, rp, rt, rg, rb, rd	–3
b.	$LO_{[+cont]}$	rf, rv	–2.5
c.	$NO_{[-cont]}$	ŋk, mp, nt, ŋg, mb, nd	–2
d.	$NO_{[+cont]}$	ŋx, ɱf, n̪θ, mv	–1.5
e.	LN	rm, rn	–1
f.	$SO_{[-cont]}$	sk, sp, st, zg, zb	–1
g.	$SO_{[+cont]}$	sf	–0.5
h.	$O_{[+cont]}O_{[-cont]}$	fk, ft, θt, vg	–0.5
i.	$C_{\alpha}C_{\alpha}$	rr, ɖɖ, mm, nn, ɲɲ, ss, ʃʃ, kk, pp, tt, gg, bb, dd, xx, ff, θθ	0
j.	$O_{[+cont]}S$	ks, ps	+0.5
k.	$O_{[-cont]}S$	xs, fs	+1
l.	SN	zm	+1
m.	$O_{[+cont]}N$	xm, ɣm, vm, xn, fn, θn, ɣn, vn	+1.5
n.	$O_{[-cont]}N$	km, tm, kn, pn	+2
o.	$O_{[+cont]}L$	xr, fr, θr, ɣr, vr, ðr, xl, fl, ɣl, vl	+2.5
p.	$O_{[-cont]}L$	kr, pr, tr, gr, br, dr, kl, pl, gl, bl	+3

The bar above which the MSD of a cluster allows a tautosyllabic parsing is set to +2.5. This means that OL are the only sequences that can occupy a complex onset. All other clusters, i.e. all shallowly rising clusters, plateaux, and reversals, are heterosyllabic.

3.2 Long-distance metathesis of liquids

One of the innovations of IG is the leftward long-distance metathesis (LDM) of liquids (Rohlfs 1950). The observed pattern involves the displacement of a liquid from a non-initial OL onset and the formation of the same sequence (OL) in the leftmost syllable of the word (Blevins & Garrett 2004; Coffman 2013a,b; Rohlfs 1950) – or, as I will argue below, the root.

(117) LDM of /r/ in IG

a.	pr̲ándemma	< pándr̲ema	‘wedding’
b.	spr̲ixáða (Gal./Rogh. CIG)	< psixr̲áða	‘chill’
c.	vr̲úθako	< vóθr̲ako	‘frog’
d.	kr̲opía	< kopr̲ía	‘manure’
e.	xr̲ondó / krondó	< xondr̲ós	‘fat’
f.	ɣr̲ambí	< ɣambr̲í	‘bride’
g.	kr̲apísti	< kapístr̲i	‘halter’

LDM in principle targets rhotics. Previous literature (Rohlfs 1950; Blevins & Garrett 2004; Coffman 2013a,b) refers to LDM of *liquids* in general and presents data where the lateral /l/ also appears to have moved. The –admittedly scant– examples include Romance loans such as the following:

(118) LDM of /l/ in loanwords

a.	kl̲onúka	< konukl̲a	‘distaff’
b.	pl̲étiko	< pedicl̲u	‘tether’
c.	sfl̲ékka	< spekl̲a	‘mirror’

The vast majority of native roots containing /Ol/ do not meet the requirements for LDM to apply. For instance, they lack a suitable hosting environment for the migrating liquid, e.g. *avlí *laví,*‘yard’, *múxla *mlúxa* ‘mould’, *tifló *tlifó* ‘blind’, *ðipló *dlipó* ‘double’, *t͡ʃiklí *t͡ʃlikí* ‘type of toy’ (see immediately below for details). In addition to the scarcity of positive evidence that laterals are subject to LDM, there is one counterexample, i.e. the root /kavl/, in all the derivatives of which the lateral is realized in the original syllable despite the fitting target environment, e.g. *kavlí *klaví* ‘stem’, *kavlimía *klavimía* ‘erection’ (Karanastassis 1984–1992;

Squillaci & Squillaci 2016). In what remains, the discussion mostly revolves around examples of rhotic movement, which is abundantly attested.

LDM is prevented from applying in a number of cases. Existing literature has pointed out blocking effects in principle related with unfitting landing sites (Blevins & Garrett 2004: 130–131). First, no movement is triggered when the root begins with a vowel – in other words, with an onsetless syllable (119).

(119) No LDM to onsetless syllables

a.	**a**lévṟi	*ṟalévi	'flour'
b.	**é**xendṟa	*ṟexenda	'grass snake'
c.	**á**kṟa	*ṟáka	'edge'

LDM fails to apply if, as Blevins & Garrett (2004: 134) put it, "a gesturally incompatible segment blocks coarticulation". Specifically, the liquid does not migrate next to another sonorant in a simplex (120a–c) or complex onset (120d), the alveolar sibilant (120e), or an affricate (120e–f). In all these cases, LDM would result in phonotactically inadmissible sequences.

(120) No LDM next to sonorants and sibilants

a.	**m**ávṟo	***m**ṟávo	'black'
b.	**n**efṟó	***n**ṟefó	'kidney'
c.	**l**áxṟi	***l**ṟáxi	'fern'
d.	**pl**evṟó	***pl**ṟevó	'rib'
e.	**s**ágṟipa	***s**ṟágipa	'type of goat'
f.	**t͡ʃ**éndṟo	***t͡ʃ**ṟéndo	'center'
g.	**t͡s**ixṟó	***t͡s**ṟixó	'cold' (Bova CIG)

The creation of aberrant clusters does not constitute the only factor that blocks LDM. A liquid does not move next to a coronal consonant (121), even though the respective etymological sequences are well-documented (122).

(121) No LDM next to coronal

a.	**ð**ákṟi	***ð**ṟáki	'tear'

b.	**t**avr̲í	***t**r̲aví	‘bull’
c.	s**t**avr̲ó	*s**t**r̲avó	‘cross’

(122) Etymological $C_{[cor]}$r clusters

a.	**ðr**áko		‘dragon’
b.	**tr**ípi		‘hole’
c.	s**tr**atía		‘road’

Aside from the intricacies with respect to the landing site, a limitation that has gone unnoticed in previous works is that LDM does not affect non-initial /tr/ clusters, even if the first syllable is a suitable host. As shown in (123), /r/ does not migrate next to labial (123a–b) or dorsal (123c) obstruents, even though this is possible, as shown by examples like ***p**ándr̲emma* > ***p**r̲ándemma* (117a), ***k**opr̲ía* > ***k**r̲opía* (117d). Interestingly enough, the particular sequence is found to have been optionally retroflected and to behave as an affricate (see section 2.1) (Loporcaro 2001; Romano 1999; Romano & Gambino 2010). I assume that /tr/ has become a complex segment in IG and as such it is not affected by LDM (see further details in chapter 6, section 2).

(123) No LDM from /tr

a.	pé**t**r̲a	*pr̲é**t**a	‘stone’
b.	fi**t**r̲ía	*fr̲i**t**ía	‘potato bud’
c.	ko**t**r̲onít͡ʃi	*kr̲o**t**onít͡ʃi	‘rock partridge’

As far as medial /str/ configurations are concerned, a cross-dialectal difference arises that also has not being pointed out in previous literature. In SIG, /str/ behaves in the exact same way as intervocalic /tr/ (124), even though free variation between non-metathetic and metathetic forms is encountered in isolated lexical items (124c). In CIG, /tr/ is split when a sibilant precedes it (125).

(124) No LDM from /str/ in SIG

a.	pá**st**r̲iko	= pá**st**r̲iko	‘clean’
b.	kapí**st**r̲i	= kapí**st**r̲i	‘halter’
c.	vó**st**r̲ixos	> pó**st**r̲iko ~ pr̲ó**st**iko	‘braid’ (SIG)

(125) LDM from /str/ in SIG

a.	pá**st**r̲iko	> pr̲á**st**iko	‘clean’
b.	kapí**st**r̲i	> kr̲apí**st**i	‘halter’

LDM is an *all-or-nothing* process (Coffman 2013a: 12), in the sense that, when it cannot result in an initial OL onset, no alternative movement is reported. A migrating rhotic cannot form a word-initial simplex onset. Moreover, in the absence of a suitable host word-initially, we do not encounter alternative transposition of the OL cluster that brings the liquid to a post-vocalic position (126a–c) or to the onset of a non-initial syllable (126d).

(126) No alternative movement

a.	**a**lévr̲i	*a**lér̲**vi	‘flour’
b.	**n**efr̲ó	***ner̲**fó	‘kidney’
c.	**ð**ákr̲i	***ðár̲**ki	‘tear’
d.	**é**xendr̲a	*é**xr̲e**nda	‘grass snake’

Interestingly, these alternatives are blocked despite the fact that the respective outcomes would be in accordance with the language phonotactics. Consider, for instance, the following cases of etymological root-initial (127) and coda rhotics (128):

(127) Etymological root-initial /r/

a.	**r**addí	‘stick’
b.	**r**éma	‘sea’

(128) Etymological pre-consonantal /r/

a.	ka**rp**ó	‘fruit’
b.	o**rf**anó	‘orphan’

Finally, LDM is blocked when another liquid intervenes between the source and the target syllable (Blevins & Garrett 2004: 134):

(129) No LDM in roots with two liquids

a.	xa**r**áðr̲a	*xr̲a**r**áða	‘fissure’

b. sga**l**ámbro *sgra**l**ámbo ‘hornet bee’

c. sgo**l**úmbriko *sgro**l**úmbiko ‘earthworm’

LDM is independent of metrical considerations. The migrating liquids do not necessarily gravitate towards the stressed syllable. In fact, they can depart from a syllable bearing stress and land in an unaccented one, e.g. *spixráða* > *sprixáða* (117b) or move from and to unstressed syllables, e.g. *kapístri* > *krapísti* (117g). Further, the shape of the target syllable does not play a role in LDM, i.e. it can be both open, e.g. *spixráða* > *sprixáða* (117b), and closed, e.g. gambrí > grambí (117f).

The existing literature (e.g. Blevins & Garrett 2004; Coffman 2013a,b) has offered valuable insight into the phonetic and phonological aspects of LDM in IG. However, to my knowledge, the morphological domain within which the process applies has never been investigated thoroughly. The studies I am aware of in principle imply that LDM occurs within a word, without specifying further. A close examination to the available data suggests that the domain within which LDM operates is not regulated by the prosodic structure but rather by morphological constituency. In particular, I maintain that migrating liquids do not cross the borders of a root. To offer sufficient empirical support for this claim, below I examine morphologically complex words in which:

(a) LDM takes place even though some of the necessary conditions outlined above are not met, e.g. the leftmost syllable of the word is onsetless, yet the metathesized liquid moves to the leftmost syllable of the root (which presents a suitable landing site);

(b) LDM fails to apply despite the favorable phonological environment, e.g. when the leftmost syllable of the word does present a suitable landing site, e.g. begins with a non-coronal obstruent (however, this syllable and the liquid to be metathesized do not belong to the same morpheme).

The above situations are schematized below (‘*’ denotes an ungrammatical result; ‘σ’ stands for syllable; ‘L’ stands for liquid; ‘V’ stands for vowel; ‘P’ stands for non-coronal obstruent; ‘M’ stands for sonorant; the abbreviations *P* and *M* hold only for the schemata in 130–131):

(130) “Unexpected” LDM

#.V(.PL .σ).σ   * #.V(.P .σL).σ

root   root

(131) Absence of expected LDM

#.P(.M .σL).σ   * #.PL(.M .σ).σ

root   root

A first prerequisite for LDM to be triggered is the availability of a suitable O_V environment in the target syllable. Crucially, if this condition is not met, e.g. if the target syllable is onsetless, as in [éxendra] ‘grass snake’ (119b), the liquid does not dock on a different site, e.g. *[éxrenda]. Keeping this in mind, let us switch to the examples in (132). In (132a), LDM applies, as expected, with the result being a word-initial complex onset OL, i.e. [prandemméno] ‘married’. Interestingly, though, liquid movement is observed in the etymologically related [aprándesto] ‘unmarried’ (132b). This case of LDM seems to contradict the rules of blocking outlined above: given that the word begins with a vowel, LDM should not have been triggered, and the onset of the second syllable should have failed to provide an alternative landing site. Nevertheless, this contradiction is resolved if we consider the fact that the word-initial vowel constitutes a separate morpheme, i.e. the negation prefix /a-/ ‘un-’, and the movement has taken place within the root /pandr/, the initial syllable of which, i.e. /pa/, meets the requirements for LDM.

(132) LDM within root

a. **p**andr-ev-mén-o   **p**randemméno
marry-VBZ-PTCP-N.SG.NOM/ACC
‘married’

b. **a**-**p**andr-ev-t-o   **ap**rándesto, ***ap**andresto
PFX-marry-VBZ-PTCP-N.SG.NOM/ACC
‘unmarried’

Let us now move on to cases where the critical OL onset is part of a derivational suffix. As demonstrated in (133a), the liquid does not move leftwards in the nominal stem /kaθistr/

(Karanastassis 1984–1991; Squillaci & Squillaci 2016). On the other hand, /r/ displays LDM within the stem /kapistr/ (133b): in spite of sharing both the source environment, i.e. /str/, and the target environment, i.e. #/ka/, the two nominal stems do not exhibit the same properties, i.e. they do not both allow /r/ movement. The key to explain this discrepancy lies in the morphological structure of the two stems. In the former case, the liquid belongs to the nominalizer /-tr-/, while in the latter case /tr/ is part of the root /kapistr/. We can thus conclude that it is the root boundaries that demarcate the domain within which LDM operates.

(133) Underapplication of LDM in suffixed words

a. kaθ-í**s**-**t**r̲-a — kaθí**st**r̲a, *kr̲aθí**st**a
sit-VBZ-NMZ.F-SG
'chair'

b. kapi**st**r̲-i — kr̲apí**st**i, *kapí**st**r̲i (CIG)
halter-TH
'halter'

Further evidence comes from prefixed words and compounds. When the OL sequence is not found in the initial part of a structure, such as the base in prefixed words (134), or in the second member of a compound (135), the liquid is not attracted by the first syllable of the word, despite the fact that the result would be perfectly grammatical with respect to phonotactics (recall *kapístri* 117g; *xrondó* 117e; *prikía* 79).

(134) Underapplication of LDM in prefixed words

a. **k**ata-xr̲on-a — **k**atáxr̲ona, ***k**r̲atáxona
PFX-year-ADV
'annually'

b. **k**ata-mavr̲-o — **k**atámavr̲o, ***k**r̲atámavo
PFX-black-N.SG.NOM
'pitch black'

(135) Underapplication of LDM in compounds

a. **x**am-o-vr̲ond-i — **x**amovr̲óndi, ***x**r̲amovóndi
low-CMPD-thunder-N.SG.NOM
'distant thunder'

b. **p**ent-a-nevr̲-o — **p**entánevr̲o, ***p**r̲entánevo
five-CMPD-nerve-N.SG.NOM
'type of leaf'

3.3 Lenition of intervocalic onsets

All consonants in the inventory of IG may form a simplex onset in a prevocalic word-initial position as well as intervocalically. Although phonological distinctions based on MoA and voicing features hold, the contrast is frequently neutralized due to various lenition processes that target intervocalic onsets, especially in SIG. As a result, free variation among the "prototypical" realization and several lenis variants is observed.

First, the voiced obstruents /d, g/, which are normally realized as voiced plosives, are turned into a voiced fricative, i.e. [ð, ɣ], either word-internally (136a–c) or across words (137a–b). The same holds for the palatal [ɟɟ] coming from /li/ (136d) or /di/ (137d), which may be spirantized, i.e. [ʝ]. Other observed alternatives that cannot be strictly described as outcomes of lenition involve devoicing, i.e. [d, g] ~ [t, k], [ʝ] ~ [c].

(136) Lenition of intervocalic word-internal voiced obstruents

a. pe**d**í ~ pe**ð**í ~ pe**t**í 'child'
b. a**g**ápi ~ a**k**ápi ~ a**ɣ**ávi 'love'
c. fa**ɟ**itó ~ fa**ʝ**itó ~ fa**c**itó 'food'
d. í**ɟɟ**o ~ í**ʝ**o 'sun'

(137) Lenition of word-initial voiced obstruents after word-final vowel

a. o **d**eméno ~ o **ð**eméno ~ o **t**eméno 'the tied one'
b. o **g**ála ~ o **ɣ**ála ~ o **k**ála 'the milk'
c. o **ɟ**unnó ~ o **ʝ**unnó ~ o **c**unnó 'the naked one'
d. evó **dj**avénno ~ **ɟ**avénno ~ **ʝ**avénno 'I pass by'

Moreover, variation in the realization of the voiceless /p/ (138), /t/ (139), /k/ (140), as well as /θ/ (141) is observed, as the plosives [p, t, k] alternate with [v~β, d~ð, ɣ~x], respectively, when they are flanked by vowels.

(138) Lenition of /p/

a.	aɣá**p**i ~ aɣá**v**i ~ aɣá**β**i	‘love’
b.	o **p**eðí ~ o **v**eðí ~ o **β**eðí	‘the child’

(139) Lenition of /t/

a.	kóna**t**o ~ kóna**ð**o	‘knee’
b.	ammá**tj**a ~ ammá**dj**a ~ ammá**ðj**a ~ ammá**ʝ**a	‘eyes’

(140) Lenition of /k/

a.	pra**k**aló ~ pra**ɣ**aló	‘I beg’
b.	na **k**atíso ~ na **x**atíso ~ na **ɣ**adíso	‘that I sit’

(141) Lenition of /θ/

a.	**t**élo	‘I want’
a′.	dén i**ð**élo	‘I don’t want’
b.	na xa**t**íso ~ na xa**d**íso ~ na ɣa**ð**íso	‘that I sit’

Additionally, pre-liquid /p, t, k/ may become voiced plosives. The same holds for /x/, where the value of [±continuant] is also neutralized (142e).

(142) Lenition of pre-consonantal obstruents after a vowel

a.	evó **p**lenno ~ **b**lenno	‘I wash’
b.	i **p**ratina ~ **b**ratina	‘the ewe’
c.	o **k**lamméno ~ **g**lamméno	‘broken’
d.	o **x**rusáfi ~ **k**rusáfi ~ **g**rusáfi ~ **ɣ**rusáfi	‘the gold’
e.	ta **ʈ**ɽí ~ **ɖ**ɽí	‘the three’

The affricate /t͡ʃ/ may be turned to a post-alveolar fricative intervocalically, with the voice distinction being lost.

(143) Lenition of /t͡ʃ/: deaffrication and voicing

a.	gli**t͡ʃ**éo ~ gli**ʃ**éo ~ gli**ʒ**éo	'sweet'
b.	pedá**t͡ʃ**i ~ pedá**ʃ**i ~ pedá**ʒ**i	'little child'

Moreover, [z] may rarely replace an intervocalic [d͡z], e.g. in verbs ending in *-íd͡zo*.

(144) Lenition of /d͡z/: deaffrication

a.	kanní**d͡z**o ~ kanní**z**o	'I smoke'
b.	trí**d͡z**o ~ trí**z**o	'I creak'

In many cases, the final stage of lenition involves the elision of an intervocalic consonant in SIG.[27]

(145) Elision of intervocalic consonants

a.	ka**θ**ínno ~ ka**s**ínno ~ ka**Ø**ínno	'I sit'
b.	pedá**t͡ʃ**i ~ pedá**ʃ**i ~ pedá**ʒ**i ~ pedá**Ø**i	'little child'
c.	trí**d͡z**o ~ trí**z**o ~ drí**Ø**o	'I creak'
d.	fó**v**o ~ fó**Ø**o	'fear'
e.	pro**v**atína ~ pro**Ø**atína ~ pra**t**ína ~ pra**Ø**ína	'ewe'
f.	alaká**t**i ~ alaká**Ø**i	'distaff'
g.	sté**k**o ~ sté**Ø**o	'I stand'
h.	mé**ɣ**a ~ mé**Ø**a	'big'
i.	tra**v**údi ~ tra**Ø**údi	'song'
j.	ala**v**ó ~ la**Ø**ó	'hare'
k.	xoré**v**o ~ xoré**Ø**o	'I dance'

Intervocalic consonant elision is also observed in CIG, but to a limited extent. The process mainly targets the exponent /s/ 'IPFV', when it occurs intervocalically in verbal inflection:

[27] Lenition typically does not target nasals. In my FW I encountered one production where /n/ had elided, i.e. [aloári] instead of [alo**n**ári] 'July', by a speaker of Calimera SIG. However, another speaker of the same variety questioned this choice.

(146) Elision of intervocalic /s/

a. aɣápi**s**a ~ aɣápi**Ø**a 'I loved'

b. na aɣapí**s**o ~ na aɣapí**Ø**o 'that I love'

Finally, degemination of consonants that typically surface as long could also be considered as an outcome of lenition.

(147) Degemination due to lenition

a. fí**ɖɖ**o ~ fí**ɖ**o 'leaf'

b. asimé**ɲɲ**o ~ asimé**ɲ**o 'silver'

c. í**ɟɟ**o ~ í**ɟ**o 'sun'

It should be underscored that the above processes, which have extremely variable outcomes, take place optionally. Different realizations of the same lexical item are found even in the speech of the same speaker (FW; Profili 1985). In careful speech, though, speakers tend to apply lenition to a lesser extent. It is plausible that the driving force of lenition is minimization of articulatory effort (Kirchner 1998; see also Gurevich 2004; Kingston 2007; de Carvalho et al. 2008 and references therein) rather than a systematic avoidance of intervocalic voiceless stops.

3.4 MoA in heterosyllabic clusters

Already since Late MedG, a fixed distribution of continuant and non-continuant segments in a heterosyllabic cluster is observed: for most phonological contexts, at surface level we get a $C_{[+cont]}C_{[-cont]}$ sequence.[28] Consider the instances of MoA dissimilation in the following OO clusters in (148), where both spirantization of the first consonant and despirantization of the second one are witnessed. Note that the data are from Late MedG (first column), compared to earlier versions still preserved in Learned Greek (second column), since in IG additional changes with respect to PoA would complicate the picture.

[28] This tendency was not necessarily observed across the entire Greek-speaking territory (see Holton et al. 2019). The reader is reminded that for the purposes of this thesis, unless stated otherwise, (Late) MedG refers to the version of Greek spoken in the current IG-speaking regions.

(148) MoA dissimilation in voiceless OO clusters of the same continuancy

a.	**ft**íra	< **fθ**íra	'louse'
b.	e**ft**á	< e**pt**á	'seven'
c.	o**xt**ó	< o**kt**ó	'eight'

Voiced clusters are also in accordance with the general preference for fricative–stop sequences. In MedG there is no underlying MoA distinction in voiced obstruents, thus the value of [±cont] is determined exclusively by their position in the cluster (for the PoA shift in 149a see section 3.5).

(149) MoA dissimilation in voiceled OO clusters of the same continuancy

a.	**vd**erro (SIG)	< **ɣð**érno	'I skin'
b.	a**vg**ó (SIG)	< a**vɣ**ó	'egg'

In the version of MedG spoken in the current IG-speaking region, the contrast based on [±cont] was neutralized also after /s/ and /r/, which behaves as a [+cont] segment. However, despirantization affected only dorsal (150) and coronal (151) fricatives:

(150) Dorsals and coronals following /r/: neutralization with respect to MoA

a.	ó**rk**uma	cf. MedG ó**rk**os	'oath'
b.	é**rk**ome	< é**rx**ome	'I come'
c.	á**rt**e	< AncG á**rt**i	'now'
d.	o**rt**ónno	< o**rθ**óno	'I straighten up'
e.	a**rg**alío	< a**rɣ**aljós	'loom'
f.	ka**rd**ía	< ka**rð**ía	'heart'

(151) Dorsals and coronals following /s/: neutralization with respect to MoA

a.	**sk**avéo (SIG)	< **sk**ávo	'I dig'
b.	**sk**ád͡zo	< **sx**ázo	'I explode'
c.	**st**éko	< **st**éko	'I stand'
d.	**st**émma	< á**sθ**ma	'asthma'

The contrast between continuant and non-continuant labials typically survives after /r/ in both dialects (152a–b) and after /s/ in SIG (152d, cf. 152e). The voiced fricative /v/ is optionally despirantized after /s/ also in CIG (152f).

(152) Labials following /r/: contrast with respect to MoA

	a.	ka**rp**ó	‘fruit’
	b.	ka**rf**í	‘nail’
	c.	**sp**áθa	‘sword’
	d.	**sf**ád͡zo (~ **sp**ád͡zo) (SIG)	‘I slaughter’
	e.	**sp**ád͡zo (CIG)	‘I slaughter’
	f.	**zv**ío ~ **zb**ínno	‘I put out’

It should be noted parenthetically that in a handful of inherited roots [fs] constitutes a rare variant of [sf] in Martano SIG (153b, 154a). Other alternatives gleaned during FW in other IG-speaking areas include assimilated forms towards both directions: certain speakers of Calimera SIG pronouced [ss] (154c), whereas a speaker from Galliciano (CIG) opted for [ff] (154d).

Evolution of /sf/ in Martano SIG

(153)	a.	**sf**ázo	**sf**ad͡zo ~ **sp**ád͡zo	‘I slaughter’
	b.	**sf**ázo	**fs**ád͡zo	‘I slaughter’

(154)	a.	**sf**ixtó	**fs**iftó (Martano SIG)	‘tight’
	b.	**sf**ixtó	**sp**ittó ~ **sp**istó ~ **sp**iθtó (CIG)	‘tight’
	c.	**sf**ixtó	**ss**ittó (Calimera SIG)	‘tight’
	d.	**sf**ixtó	**ff**ittó (Galliciano CIG)	‘tight’

The observed tendency is that fricative–stop clusters are created. Given the absence of a non-continuant strident counterpart of /s/, MedG exceptionally turned fricatives preceding a sibilant to plosives, in order for a cluster of continuants to be avoided. Telling examples can be found in the perfective form of verbs forming the perfective aspect using the suffix /s/. When the suffix is attached to a stem ending in a labial (155a) or a dorsal (155b) fricative, MoA dissimilation is triggered:

(155) Despirantization before /s/ in MedG

a.	/e-ɣra**f**-**s**-a/	éɣra**ps**a	'I wrote'
b.	/e-vre**x**-**s**-e/	évre**ks**e	'it rained'

The avoidance of cooccurring continuants ceased to be required in Pre-SIG. Thus, given the preexisting tendency that plosives do not emerge in codas, spirantization eliminated all pre-consonantal coda stops and eradicated any contrast with respect to [±cont] in the particular position. The process, apart from /Cs/ (156), extended to CN clusters, which began to be parsed as heterosyllabic (156).

(156) Spirantization before /s/ in Pre-SIG

a.	**fs**ári	< **ps**ári	'fish'
b.	**xs**éro	< **ks**éro	'I know'

(157) Spirantization before /n/ in Pre-SIG

a.	ka**fn**íd͡zo	< ka**pn**ízo	'smoke'
b.	dá**fn**i	< ðá**fn**i	'laurel
c.	pi**xn**ó	< pi**kn**ós	'thick'
d.	lí**xn**o	< lí**xn**os	'lamp'

The ban of [–cont] segments in the coda, unless they constituted the first member of a geminate, was global in IG and holds to date. However, unlike Pre-SIG, all IG varieties with the exception of current Martano SIG (158, first column) do not tolerate adjacent continuants. In these varieties, an intrusive [t] developed spontaneously in order to split C[+cont]s clusters (Marotta 2005; Recasens 2012). More specifically, [fs] sequences were avoided via [t] insertion during the early stages of most SIG varieties, e.g. Sternatia (158, second column) (Lambrinos 2014). Furthermore, [t] emerged between /r/ and /s/. In CIG (158, third column) the sibilant was also palatalized, which leads to [rt͡ʃ] (Rohlfs 1950: 47). The resulting affricates may have been phonologized (see Marotta 2005, 2008 for comparable cases in Tuscan and Roman Italian).

(158) Evolution of fricative–sibilant sequences (Martano, Sternatia, CIG)

a.	**fs**eró	**ft͡s**eró		'dry'
b.	a**fs**ári	a**ft͡s**ári		'fish'

c.	a**rs**enikó	a**r͡ts**inikó	a**r͡tʃ**inikó	‘male’
d.	pé**rs**i	pé**r͡ts**i	pé**r͡tʃ**i	‘last year’
e	xé**rs**o	xé**r͡ts**o	xé**r͡tʃ**o	‘infertile’

Lambrinos (1994) reports the pronunciation [fʃ] instead of [fs] in the –now extinct– variety of Zollino SIG as well as the variant [ʃʃ] in younger speakers. These versions are not confirmed by my data, however, retraction could be taken to serve as an alternative dissimilation process (see Kokkelmans 2020). The assimilation into a geminate could be related to the elimination of labials in the coda (see section 3.5).

More recently, non-strident fricatives were also prevented from surfacing in the coda in SIG, again with the exception of Martano. What is more, Bova and Galliciano CIG ceased to admit non-strident obstruents in the coda as well. In the majority of cases, illicit codas were repaired via a change of MoA features. In SIG, /Ot/ converted to [tt] (159a), as geminates are not subject to the imposed restrictions. Galliciano CIG also features a geminate [tt] in the place of old [Ot], with the difference between it and SIG lying in the presence of aspiration, i.e. [tt^h] (159b). On the contrary, Bova CIG opted for the realization of obstruents preceding /t/ as a sibilant [s] (159c). Notably, Roghudi CIG continued allowing the non-sibilant cluster [θt] (159d).

(159) Elimination of non-strident obstruents in coda: /Ot/

a. e**tt**á	Sternatia SIG	‘seven’
b. e**tt**^{h}á	Galliciano CIG	‘seven’
c. e**st**á	Bova CIG	‘seven’
d. e**θt**á	Roghudi CIG	‘seven’
cf. e**ft**á	MedG, Martano SIG	‘seven’

In a similar vein, /Od/ clusters as well as the unique labial–dorsal cluster [vg] are transformed into geminates:

(160) Elimination of non-strident obstruents in coda: /Od/

a**dd**éɖɖa	< **vd**élla	‘leech’

(161) Elimination of non-strident obstruents in coda: /vɣ/

a**g(g)**ó ~ a**g(g)ʷ**ó < a**vg**ó ‘egg’

/Os/ either turned into [ss] or an affricate [tts] (162a, 163a) (which could alternatively be taken to date back to /Ots/, see 158 above). The affricate variant is also found in Bova CIG (162b, 163b). In Galliciano and Roghudi CIG, on the other hand, /Os/ clusters transpose to [sO] (162c, 163c). In these two last CIG varieties, exclusively in verbal forms where the /s/ constitutes an aspectual suffix (‘PFV’), the variant [ss] coexists with [sp] (164a) and [ʃʃ] (< [sk]) (164b).

(162) Elimination of non-strident obstruents in coda: Root-internal /ps/

a. a**ss**ári ~ a**tt͡s**ári ‘fish’
b. **t͡s**ári ‘fish’
c. a**sp**ári ‘fish’
cf. **ps**ári ‘fish’

(163) Elimination of non-strident obstruents in coda: Root-internal /ks/

a. o**ss**ía ~ o**tt͡s**ía ‘mountain’
b. o**tt͡s**ía ‘mountain’
c. o**ʃʃ**ía (< o**sk**ía) ‘mountain’
cf. o**ks**ía ‘peak’

(164) Elimination of non-strident obstruents in coda: Derived /ps/ and /ks/

a. /e-ɣra**f**-**s**-a/ éɣra**sp**a ~ éɣra**ss**a ‘I wrote’
b. /e-vre**x**-**s**-e/ évre**ʃʃ**e (<évre**sk**e) ~ évre**ss**e ‘it rained’

Finally, non-strident obstruents in /On/ sequences were replaced by a nasal, which yielded a surface geminate [nn] in all IG varieties:

(165) Elimination of non-strident obstruents in coda: /On/

dá**nn**i < ðá**fn**i ‘laurel’

Other alternatives for non-strident obstruents preceding another obstruent included turning into a sonorant [r] (166a–c). CN clusters alternatively were avoided via vowel insertion or by transforming into CL, i.e. a complex onset (166d).

(166) Elimination of non-strident obstruents in coda: alternatives

a.	a**rd**éɖɖa	< **vd**élla	'leech'
b.	e**rt**á	< e**ft**á	'eye'
c.	do**rt͡s**ío	< ðe**ks**iós	'right'
d.	dá**fin**i ~ dá**fr**i ~ dá**fl**i	< ðá**fn**i	'laurel'

3.5 PoA in heterosyllabic clusters

MedG allowed all three major PoAs in the coda. Since the dawn of the SIG branch, dorsals have been avoided before a coronal or a labial. Labials preceding coronals were also banned in the most recent versions of the dialect. In CIG, on the other hand, coronals replaced all other segments in the coda right from the beginning. The introduction of restrictions with respect to PoA is one of the most characteristic traits of IG as opposed to other Greek dialects. In terms of markedness, given the hierarchy *dorsal ≺ labial ≺ coronal* (Ito 1986; 1989; McCarthy 1988; Yip 1991; Lombardi 1991; 2002; de Lacy 2002; 2006; see also Paradis & Prunet 1991 and Walker 2019), the coda position licensed progressively less marked features.

The elimination of marked features in the coda was gradual and did not affect both enclaves at the same time or in the same way. In a first wave, dorsals were banished before coronal obstruents and /n/ and converged with labials in SIG. This version still survives in Martano SIG. In the varieties of other villages, though, etymological and derived pre-consonantal labials further shifted to coronals. In CIG, dorsals and labials changed directly to coronals. Exceptionally, the avoidance of pre-sibilant dorsals and labials in Galliciano and Roghudi CIG was accomplished via local metathesis, except in verbal forms, where an addional [ss] variant is found (see also 164 above). The tables below demonstrate all variants of IG:

(167) PoA shifts in IG: /Ot/

MedG	[o**xt**ó] ‘eight’	[e**ft**á] ‘seven’	[**ɣd**érno] ‘I skin’	[ra**vd**í] ‘stick’
Early SIG, Martano SIG	o**ft**ó	e**ft**á	**vd**érno	ra**vd**í
Sternatia/Calimera SIG	o**tt**$^{(h)}$ó	i**tt**$^{(h)}$á	**dd**érno	ra**dd**í
Roghudi CIG	o**θt**ó	e**θt**á	**dd**érro	ra**dd**í
Bova CIG	o**st**ó	e**st**á	**dd**érro	ra**dd**í
Galliciano CIG	o**tt**^{h}ó	e**tt**^{h}á	**dd**érro	ra**dd**í

(168) PoA shifts in IG: /Os/

MedG	[**ps**ári] ‘fish’	[é**ks**i] ‘six’
Early SIG, Martano SIG	a**fs**ári	é**fs**e
Early Stern./Claim. SIG	a**ft͡s**ári	é**ft͡s**e
Sternatia/ Calimera SIG	a**tt͡s**ári ~ a**ss**ári	é**tt͡s**e ~ é**ss**e
Bova CIG	a**tt͡s**ári	é**tt͡s**e
Roghudi/Galliciano CIG	a**sp**ári	é**sk**e > é**ʃʃ**e
+ verbs Rogh./Gall. CIG	éɣra**sp**a ~ éɣra**ss**a	évre**sk**e > évre**ʃʃ**e ~ évre**ss**e

(169) PoA shifts in IG: /On/

MedG	[pi**kn**ó] ‘thick’	[lí**xn**os] ‘lamp’	[**ɣn**éθo] ‘I spin’	[ka**pn**ós] ‘smoke’	[ðá**fn**i] ‘laurel’
Early SIG, Martano SIG	pi**fn**ó	lí**fn**o	**vn**éθo	ka**fn**ó	dá**fn**i
Stern./Calim. SIG, CIG	pi**nn**ó	lí**nn**o	**nn**éθo	lí**nn**ó	dá**nn**i

Dorsals were also eliminated before another labial. In practice, the relevant combination is only found at stem–suffix borders, with the labial always being a nasal /m/. The outcome is a geminate [mm]. Notably, though, the same realization holds also for labial clusters. In fact, these clusters are avoided in general also in MedG, with the exception of [mO]. The difference with IG is that MedG, as a non-geminating dialect, resolves the illicit labial–labial sequence by applying deletion of the stem-final labial. Relevant examples are given in (170):

(170) PoA shifts in IG: /Om/

MedG	[áni**ɣm**a] 'opening'	[ɣrá**m**a] 'letter' (/ɣra**f-m**a/)
IG	áni**m**ma	grá**mm**a

The conversion of /l/ (which bears [dor] specification, see section 2.1) into a rhotic in the coda as well as the change of /mn/ to [nn] is explained along the same lines.

(171) PoA shifts in IG: /lC/, /mn/

MedG	[a**lm**iro] 'salty'	[ska**mn**í] 'stool'
IG	a**rm**iró	ska**nn**í

Labials can still emerge as long as they are followed by a more marked onset, i.e. a dorsal segment. For instance, the realization [avgó] 'egg' complies with the limitations on PoA in coda (see section 3.4 on modifications due to restrictions on MoA).

Coronal segments are admissible in coda throughout the history of IG, thus they do not undergo PoA shifts. An exception is found in NO clusters, since, as mentioned in section 2.2, the nasal /n/ adopts the PoA features of the following segment:

(172) Agreement with respect to PoA in NO clusters

a.	a**mp**^{h}éli	'vineyard' (SIG)
b.	gra**mb**ó	'brother-in-law'
c.	pé**nt**^{h}e	'five' (SIG)
d.	á**nd**ra	'man'
e.	á**ŋg**ona	'elbow'
f.	e**ɲɟ**íd͡zo	'I touch'

3.6 Voice agreement

In Greek, heterosyllabic obstruent clusters share a single value of [±voice], with the coda adopting the value of the onset in case of different underlying specification. In particular, both in MedG and IG, OO clusters are comprised of either two voiceless segments (173a) or two voiced ones (173b).

(173)	Agreement with respect to [±voice] in OO clusters		
	a.	e**ft**á	‘seven’
	b.	ra**vd**í	‘stick’

Moreover, a coda /s/ acquires the voicing value of the adjacent onset (174b). Regressive voice assimilation also targeted /On/ in Martano SIG (174c).

(174)	Agreement with respect to [±voice] in sC and On		
	a.	**sp**íti	‘house’
	b.	**zv**ínno	‘I erase’
	c.	ka**fn**ó ~ ka**vn**ó	‘smoke’

The only case of progressive assimilation is detected in NO clusters already present in MedG, where it is the [+voi] feature of the nasal that is carried to the following obstruent. The process is retained in CIG (175, first column). Interestingly enough, though, SIG ignored the requirement of agreement as far as the particular clusters are concerned (second column) (*Rize Grike*; FW). Moreover, devoicing optionally affected etymological voiced segments (175a–d, second column), unless they are (175e–f) or used to be (175g) followed by a liquid. The voiceless post-nasal consonants are typically aspirated. Notably, Romance words containing post-nasal plosives get integrated with the original voicing value, e.g. *com[b]inare* > *kum[b]inéo* ‘to/I combine’, *coman[d]are* > *kuman[d]éo* ‘to/I command’, *man[k]are* > *man[k]éo* ‘to/I miss’.

(175)	Cross-dialectal variation: voiced vs. voiceless O after N			
	a.	a**mb**éli	a**mp**^{h}éli	‘vineyard’
	b.	é**nd**ero	é**nt**^{h}ero	‘intestine’
	c.	á**ŋg**ona	á**ŋk**^{h}ona ~ á**ŋg**ona	‘elbow’
	d.	ma**nd**íli	ma**nt**^{h}íli	‘apron’
	e.	á**nd**ra	á**nd**ra	‘man’
	f.	a**mb**ró	a**mb**ró	‘forward’
	g.	xr̲o**nd**ó (< xo**nd**r̲ó)	xr̲o**nd**ó (< xo**nd**r̲ó)	‘fat’

3.7 Word-final codas

Word-finally, only open syllables are admitted. Former word-final consonants, specifically /s/ and /n/, are typically deleted. Given that the particular consonants used to mark morphological case, their deletion led to case syncretism in masculine (176) and feminine (177) nouns.[29]

(176) Elision of final /s/ and /n/: case syncretism in masculine nouns

a.	ándra**s**	> ándra**Ø**	'man (NOM)'
b.	ándra	> ándra	'man (GEN)'
c.	ándra**n**	> ándra**Ø**	'man (ACC)'

(177) Elision of final /s/ and /n/: case syncretism in feminine nouns

a.	θálassa	> θálassa	'sea (NOM)'
b.	θálassa**s**	> θálassa**Ø**	'sea (GEN)'
c.	θálassa**n**	> θálassa**Ø**	'sea (ACC)'

Cross-dialectal difference is observed with respect to the realization of the second person of singular in verbal inflection (178). In SIG (second column), the word-final closed syllables of MedG (first column) are repaired via deletion, which leads to syncretism between the second (178a, c) and the third (178b, d) person. In CIG (third column), a vowel is inserted to create an open syllable.

(178) Cross-dialectal variation: deletion vs. insertion in 2SG

a.	θéli**s**	téli**Ø**	θéli**se**	'you want'
b.	θéli	téli	θéli	's/he wants'
c.	pái**s**	pái**Ø**	páis**e** ~ pás**e**	'you go'
d.	pái	pái	pái	's/he goes'

[29] The same holds for adjectives, e.g. *áspros* (M.NOM)', *áspron* (GEN.PL) > *áspro* 'white'.

3.8 Word-initial non-tautosyllabic clusters

Word-initially, a non-tautosyllabic parsing is again postulated. The exact status of the consonants that are word-initial but not syllable-initial is discussed in detail in chapter 4.

(179) Non-tautosyllabic word-initial clusters

	a.	[v.d]érro	'I skin' (Martano SIG)
	b.	[s.p]íti	'house'
	c.	[θ.t]éni	'comb' (Roghudi CIG)
	d.	[t.t^{h}]éni	'comb' (Galliciano CIG)
	e.	[f.s]éno	'stranger'
	f.	[z.m]íŋgo	'I unite'

The same holds for /s/ preceding OL, which is not syllabified in a three-member onset but rather is heterosyllabic to the cluster.

(180) Word-initial /sOL/

	a.	[s.pr]ixó	'cold' (Roghudi CIG)
	b.	[s.kl]íθra	'nettle'

In absolute initial position, geminates surface as singletons, e.g. [t^{h}éni] (FW) (see 179d). Vowel anaptyxis is common before a word-initial non-tautosyllabic cluster, e.g. [xténi] > [fténi] ~ [afténi], [tt$^{(h)}$éni] ~ [att$^{(h)}$éni] 'comb' (FW).

3.9 Sandhi phenomena

This section investigates vocalic and consonantal sequences formed at word boundaries. Section 3.9.1 focuses on sandhi vowel hiatus and section 3.9.2 delves into the complex patterns arising when traces of final consonants are found adjacent to word-initial consonants.

3.9.1 V# #V

Vowel hiatus across adjacent words is usually repaired in fast speech. When the two adjacent vowels are identical, they are taken to merge into one (or, alternatively, one is deleted) (Katsoyannou 1995: 92).

(181) Sandhi hiatus resolution via coalescence of identical vowels

a.	n**a a**ɖɖásso	→	n**a**ɖɖásso	'that I change'
b.	**o o**θtró	→	**o**θtró	'the enemy'
c.	t͡ʃ**e é**kama	→	t͡ʃ**é**kama	'and I did'
b.	**i i**méra	→	**i**méra	'the day'

With different vowels, hiatus is optionally repaired via deletion (Katsoyannou 1995: 92).[30]

(182) Sandhi hiatus resolution via deletion

a.	t**u a**ndrú	→	t**Ø a**ndrú	'the man (GEN)'
b.	t**o é**kama	→	t**ó Ø**kama	'I did it'
c.	t͡ʃ**e ó**tu	→	t͡ʃ**Ø ó**tu	'and so'

Another possibility, according to Katsoyannou (1995: 93), is that an innovative liaison consonant emerges between the two vowels, e.g. ékama áɖɖo ~ [ékaman áɖɖo] 'I did another (thing)'. This strategy was not employed by the speakers I interviewed during my fieldwork, and in fact, the example provided by Katsoyannou should be regarded with caution given that the utterance *ékaman áɖɖo* could actually correspond to *ékam' an' áɖɖo* (literally 'I did an other'). Perhaps it could be considered speaker-specific.

3.9.2 C# #C

In most cases, the liaison consonant mentioned in the previous section does not need to be considered as epenthetic. Due to the preference of IG for open syllables at the right edge of a word, former word-final /n/ and /s/ were silenced (see section 3.7) in phrase-final positions.

[30] Which vowel is deleted usually depends on morphological criteria that are not discussed here.

However, these vanished segments seem to reappear in some disguise when followed by particular segments. Specifically, in hiatus environments they emerge as [n] (183a′–b′) and [s] (183c′–d′) (data from FW).

(183) Sandhi hiatus resolution via emergence of final consonants

	a.	léɣomeØ	‘we say’
	a′.	léɣome**n** áɖɖo	‘we say otherwise’
	b.	pléØ	‘more’
	b′.	plé**n** órrjo	‘more beautiful’
	c.	tríØ	‘three’
	c′.	trí**s** imére	‘three days’
	d.	póØ ~ pó**se**	‘how’
	d′.	pó**s** éxise?	‘how are you?’

When these ghost-like segments precede a word-initial consonant, though, more interesting interactions are observed. Let’s, compare the sandhi phenomena arising between the definite article and the noun in the following cases:

(a) in the nominative case, where the definite articles consist of a vowel, i.e. /o/ (M) and /i/ (F) (184–188, first column),

(b) in the accusative, where the articles ends in a nasal, i.e. /ton/ (M) and /tin/ (F) (184–188, second column),

(c) in genitive forms, where the feminine article of the singular and the gender-independent article of the plural contain a final /s/, i.e. /tis/ (F.SG) and /tos/ (M/F.PL) (184–188, third column).

Like in the examples in (183) above, before a vowel we consistently get the realizations [n] and [s] (184).

(184) Emergence of ghost segments before vowels

	a.	o anθropo	to**n** ántropo	to**s** ántropo	‘the man’
	b.	i aɣapi	ti**n** aɣápi	ti**s** aɣápi	‘the love’

When /n/ and /s/ precede a consonant, though, the results vary significantly. In both IG dialects, /s/ and /n/ are dropped before heterosyllabic sequences, i.e. surface geminates (185a) and clusters not comprised of an obstruent and a liquid (185b–e).

(185) Silencing of ghost segments before heterosyllabic clusters

a.	o sséno	to∅ sséno	to∅ sséno	'the foreigner'
		*ton sséno	*tos sséno	
b.	o fseró	to∅ fseró	to∅ fseró	'the dry one'
		*ton fseró	*tos fseró	
c.	o θtoxó	to∅ θtoxó	to∅ θtoxó	'the poor one'
		*ton θtoxó	*tos θtoxó	
d.	i skáfi	ti∅ skáfi	ti∅ skáfi	'the basin'
		*tin skáfi	*tis skáfi	
e.	o stravo	to∅ stravó	to∅ stravó	'the crooked one'
		*ton stravó	*tos stravó	

Before onsets, i.e. singletons and OL clusters, though, traces of the final ghost-like /n/ and /s/ are detected, with the patterns varying between the two IG dialects. As shown in (186), in CIG (second column) voice assimilation affects voiceless stops in both pre-vocalic (186a–c) and pre-consonantal position (186d–f) as well as affricates (186g). Moreover, voiced fricatives are realized as stops after the nasal (187) (see 2.2, 2.3). On the other hand, in SIG (third column) the nasal is always entirely assimilated by the following consonant (note that –non-lenited– intervocalic voiced obstruents are typically realized as continuants in CIG and as non-continuants in SIG).

(186) Cross-dalectal variation: word-final /n/ before voiceless plosive

a.	i porta	ti**m b**órta	ti**p** porta	'the door'
b.	o tópo	to**n d**ópo	to**t** tópo	'the place'
c.	i kardía	ti**ŋ g**ardía	ti**k** kardía	'the heart'
d.	i pláti	ti**m b**láti	ti**p** pláti	'the back'
e.	i trípi	ti**n d**rípi	ti**t** trípi	'the hole'
f.	o krifó	to**ŋ g**rifó	to**k** krifó	'the secret one'
g.	i t͡ʃilía	ti**n d͡ʒ**ilía	ti**t** t͡ʃilía	'the belly'

(187) Cross-dalectal variation: word-final /n/ before voiceled obstruent

a.	o vúa	to**m b**úa	to**v v**úa	‘the Bova’
b.	i ðulía/dulía	ti**n d**ulía	ti**d d**ulía	‘the work’
c.	o ɣáðaro/gádaro	to**ŋ g**áðaro	to**g g**áðaro	‘the donkey’
d.	i ʝinéka/ɟinéka	ti**ŋ ɟ**inéka	ti**ɟ ɟ**inéka	‘the woman’
e.	i vrondí	ti**v v**rondí	ti**v v**rondí	‘the thunder’
f.	o ðráko/dráko	to**n d**ráko	to**d d**ráko	‘the dragon’
g.	o ɣrambó/grambó	to**ŋ g**rambó	to**g g**rambó	‘the son-in-law’

Word-initial voiceless fricatives (188a–f) as well as nasals (188g–h) and liquids (188i–j) “absorb” the final /n/ in both dialects.

(188) Sandhi assimilation of final /n/ before fricatives and sonorants

a.	o fílo	to**f f**ílo	to**f f**ílo	‘the friend’
b.	o θánato	to**θ θ**ánato	to**t t**ánato	‘the death’
c.	i xóra	ti**x x**óra	ti**k k**óra	‘the capital’
d.	i frási	ti**f f**rási	ti**f f**rási	‘the sentence’
e.	o xrondó	to**x x**rondó	to**k k**rondó	‘the fat one’
f.	i sárka	ti**s s**árka	ti**s s**árka	‘the flesh’
g.	o mína	to**m m**ína	to**m m**ína	‘the month’
h.	i nítta	ti**n n**ítta	ti**n n**ítta	‘the night’
i	o líko	to**l l**íko	to**l l**íko	‘the wolf’
j.	i ríd͡za	ti**r r**íd͡za	ti**r r**íd͡za	‘the root’

Final /s/, found, for instance, in the definite articles /tis/ ‘F.GEN.SG’ and /tos/ ‘GEN.PL’, typically gets absorbed by the consonant it precedes in both dialects. The outcome is a geminate, as demonstrated via representative examples in (189).[31]

[31] The unassimilated realization [s], e.g. *to[s] fílo* (188a), is reported in older works, e.g. Rohlfs (1950), as well as in written sources, e.g. the vocabulary lists on *Rize Grike*. However, recorded speech on the above website as well as my data show that this <s> is mostly a relic of an orthographic convention rather than accurate phonetic transcription.

(189) Sandhi assimilation of final /s/ before consonants

a. ti**p p**orta

b. to**θ θ**anáto (CIG) / to**t t**anáto (SIG)

c. ti**ð ð**ulía (CIG) / ti**d d**ulía (SIG)

d. ti**x x**rondí (CIG) / ti**k k**rondí (SIG)

e. ti**n n**ítta

An alternative, less widespread repair strategy amending C# #C sequences is vowel epenthesis. For instance, after the negation [én], the vowel /i/ may be inserted when the following word starts with a consonant (190b–c, cf. 190a; Rohlfs 1950; Profili 1983; Katsoyannou 1995; FW). The alternative to assimilate to the obstruent remains available (190d).

(190) Sandhi vowel insertion after negation morpheme /(ð)én/

a.	**t**élo (SIG); **θ**élo (CIG)	'I want'
b.	én **i**ðélo	'I don't want'
c.	én **it**^{h}élo	'I don't want'
d.	é**t** t^{h}élo	'I don't want'

4. Stress

IG exhibits dynamic accent confined in the three last syllables of a word (Revithiadou 1999; Malikouti-Drachman & Drachman 1989; Drachman & Malikouti-Drachman 1999; van Oostendorp 2012).[32] Syllable structure plays no role in stress assignment. Main stress may land on the antepenultimate (191a), penultimate (191b), or ultimate syllable (191c), without being obligatorily attracted by a closed syllable within the trisyllabic window (i.e. **θalássa*, **áppidi*, **kárpo*).

(191) Antepenult, penultimate, and ultimate stress in IG

a.	θálassa	'sea'	antepenultimate stress
b.	appíði	'pear'	penultimate stress
c.	karpó	'fruit'	ultimate stress

[32] Cf. Cypriot Greek, among others, where this trisyllabic window can be violated (Arvaniti 1999).

However, derivational suffixes come with specific stress properties (see Revithiadou 1999 for Standard Greek). Examples of inherently stressed suffixes are provided, among many others, by all the verbalizers available in IG, the most productive of which are given in (192). Other suffixes, e.g. *-iss(a)*, which forms feminine animate nouns, are pre-tonic (193a). Nouns constructed via the affixation of nominalizers like *-ma* (denoting a result) and *-si* (denoting action) have antepenultimate stress (193b, d), unless the root is monosyllabic, in which case the stress compulsorily falls on the penultimate syllable (193c, e). Finally, there are a few suffixes such as /t/, which forms deverbal adjectives, requiring that the stress fall on their right (193f, g).

(192) Inherently stressed verbalizers

a.	-íd͡z-	alatíd͡zo	'I salt'
b.	-égʷ-	xorégʷo	'I dance'
c.	-ónn-	alevrónno	'I flour'

(193) Nominal suffixes with inherent stress properties

a.	-issa	ɟitónissa	'female neighbor'
b.	-ma	ánimma	'gap'
c.		dérma	'skin'
d.	-si	ármeʃʃi	'milking'
e.		ftési	'blame'
f.	-t-	aniftó	'open'
g.		klistó	'close'

Stress is contrastive in IG. A number of minimal pairs that are distinguished on the grounds of the stressed syllable are cited below:

(194) Contrastive stress

a.	kánno	'I do'
b.	kannó	'smoke'
c.	tséro (Bova CIG)	'I know'
d.	tseró (Bova CIG)	'dry'
e.	tsílo (Bova CIG)	'wood'

f.	tsiló (Bova CIG)	‘tall’
g.	kástano	‘chestnut’
h.	kastanó	‘brown’

Apart from leading to a phonological contrast, stress may also operate as a (supplementary) exponent of morphological information. For instance, like in Standard Greek (Revithiadou 1999; Malikouti-Drachman & Drachman 1989; Drachman & Malikouti-Drachman 1999; van Oostendorp 2012), the past tense is associated with antepenultimate stress. Thus, stress is retracted from the ultimate (195a–b) and the penultimate (195c–d) syllable to the antepenult. In bisyllabic words (195e–f), the past is also encoded via an augment (usually the vowel /e/).

(195) Stress retraction in the past tense

a.	agapó	‘I love’
b.	agápona	‘I was loving’
c.	aɖɖád͡zo	‘I change’
d.	áɖɖad͡za	‘I was changing’
e.	kánno	‘I do’
f	**é**kanna	‘I was doing’

Stress assignment is not iterative in IG. Secondary stress emerges only in case the main stress is found in the preantepenult due to the presence of suffixal clitics. When a stressless element, e.g. possessive pronouns (196) or clitics (197), is attached to the right edge of a proparoxytone word, a larger phonological word is formed. In order for a pro-proparoxytone pattern to be avoided (196b, 197b), primary stress is shifted to the antepenult of the entire prosodic unit and secondary stress emerges on the originally stressed syllable (196c, 197c) (Katsoyannou 1995):

(196) Secondary stress: noun + possessive pronoun

a.	to ɣónato	‘the knee’
b.	?to ɣónato mu	‘my knee’
c.	to ɣònató mu	‘my knee’

(197) Secondary stress: verb + dative argument

a.	férete	‘bring’ (imperative, plural)

b.	?férete mu	‘bring to me’
c.	fèreté mu	‘bring to me’

Rohlfs (1950: 63) mentions that the original stress is lost, e.g. *ɣáðaro* ‘donkey’ – *o ɣaðarómmu* ‘my donkey’, *férete* ‘bring (imperative plural)’ – *feretému* ‘bring to me’. This could be true for the period Rohlfs conducted fieldwork in the Greek-speaking areas, however in the 1990s Katsoyannou finds secondary stress in the constructions at hand, which is also confirmed by my collected data (FW). The pattern Rohlfs documents seems to have changed over the course of time, perhaps due to the influence of Standard Greek.

Take-home message

- This chapter offered a comprehensive description of the phonological system of IG, with special emphasis on variation across IG varieties, both at diachronic and synchronic level.

- The main focus of the chapter was on consonants (C) and the processes affecting them as well as on the structure of syllable margins. Other aspects of the IG phonology that were touched upon for the sake of completeness were:
  - The IG vowel inventory (five vowels: /i, e, a, o, u/) and processes affecting vowels (scattered instances of vowel assimilation/dissimilation, glide formation).
  - Stress properties (trisyllabic window for stress, distinctive role of stress, morphemes with inherent stress properties).

- The underlying consonant inventory of IG was revisited. Taking into account allophonic variation and derivable phonetic realizations, a maximally economic inventory was proposed (Table 1).

Table 1	*Labial*	*Coronal*	*Dorsal*
Obstruents	p f v	t θ ð s	k x ɣ
Nasals	m	n	
Liquids		r	l

  - The post-alveolars /t͡ʃ/ and /ʃ/ are derivable, yet they have arguably been phonologized and can thus be added to the current IG inventory.
  - The marginal phonemes /b/ and /d͡ʒ/ are found exclusively in loans.
  - Note that /l/ was taken to contain [dor] specification.

- The phonological status of geminates was revisited. Arguments were adduced against the existence of underlying geminates in IG (cf. previous literature) and a representation as two distinct consonantal roots was proposed. A surface geminate thus maps onto two adjacent consonants; either identical or different. Crucial evidence supporting this claim is summarized below:
  - True minimal pairs are absent.
  - Geminates and true clusters vary across IG dialects and may even vary freely within the same dialect.

- Only a handful of etymological geminates and instances of "spontaneous gemination"; all other cases are derivable through processes affecting heterosyllabic clusters. Importantly, these processes are encountered also at morpheme boundaries.

- The Sonority Distance (SD) requirements governing the syllabification of clusters were determined, on the basis of a sonority scale the steps of which are not evenly spaced (Table 2) ('O' stands for non-strident obstruents, 'S' stands for sibilants; 'N' stands for nasals; 'L' stands for liquids):

Table 2

$O_{[-cont]}$	$O_{[+cont]}$	S	N	L
0	0.5	1	2	3

  - Clusters with SD ≥ +2.5, i.e. OL, are syllabified as complex onsets
  - Clusters with SD ≤ +2, i.e. all other clusters, are syllabified as coda–onset
  - Syllable Contact restrictions are generally not imposed, i.e. sonority may rise, fall, or remain unaltered across syllable borders. An exception is found in recent Galliciano CIG, where rising sonority seems to be avoided.

- New insight into long-distance metathesis of liquids (LDM) was offered. According to existing literature, LDM displaced post-consonantal liquids from a medial position to the first syllable to a post-consonantal position. In terms of syllable structure, LDM deconstructs a medial complex onset and forms one in the leftmost syllable. LDM fails to take place under certain circumstances:

  (a) if the first syllable is onsetless.

  (b) if the first syllable starts with a sonorant, a coronal obstruent, an affricate, or a tautosyllabic cluster (cf. sC clusters).

  (c) if another liquid intervenes between the post-consonantal liquid and the first syllable.

  - An exception not pointed out so far was that LDM does not split medial /tr/. If /tr/ is preceded by a sibilant, then LDM affects /r/ in CIG, but not in SIG. Based on observations that /tr/ has acquired a retroflected pronunciation and behaves as an affricate, I assumed that /tr/ has become a complex segment in IG.
  - It was shown that LDM operates within roots rather than prosodic words (cf. previous literature where the domain is not specified).

- The manner (MoA) features the coda position may accommodate were determined for each variety and historical stage (comparisons with Learned Greek were also drawn). The distinctions among varieties were made based on what segments (plosives, non-strident fricatives, sibilants, sonorants) are allowed in the coda.

- Learned Greek allowed codas of all MoA features
- MedG disallowed plosives in the coda. The same holds for early versions of SIG, contemporary Martano SIG, and Roghudi CIG.
- All other IG varieties admit only sibilants and sonorans in the coda.
- In all cases, geminates are exempted.

- The allowed combinations of place (PoA) features in heterosyllabic clusters were determined for each variety and historical stage.
  - MedG allowed codas of all PoA features independently of the PoA feature of the adjacent onset
  - Early SIG and contemporary Martano SIG ceased to allow for dorsal codas before a non-dorsal onset. Dorsals in illicit clusters shifted to labials.
  - More innovative SIG varieties (e.g. Sternatia, Calimera…) took a step further and disallowed both dorsals (unless they preceded a dorsal) and labials (unless they preceded a labial or a dorsal) in the coda. Dorsals and labials preceding coronals shifted to coronals and dorsals preceding labials shifted to labials.
  - CIG varieties prohibited both dorsals (unless they preceded a dorsal) and labials (unless they preceded a labial or a dorsal) in the coda. In Bova CIG, similar shifts as in Sternatia SIG are observed (i.e. dorsals and labials preceding coronals shifted to coronals and dorsals preceding labials shifted to labials). In Roghudi and Galliciano CIG, on the other hand, at least some illicit clusters (/ks/, /ps/) are avoided via transposition (i.e. [sk], [sp]).

- Other observations regarding syllable structure concerned
  - The agreement with respect to [±voice] in all adjacent heterosyllabic segments except for /rC/ and, in SIG, /n$O_{[-\text{cont}]}$/.
  - Strategies to avoid word-final codas, i.e. (mainly) consonant deletion and (less frequently) vowel insertion.
  - Sandhi processes at word boundaries

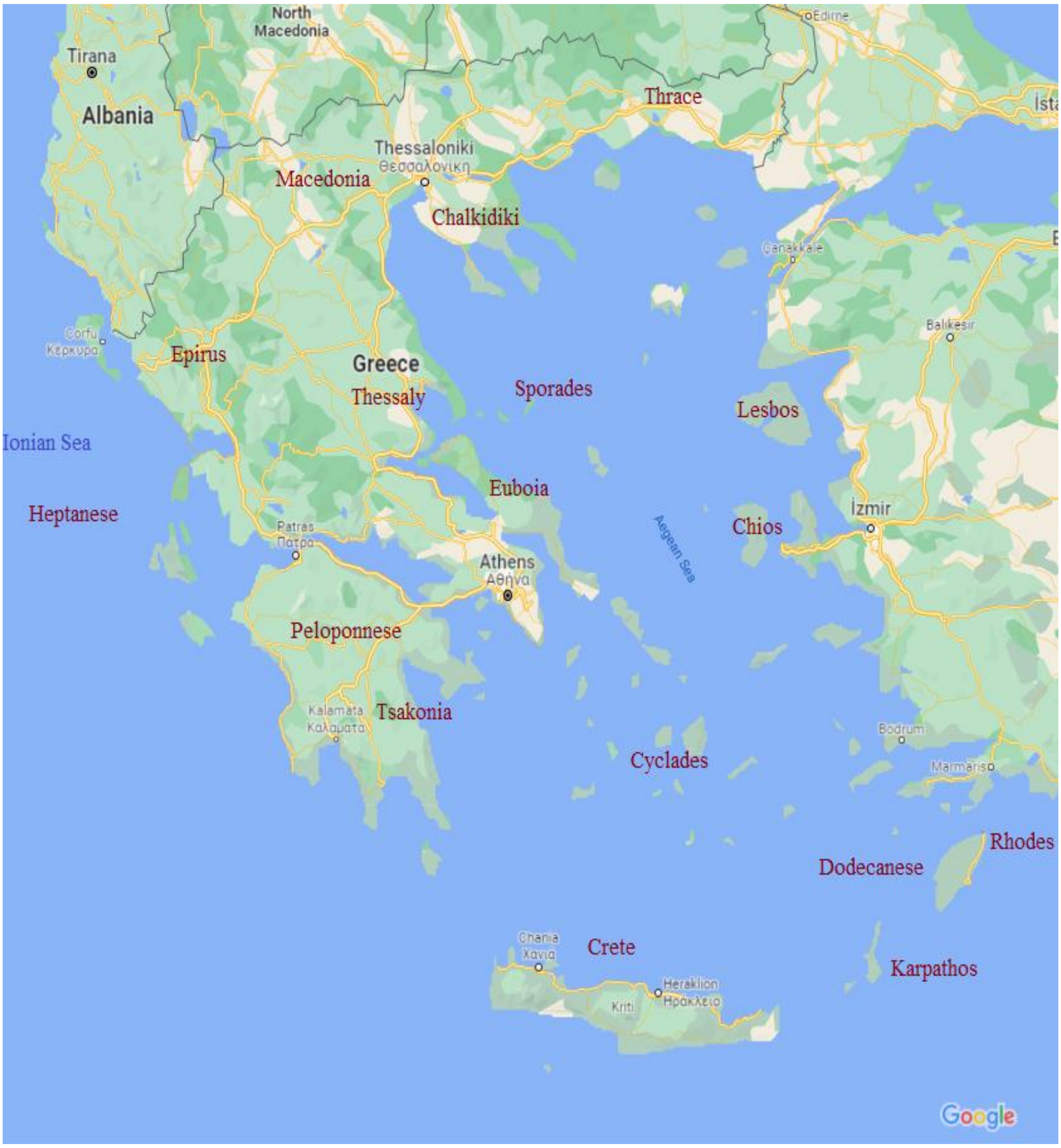
CHAPTER 3

Pre-theoretical comparisons among IG, Greek, and Romance

The consonantal system of IG displays significant differences from that of its immediate predecessor, i.e. MedG. Given the isolation of the IG enclaves from the rest of the Greek-speaking world and the long-standing contact with regional Romance, the question arises whether the diachronic changes that have led to contemporary IG are typical of Greek, even within a restricted linguistic area, or if they have been prompted by the influence of Romance. The objective of this chapter is to investigate the main points of divergence between IG and MedG in a pre-theoretical frame and tell apart endogenous from contact-induced changes. The focus is on the following phenomena: retroflexion (section 1), palatalization (section 2), lenition of intervocalic onsets (section 3), long-distance metathesis of liquids (section 4), coda inventories and processes affecting heterosyllabic clusters (section 5), lexical geminates (section 6), and sandhi processes leading to post-lexical geminates and consonant clusters (section 7). Each section demonstrates the manifestation of a selected phenomenon in Greek outside Italy (first subsection) and in Italo-Romance or, in case a broader look is worthwhile, Romance in general (second subsection). The final section (8) discusses the affiliation of IG with its Greek relatives and the superstratal Romance languages that have surrounded the IG-speaking linguistic pockets for centuries and highlights the diachronic changes that have most probably been motivated by language contact rather than endogenous evolution.

To facilitate the association of toponyms with the respective locations on the map, especially for readers not acquainted with Greek and Italian geography, the main areas that become relevant to the comparisons to follow are pinpointed on the maps below (taken from Google maps):

(1) Map of Greece



(2) Map of Italy

1. Retroflexion

1.1 Retroflexion in Greek

The first phenomenon under examination is the evolution of the old geminate /ll/ in Greek dialects. Among the dialects that have preserved geminates, Cypriot retains the pronunciation of a double alveolar [ll], e.g. ***áll**os* ‘other’ (Newton 1967; Arvaniti 1999, 2001, 2010). On the other hand, aside from IG, indications of retroflexion are detected in several islands of the Aegean, especially in Eastern Cyclades and the Dodecanese, with a wide range of variants being reported independently of the phonological context (Manolesou & Bassea-Bezantakou 2012). Apart from the retention of [ll], /ll/ is also reported to surface as a dissimilated cluster [ld], e.g. *fi**ld**áða* 'newspaper' (Eastern Cyclades, Dodecanese; Tsopanakis 1940; Kontossopoulos 1994/2008) or [lt], e.g. *fi**lt**áða* (Astypalea, Karpathos; Pantelidis 1929; Karanastassis 1958; Minas 1970; Kontossopoulos 1994/2008). According to Rohlfs's on-site research in the 20s (1977: 56), though, at least the second consonant in [ld] has a clear cacuminal pronunciation in Karpathos, Kos, and Rhodes, i.e. [lɖ]. Moreover, Rohlfs documents a geminate cacuminal lateral [ɭɭ] and a delateralized [ɖɖ] in a particular area of Karpathos and Rhodes, respectively.[1]

Interestingly, unlike IG, where retroflexion targeted exclusively lexical /ll/ (3a) (Katsoyannou 1995), in some of the Dodecanesian varieties, post-lexical [ll] may also be realized as [ld] (3b, Minas 1970: 3; Karanastassis 1958: 118) or [lt] (3c, Kontossopoulos 1994/2008: 44), as shown in (3). This ascertains that dissimilation of the geminate lateral is productive in the particular Dodecanesian dialects.

(3) Post-lexical *ll*

a.	/ton liko/	to**l.l**íko		*to**ɖ.ɖ**íko	'the wolf (acc.)' IG
b.	/tin lampa/	ti**l.l**ámba	~	ti**l.d**ámba	'the lamp (acc.)' Karpathos
c.	/tin lira/	ti**l.l**íra	~	ti**l.t**íra	'the lyre (acc.)' Astypalea

As far as the sequence /tr/ (and, in turn, /str/) is concerned, IG is, to my knowledge, the only Greek dialect in which a retroflected innovative variant is reported. Affrication of /tr/ is not entirely unheard of in Greek, as /tr/ is pronounced as [tʃ] in Tsakonian, e.g. *tráɣos* > *tʃáo* 'billy goat' (Liosis 2007). However, in this case, the affricate has resulted from assibilation of /r/ (which affected all onset rhotics in Tsakonian) and spontaneous reanalysis of the stop–sibilant sequence.

[1] Other reported pronunciations are a velar [ɫ] that may even sound as an approximant [w] (Kalymnos, Symi, parts of Kos; Kontossopoulos 1998/2006) and a retroflex approximant [ɻ] in Western Cretan as well as the Naxian dialect of Aperathou (Oikonomidis 1952; Rohlfs 1974; Kontossopoulos 1994/2008; Lengeris et al. 2014; Nikolou et al. 2016), which, however, results from any /l/ found in onset position, e.g. /telos/ → [téɻos] 'end'; /plastiko/ → [pɻastikó] 'plastic' (Western Cretan; Lengeris et al. 2014: 875).

1.2 Retroflexion in Italo-Romance

Retroflexion of the geminate /ll/ to [ɖɖ] is exceptionally widespread in Romance in general and in Southern Italy in particular (Rohfls 1966; Romano 1999, 2015; Jones 2004; Celata 2006; Recasens 2011; Müller 2011). The process affects both inherited lexical (4) and, less frequently, post-lexical geminate laterals (5) (Meyer-Lübke 1934; Celata 2006; Müller 2011).

(4) Retroflexion of lexical *ll* (Calabrian; Rohlfs 1966: 329–330)

a.	CABALLU	kavaɖɖu	'horse'
b.	BELLU	beɖɖu	'beautiful'

(5) Retroflexion of post-lexical *ll* (Minucciano Tuscan; Celata 2006: 32)

a.	al letto	a ɖetto	'to bed'

Other variants containing cacuminals that are reported in the broader area are [ɭɭ] around Reggio di Calabria (Rohlfs 1929; Bianco 1981; Müller 2011; cf. Celata 2010) and in Sicily (Ruffino 1997), [ɖɭ] in Corsican (Dalbera-Stefanaggi 1991; Rohlfs 1966; Recasens 2011), and [ɖ͡ʐ] in Calabria (Rohlfs 1966; Romito & Milelli 1999; Müller 2011). Further evolutions that are also witnessed involve palatalization, e.g. [dʎ] (Corsican), [ɟɟ] (Calabrian), [d:ʒ] (Calabria, Apulia) (Rohlfs 1966; Müller 2011). A wide array of other coexisting realizations, e.g. [ɖ, d, d:, ð, ɟ, j, ʐ, ʒ, ɻ, ɾ, ʎ], with extensive inter- and intra-speaker variation, is found in Calabria (Rohlfs 1966; Romito & Milelli 1999; Bianco 1981; Romito & Scuticchio 2009; Müller 2011) and Corsica (Celata 2010).

The rhotic is also subject to retroflexion, this time in the context of a coronal, especially after /t/ (Rohlfs 1966; Sorianello & Mancuso 1998; Loporcaro 2001; Celata 2006, 2010; Romano & Gambino 2010; Müller 2011; Romano 2015). As a second step, the coronal stop undergoes anticipatory place assimilation (see Hamann 2003) and a retroflex cluster, i.e. [ʈɽ], is obtained (Sorianello & Mancuso 1998). The [+apical] feature may spread even further, to a preceding /s/, with the upshot being [ʂʈɽ] (Romano 2015). The phenomenon is particularly common across the Southern part of the Italian peninsula, including Sicily, Apulia, and Calabria (Rohlfs 1966). Ample evidence provided by phonetic research confirms the pronunciation of the etymological /tr/ as [ʈ͡ʂ], which may even be indistinguishable from the alveolopalatal affricate (Celata 2006, 2010; Romano 2015; see also Ruffino 1991; Sorianello & Mancuso 1998; Loporcaro 2001). The phenomena at hand are briefly illustrated below:

(6) Retroflexion of /tr/ in Sicilian (adapted from Celata 2010: 37)

a.	/treno/	ʈɻéno ~ ʈ͡ʂéno	‘train’
b.	/attrovare/	aʈʈɻováɾe ~ aʈ͡ʈ͡ʂováɾe	‘to find’

2. Palatalization

2.1 Palatalization in Greek

Greek displays a wide range of palatalization processes (see Baltazani et al. 2016), the most well-established one being related to the fronting of the dorsals /k, g, x, ɣ/ as well as the coronals /l, n, s/[2] in the context of a front vocoid /i, e, j/ following the target consonant (Newton 1972; Grandqvist 1997; Kontossopoulos 1994/2008; Trudgill 2003; Arvaniti 2007; Topintzi & Baltazani 2016; Apostolopoulou 2018). Topintzi & Baltazani (2016) distinguish two aspects of this process, i.e. *Simple Palatalization* and *Extreme Palatalization*.

In Simple Palatalization, the front vowels /i, e/ trigger fronting of the dorsals /k, g, x, ɣ/ in all dialects (7a–d) and, in addition, the alveolars /l, n, s/ in restricted geographical areas (7e–g).[3]

(7) Simple Palatalization

a.	/kima/	**c**íma	‘wave’	Standard
b.	/geto/	**ɟ**éto	‘ghetto’	Standard
c.	/xilos/	**ç**ilós	‘mush’	Standard
d.	/ɣeros/	**ʝ**erós	‘sturdy’	Standard

[2] The voiced stop /g/ as well as /b, d/ below may also be derived from their underlying voiceless counterparts under the influence of a preceding nasal. For the illustration of the palatalization processes, I simply assume underlying voiced stops without further discussing their actual status.

[3] The two sonorants are palatalized in Peloponnese (Papazachariou 2006), Thessaly, Lesbos, Crete; the sibilant is palatalized in Samothraki, Thessaly, Imvros (Newton 1972), as well as Edessa, especially by speakers bilingual with Slavic dialects (FW 2015). Newton (1972: 142m) also mentions instances of /z/ palatalization.

e.	/lino/	**ʎ**íno	'I untie'	Peloponnesian
		cf. **l**íno		cf. Standard
f.	/irini/	irí**ɲ**i	'peace'	Peloponnesian
		cf. irí**n**i		cf. Standard
g.	/sima/	**ʃ**íma	'signal'	Edessa
		cf. síma		cf. Standard

The front glide /j/ is also subject to simple palatalization in a prevocalic environment. The values of [±voi] and [±nas] are assigned in accordance with the featural specification of the preceding consonant. Word-initially, intervocalically, and after voiced coronals, i.e. /d, ð, r, z/, and non-nasal labials, i.e. /b, v/, the realization of the glide is identical to the fronted allophone of the dorsal /ɣ/, e.g. [ʝ] in Standard Greek (see below for cross-dialectal variation). The voiceless counterpart, e.g. [ç], emerges after the voiceless /t, θ, p, f, s/. Finally, after the nasal /m/, the glide surfaces as a nasal palatal [ɲ]. The inflectional paradigm of neuter nouns containing the theme element /j/ lends itself to a comprehensive demonstration of the phenomenon (the morphological segmentation corresponds to root-TH-N.PL):

(8) Simple palatalization of /j/

a.	/so-j-a/	só**ʝ**a	'extended families'	Standard
b.	/ɣand-j-a/	ɣá^{n}d**ʝ**a	'gloves'	Standard
c.	/ɣat-j-a/	ɣat**ç**á	'kittens'	Standard
d.	/kalam-j-a/	kalám**ɲ**a	'canes	Standard

In most dialects, the glide surfaces as a fricative (with the exception of [mɲ]). Rarely, e.g. in certain environments in IG (see chapter 2) as well as in hypercorrected speech in Standard Greek (see Kazazis 1968; Apostolopoulou 2018), an approximant [j] may emerge as a co-variant. Other variety-specific idiosyncrasies regarding glide strengthening include, among others, the allophony between a fronted (not palatalized; represented here as [k´]) stop after /p, f, v, t, θ, ð/ and a back velar stop after /r/ in Cypriot, e.g. [aðerf**k´**a] 'brothers' vs. [zefkár**k**a] 'pairs' (Newton 1967; Kaisse 1992; Nevins & Chitoran 2008) and the subsequent spirantization of stops preceding the /j/ variant, e.g. Cretan /mat-j-a/ → [máθca] 'eyes' (Granqvist 1997).

Extreme palatalization targets dorsals (9a–d) and /l, n/ (9e–f) independently of the dialect and involves the full absorption of a pre-vocalic glide (see Apostolopoulou 2018 for a discussion on the distinction between the two cases in Standard Greek) by the preceding consonant (cf. Bateman 2007 and Kochetov 2011 and references therein). IG seems to be the only dialect in which dentals may constitute targets of extreme palatalization (recall SIG **dj**avénno ~ **ɟ**avénno ~ **ʝ**avénno 'I pass by'; **tj**ári ~ **c**ári 'shovel', chapter 2). In Peloponnese, Cyprus, Epirus, Samothraki, Imvros, Thessaly, and Edessa, /s/ is also affected (9g).

(9) Extreme palatalization (in Standard Greek)

a.	/kapak-j-a/	kapá**c**a	'lids'
b.	/pung-j-a/	pu^{ŋ}**ɟ**á	'pouches'
c.	/stax-j-a/	stá**ç**a	'straws'
d.	/kiniɣ-j-a	ciní**ʝ**a	'games (of hunting)'
e.	/stafil-j-a/	stafí**ʎ**a	'grapes'
f.	/lemon-j-a/	lemó**ɲ**a	'lemons'
g.	/kafas-j-a/	kafá**ʃ**a	'crates'
		cf. Standard kafás**ç**a	

The fused palatals, especially the allophones of the sonorants /l/ and /n/, may be lengthened in the dialects allowing for geminate consonants, e.g. in Cypriot (Armostis 2012), Dodecanesian (Tsopanakis 1940), and IG. Roughly in the same dialects, the palatalized lateral is optionally replaced by the fricative [ʝʝ] (Christodoulou 1967; Armostis et al. 2006).

Notably, /j/ is available in the phonemic inventory of those dialects that have phonologized the old unstressed /i/ in a prevocalic position, among which the Standard (Mirambel 1959; Householder 1964; Setatos 1974; Nyman 1981; Topintzi & Baltazani 2016; Apostolopoulou 2018; cf. Kazazis 1968; Warburton 1976; Holton et al. 2012; Arvaniti 2007). In these varieties, /i/ and /j/ contrast, as shown via minimal pairs, e.g. /trapezi-a/ → [trapezia] 'trapezoids' vs. /trapez-j-a/ → [trapézʝa] 'tables' (Apostolopoulou 2018). Other dialects, such as IG, show indications of retention of a vowel /i/ in all positions, with the glide emerging predictably as a non-syllabic allophone in hiatus environments. The exact phonetic form of this derived glide is typically consistent with the respective realization of the dorsal and alveolar consonants in a given dialect, e.g. IG /kalam-i-a/ kalámmɲa (see chapter 2).

Although the palatals [c, ɟ, ç, ʝ] constitute the most widespread incarnation of velar fronting in Greek, different instantiations that have undergone *Assibilating Stop Palatalisation* (ASP) (see Recasens 2020) are observed in Southern dialects (Newton 1972; Kontossopoulos

1994/2008; Trudgill 2003; Manolessou & Pantelidis 2013; Tzitzilis (ed., in press); specifically for Cypriot: Armostis 2006 et seq.; Christodoulou 2015; specifically for Cretan: Granqvist 1997; Kappa 2001; Lengeris & Kappa 2016; specifically for Dodecanesian: Tsopanakis 1940; Karanastassis 1965; Minas 1970; for IG see chapter 2). Manolessou & Pantelidis (2013) identify five attested types of fronting (see therein for more detailed discussion on the geographical distribution of each type and references), demonstrated below:

(10) Fronting of dorsals before front vocoids in Greek

a.	Type A	*palatals*	[c, ɟ, ç, ʝ]	MedG, Standard
b.	Type B	*advanced palatals (possibly aspirated)*	[c̟$^{(h)}$, ɟ̟, ç̟$^{(h)}$, ʝ̟][4]	part of Crete
c.	Type C	*assibilated palato-alveolars*	[t͡ɕ, d͡ʑ, ɕ, ʑ]	part of Crete, Aegean
d.	Type D	*assibilated post-alveolars*	[t͡ʃ, d͡ʒ, ʃ, ʒ]	IG, Cyprus, Dodecanese
e.	Type E	*depalatalized sibilants*	[t͡s, d͡z, s, z]	Cyclades[5]

Fronting beyond Type A does not necessarily target all four dorsal consonants. Rather, the implicational hierarchy *k* > *g* > *x* > *ɣ* has been proposed by Newton (1972), who observes that stops are the first to be affected and the voiced fricative is the least frequently palatalized consonant. Typically, dialects that do not simply exhibit palatals are consistent with respect to the additional type they belong to (Manolessou & Pantelidis 2013). Finally, it is significantly rare that a consonant resists all types of fronting (see chapter 2 for realizations of dorsals at morphological boundaries in IG).

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[4] Lengeris & Kappa's (2016) acoustic analysis reports the realization [c^{ç}] instead of [c̟^{h}].

[5] In Astypalea, an extraordinary case of fronting of /ɣ/ to [n͡dz] is observed (Karanastassis 1958).

2.2 Palatalization in Italo-Romance

Italo-Romance palatal segments, i.e. /ʎː ɲː d͡ʒː t͡ʃː ʃː/ have been created through processes that targeted different consonants or consonant clusters in the context of a front vowel /e, i/ or the palatal glide /j/ (Rohlfs 1966; Saltarelli 1970; Tekavčić 1980; Calabrese 1993; Marazzini 1994; Maiden 1995; Krämer 2009a). First, the glide /j/ coalesced with the preceding consonant (with the exception of labials) thus resulting in a geminate palatal [ʎʎ] (11a), [ɲɲ] (11b), [tt͡ʃ] (11c), [dd͡ʒ] (11d), or [ʃʃ] (11e).[6] Likewise, word-initial and intervocalic /j/ (i.e. spontaneously geminated [VjjV], Tekavčić 1980), was strengthened to [(d)d͡ʒ] (12) (for the degemination in word-initial positions see 14 below).

Palatalization before /j/ (Krämer 2009a: 27–28)

(11) /(C)Cj/

a.	fi[lj]a	> fi[ʎʎ]a	‘daughter’
b.	ba[lnj]u	> ba[ɲɲ]o	‘bath’
c.	eri[kj]u	> ri[tt͡ʃ]o	‘hedgehog’
d.	fa[gj]u	> fa[dd͡ʒ]o	‘beech’
e.	reve[rsj]are	> rove[ʃʃ]are	‘to reverse’

(12) /#jV/, /VjV/

a.	[j]anuarius	> [d͡ʒ]ennaio	‘January’
b.	pe[jj]us	> pe[dd͡ʒ]o	‘worse’

Moreover, the velars /k, g/ were turned into post-alveolar affricates before the front vowels /e, i/ (Rohlfs 1966; Saltarelli 1970; Tekavčić 1980; Marazzini 1994; Maiden 1995; Krämer 2009a; see also Burzio 2004; Krämer 2006a). In the same phonological environment, the cluster /sk/ is transformed into [ʃ(ʃ)].

(13) Velar palatalization before front vowels (Krämer 2009a: 28)

a.	[k]irculus	> [t͡ʃi]rcolo	‘circle’
b.	[g]ente	> [d͡ʒ]ente	‘people’

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[6] Rarely, the trigger /j/ is absent, e.g. *LA[ks]ARE > la[ʃʃ]are* ‘to let’ (Krämer 2009).

c. pi[sk]e > pi[ʃʃ]e ‘fish’

The Italian palatals /ʎ: ɲ: d͡ʒ: t͡ʃ: ʃ:/ are intrinsically long (Chierchia 1986; Burzio 1989; Nagy & Napoli 1996; Wiltshire & Maranzana 1998; Canepari 1999; Davis 1999; Payne 2005, 2006).[7] Their inherent property of surfacing as geminates becomes evident in intervocalic and word-initial positions after a word-final vowel, but not when they occur phrase-initially or after a consonant, as illustrated below (14a–b are drawn from Davis 1990: 101; 14d is drawn from Payne 2005: 155):

(14) Inherently long consonants

a.	fá**ʃʃ**áre	‘bandage’
b.	kása **ʃʃ**upáta	‘ruined house’
c.	**ʃ**upáta	‘ruined’
d.	non **ʃ**ákwa	‘s/he doesn’t rinse’

3. Lenition of onsets

3.1 Lenition of onsets in Greek

The most common aspect of lenition in Greek is the elision of intervocalic voiced fricatives. The phenomenon is found, except for IG, in South-Eastern varieties, e.g. Cypriot (Newton 1972; Christodoulou 2015), Dodecanesian (Newton 1972; for a comprehensive list and references see Christodoulou 2015: 402). The process operates both in word-medial positions (15) and across word boundaries (16). Compare, for instance, Standard Greek (15–16, first column) and Cypriot Greek (15–16, second column) (data taken from Christodoulou 2015):

(15) Word-medial intervocalic consonants

a.	meɣálo	meálon	‘big’

[7] The same holds for the alveolar affricates /t͡s: d͡z:/, at least some instantiations of which notably result from the same process that created palatals via fusion of a Latin consonant with the following glide /j/, e.g. UI[tj]U > ve[tt͡s]o ‘habit’, ME[dj]U > me[dd͡z]o ‘half’ (Krämer 2009: 27).

b.	kávuras	káuras	‘crab’
c.	láði	láin	‘oil’

(16) Word boundaries

a.	ta ɣónata	ta ónata	‘the knees’
b.	na tu válun	na tu álun	‘to put to it’
c.	áku na ðís	áku na ís	‘here’s the thing’ (literally ‘hear to see’)

Word-initially, [ɣ] (coming from /ɣ/ or /ð/), [v], and [ʝ] may also turn into semi-vowels in Cyprus (Vagiakakos 1973; Christodoulou 2015: 426).

(17) Gliding of word-initial voiced fricatives

a.	ɣúfa ~ wúfa	‘loom’
b.	vunón ~ wunón	‘mountain’
c.	ðuʎá (> ɣuʎá) ~ wuʎá	‘job’

Another example of lenition is the conversion of the intervocalic voiceless fricative /x/ to [h] (18a) in Cyprus, the Dodecanese, South-Eastern Aegean, and Livisi (Hatzidakis 1907; Pantelidis 1929; Karanastasis 1965; Newton 1972; Christodoulou 2015), as well as, partially, in Tsakonian (Liosis 2007). The intervocalic /s/ in certain morphological environments and a handful of roots had the same fate (18b).[8] In certain Cypriot varieties displaying a tendency to velarize non-dorsal segments, among which /f/ (18c) and /θ/ (18d) (Christodoulou 2015), derived [x] as well as its palatal counterpart [ç] are also debuccalized. At a subsequent stage, the glottal [h] is elided.

(18) Voiceless fricative debuccalization and elision in Cypriot

a.	í**x**ame	> í**h**ame	> í∅ame	‘we had’

[8] Rare and scattered instantiations of *s* > *x* preceding the debuccalization stage are reported by Tsopanakis (1940: 114–115) for Rhodes. Notably, though, Tsopanakis uses his notational convention for a velar [x] in, e.g., *kambóxes* (instead of the expected *kambó**ç**es*) ‘enough’. As a fact, Greek speakers find it hard to perceive (and produce) the difference between [h] and [x]. Without wishing to take a strong stand with respect to this matter, I would suggest that it is not impossible that the actual pronunciation includes a glottal rather than a velar fricative.

b.	mé**s**a		> mé**h**a	> méØa	'inside'
c.	a**f**íno	> a**ç**ínno	> a**h**ínno	> aØínno	'I let'
d.	kri**θ**árin	> kri**x**árin	> kri**h**árin	> kriØárin	'barley'

Newton (1972: 104) briefly mentions optional voicing of fricatives before a sonorant in Cypriot, e.g. [ðá**f**ni] ~ [ðá**v**ni] 'laurel', [**x**rónos] ~ [**ɣ**rónos] 'year', although he does not clarify whether the phenomenon falls under lenition. Undoubtedly, this process bears resemblance to the voicing onset consonants undergo in SIG, e.g. [**p**lónno] ~ [**b**lónno] 'I hang', [**x**rusáfi] ~ [**ɣ**rusáfi] 'gold' (see chapter 2). A degree of voicing that is certainly connected to lenition is observed in intervocalic voiceless stops in Cyprus (Newton 1972; Christodoulou 2015) and the Dodecanese (Karanastassis 1958, 1965), e.g. [stá**p̬**u] 'somewhere', [po**t̬**é] 'never', [to **k̬**ommá**t̬**i] 'the piece' (Christodoulou 2015: 426). The phenomenon has been both reported impressionistically and confirmed by phonetic research (Tserdanelis & Arvaniti 2001; Eftychiou 2008). Notably, voiceless stops are also reported to delete at times, e.g. [kommá**t**in] ~ [kommá**Ø**in] 'piece' (Christodoulou 2015), possibly following the intermediate partial voicing.

Notably, lenition never targets post-consonantal segments. On the contrary, post-consonantal fricatives are dissimilated into plosives, e.g. /xθ/ → [xt], /sx/ → [sk], /rð/ → [rd] (see chapter 2 for more cases and examples), which constitutes a fortition process. Utterance-initial consonants also emerge as "strong", unlenited variants, e.g. [ta Øónata] but [#**ɣ**ónata]; [to **k̬**ommát̬i] but [#**k**ommát̬i].

A final change that is subsumed under lenition is the change of the intervocalic /ɣ/ to a labial fricative. Apart from SIG (see chapter 2), this PoA shift is also sporadically encountered in a few words in Cyprus and the Dodecanese, e.g. e**ɣ**ó > **v**ó 'I', tra**ɣ**uðó > tra**v**uðó 'I sing'. Crucially, though, /v/ may also be altered quite arbitrarily, e.g. **v**aftízo > **ɣ**aftízo ~ **ð**aftízo 'I baptize', **v**íma > **ð**íma 'step' (Christodoulou 2015: 416 and references therein), similarly to the free alternation between PoAs in simplex onsets in CIG independently of the direction of the shift, e.g. **v**oréa ~ **x**oréa 'North wind', **x**úma ~ **f**úma 'soil', **θ**imonía ~ **x**imonía 'haystack', **θ**ilikó ~ **f**ilikó 'female', (in each pair, the first word represents the faithful version; see chapter 2).

3.2 Lenition of onsets in Italo-Romance

Although intervocalic stops are generally immune to lenition in Standard Italian, with the main exception being the spirantization of the Latin /b/ to /v/, e.g. *habere* > *avere* 'to have' (Krämer 2009a), dialects exhibit a wide range of lenition and interwoven fortition phenomena. A well-known lenition process is *Gorgia Toscana* ('Tuscan throat') (Giannelli & Savoia 1978; Giannelli 1997; Marotta 2006, 2008; Amato 2019). Gorgia operates within as well as across words and induces the spirantization of post-vocalic plosives, i.e. simplex onsets (e.g. 19a–b) and the first member of complex onsets (19c, f).[9] The lenited outputs may appear with a slight approximant realization (Marotta 2008: 246). Moreover, post-alveolar affricates (19g) lose their occlusive component. Geminates (19h), post-consonantal segments (e.g. post-consonantal /b/ in 19d–e), segments in utterance-initial position, and consonants subject to sandhi gemination (see section 7) escape weakening. Representative examples are given below (Standard Italian in first column, Tuscan Italian in second column; weakened segments are in bold; segments escaping weakening are in brown):

(19) Gorgia Toscana (Marotta 2008: 242)

a.	brú:**k**o	brú:**x**o ~ brú**h**o	'caterpillar'
b.	la **p**á:**g**a	la **ɸ**á**ɣ**a	'the payment'
c.	a**k**ró:**b**a**t**a	a**x**ró:**β**a**θ**a	'acrobat'
d.	la bímba	la **β**ímba	'the baby-girl'
e.	il bímbo **d**ɔrme	il bímbo **ð**ɔrme	'the baby-boy is sleeping'
f.	la **g**rótta	la **ɣ**rótta	'the cave'
g.	amí:**t͡ʃ**i	amí:**ʃ**i	'friends'
h.	la **d͡ʒ**ákka	la **ʒ**ákka	'the jacket'

Voiced stops are particularly prone to lenition in Southern dialects, e.g. Neapolitan (Fanciullo 1986; Borelli 2000; Marotta 2008; Abete 2015; see also Rohlfs 1966). Post-consonantally and in environments favoring syntactic doubling (see section 7.2), we get the strong variants [b],

[9] In Pisan, the lenited intervocalic /k/ may also delete, e.g. [plastika] > [plastixa] > [plastiØa] 'plastic', or turn into a glide, e.g. [plastija] (Marotta 2008: 249).

[g], [d], whereas a remarkable number of weak variants resulting from changes in the MoA and PoA, as well as deletion, are obtained intervocalically:

(20) Strong and week voiced obstruents

	Strong		Weak
	C._	fortition via RF	lenition: V_V
/b/	*b*	*bb*	*v ~ β ~ Ø*
/d/	*d*	*dd*	*ð ~ ɾ ~ l ~ Ø*
/g/	*g*	*gg*	*ɣ ~ j ~ v ~ Ø*

In the main contact dialects that surround the IG enclaves, lenition of voiced segments manifested as spirantization (including deaffrication, e.g. *t͡ʃ > ʃ*), or deletion is observed. In general, in Southern dialects, voiceless plosives (intervocalic or in OL clusters) are preserved intact, whereas Northern areas feature voicing, e.g. Valtellina *sádru* < *sáturu* (Rohlfs 1966: 270). Nevertheless, the South does exhibit instances of voicing, occasionally cooccurring with gemination, e.g. Salentinian *pékora* > *péggərə*, Calabrian *lepre* > *lébbiru*, Sicilian *ruta* > *ruda* (Rohlfs 1966: 276), possibly due to hypercorrection (Fanciullo 1986; Borelli 2000).

4. Long-distance metathesis of liquids

4.1 Long-distance metathesis in Greek

Based on the extant literature, IG seems to be the only Modern Greek dialect in which liquids moved systematically from and to a particular phonological environment. A potential exception could be the Heptanesian dialects, in which, according to Krimpas (2019: 252), we encounter a number of forms displaying LDM (21, first column; cf. Standard Greek, second column).[10] Notably, like Southern Italy, the Heptanese were under long-standing contact with Romance, with visible impact on several aspects of the linguistic system (Makri 2020).

[10] I thank Nikos Mourouzis for providing the data in (21a) and (22c).

(21) LDM in Greek (outside Southern Italy)

a.	pr̲ikós	pikr̲ós	‘bitter’	Corfu, Kefalonia
b.	kr̲opjá	kopr̲iá	‘manure’	Kefalonia, Zakynthos, Corfu
c.	tr̲áfos	táfr̲os	‘trench’	Lefkada
d.	pr̲ikalíða	pikr̲alíða	‘chicory’	Corfu, Kythera

Moreover, Heptanesian, as well as the dialects of Peloponnese, feature scattered instances of local metathesis of liquids (Krimpas 2018: 225), without a discernible pattern (22, first column; cf. Standard Greek, second column).

(22) Non-systematic local metathesis of liquids in Heptanese

a.	kór̲kos	kr̲ókos	‘yolk’	Kefalonia, Peloponnese
b.	kór̲da ~ kódr̲a	xor̲ði	‘string’	Kefalonia
c.	kutr̲ínes	kur̲tínes	‘drapes’	Corfu

In the rest of Modern Greek dialects, metathesis of liquids –occasionally accompanied by metathesis of other elements– is attested only sporadically. In Standard Greek, multiple variants coexist, usually with different stylistic nuances: the etymological form (23, first column) is used in neutral and formal contexts, whereas the innovative forms (23, second column) are usually more colloquial.

(23) Other instances of metathesis in Greek

a.	**f**al̲a**k**r̲ós	**k**ar̲a**f**l̲ós	‘bald’
b.	**f**úx**t**a	**x**ú**f**ta	‘fistful’
c.	kr̲okóðilos	kor̲kóðilos	‘crocodile’

Instances of metathesis of liquids are found in several dialects within the Greek-speaking world, again in a non-systematic fashion. Consider, for example, the following data from Rizomata Greek (Central Macedonia; 24–25, second column)) compared to Standard Greek (own fieldwork 2011) (other changes, e.g. vowel raising or deletion, are to be ignored here):

(24) Metathesis in Rizomata Greek

a.	vur̲kólakas	vr̲ikólakas	‘vampire’

	b.	kítirnu	kítrino	‘yellow’
	c.	ðerpán	ðrepáni	‘scythe’
	d.	gurlízu	ɣrilízo	‘I grawl’
	e.	skrupó	skorpó	‘I spread’
	f.	truvás	torvás	‘feedbag’

(25)	Absence of metathesis in the same environments			
	a.	vrázu	vrázo	‘I boil’
	b.	katrám	katrámi	‘tar’
	c.	aðráxnu	aðráxno	‘I grab’
	d.	ɣrílus	ɣrílos	‘cricket’
	e.	skórðu	skórðo	‘garlic’
	f.	túrkus	túrkos	‘Turk’

Although certain post-consonantal liquids appear to have moved rightwards into a post-vocalic position (24a–d), an examination of the examples in (25a–d), where the same OL clusters are preserved, makes it clear that metathesis is not mandatory or related to the quality of the preceding consonant.

4.2 Long-distance metathesis in Romance

The LDM phenomena found in IG are abundantly attested not just in Italo-Romance but in languages of the Romance family in general. The overarching pattern includes the leftward intersyllabic displacement of a post-consonantal liquid to a post-consonantal position. Consider, for instance, the equivalents of Latin *capra* ‘goat’:

(26)	LDM in Romance: Latin *capra* ‘goat’		
	a.	capra	Standard Italian (Kilpatrick 2010: 17)
	b.	crava	Piemontese, Genovese (Kilpatrick 2010: 17)
	c.	cräva	Piacentino (Kilpatrick 2010: 17)
	d.	crapa	Calabrian, Salentinian (FW)
	e.	craba	Alguerese Catalan (Torres-Tamarit et al 2012: 355)

f. kraβa Tertenia Sardinian (Lai 2013: 168);
g. crabo Gascon (Coffman 2013b: 113)

When the original OL cluster is located in the third syllable, two LDM versions can be distinguished on the basis of the distance the liquid travels. First, the liquid[11] may move all the way to the first syllable of the word, as in IG. This type of unbounded LDM is robustly attested in Sardinian varieties (27; data from Lai 2013) (Wagner 1941; Geisler 1994; Bolognesi 1998; Molinu 1999; Lai 2013, 2015), Southern Italo-Romance such as Calabrian (28) (Rohlfs 1966), and Gascon (29) (Grammont 1905–1906; Duménil 1987; Blevins & Garrett 1998).

(27) LDM in Sardinian (Lai 2013)

a.	kranista	<	kanistru	‘wicker basket’
b.	krannuɣa	<	konuk(u)la	‘distaff’
c.	priðúku	<	peduc(u)lu	‘tether’

(28) LDM in Calabrian

a.	crapesto	<	capistru	‘halter’
b.	frinesta	<	fenestra	‘window’
c.	klonuka	<	konuk(u)la	‘distaff’

(29) LDM in Gascon

a.	hloronc	<	furunc(u)lum	‘abscess’
b.	crabeste	<	capistru	‘halter’
c.	hrieste	<	finestra	‘window’

Evidence of this pattern is also found in Campanian dialects such as Neapolitan (30) (Abete 2015), although scarce:

(30) LDM in Neapolitan

a.	scrapestato	<	scapestrato	‘loose-living’

[11] LDM targets both /r/ and /l/. Notably, though, in some languages, among which Sardinian, the Latin liquids have been neutralized to /r/ (e.g. 35a; see also 27b–c) (Wagner 1941; Pittau 1972; Virdis 1978; Frigeni 2005).

The other option for a liquid undergoing LDM is to dock on the onset of the adjacent, i.e. the second syllable. This pattern is documented in Alguerese Catalan (31) (Cabrera-Callís et al. 2010; Torres-Tamarit et al. 2012) and Judeo-Spanish (32) (Lipski 1990; Bradley 2006; 2007).

(31) LDM in Alguerese Catalan

a.	catradal	<	catedral	'cathedral'
b.	cogrombe	<	cogombre	'cucumber'

(32) LDM in Judeo-Spanish

a.	cabresto	<	cabestro	'halter'

Scattered instances of metathesis to the adjacent syllable are reported also for Northern Italo-Romance dialects such as Lombardian (33a) and Venetian (33b) (Rohlfs 1966).

(33) LDM in Northern Italo-Romance

a.	cadrega	<	catecra	'chair'
b.	cadrea	<	catecra	'chair'

In a subset of the above languages, LDM coexisted with metathesis from a pre-consonantal position, resulting in a complex onset in either the same (34)[12] or the initial (35) syllable. Due to neutralization of the distinction between the two liquids (see fn. 11) only rhotics appear to be involved (Torres-Tamarit et al. 2012; Frigeni 2005).[13]

(34) Intrasyllabic metathesis of codas (Torres-Tamarit et al. 2012)

a.	Alguerese Catalan	frument	<	forment	'wheat'
b.	Judeo-Spanish	taβrena	<	taβerna	'tavern'

[12] Due to the scarcity of positive evidence, I follow Cabrera-Callís *et al*. (2010) in classifying Alguerese among the languages displaying intrasyllabic metathesis of pre-consonantal /r/. Torres-Tamarit et al. (2010: 355) cite the example *estornell* > *estronell* 'starling'; however, metathesis to the first syllable would not have been possible, as it lacks an onset.

[13] There is an extremely low number of exceptions where the liquid lands in a coda, e.g. *cobertor* > *corbetor* 'bedspread' (Lipski 1990) (cf. *kroβetura* 35b).

(35) Metathesis of codas to the initial syllable (Abete 2015; Frigeni 2009)

a.	Neapolitan	cravacca	<	cavalcare	‘to ride’
b.	Campid. Sardinian	kroβetura	<	coopertura	‘roof’

Like in IG, LDM in Romance is not associated with the position of stress. It is true that in bi-syllabic tokens, e.g. *cápra* > *crápa*, the liquid usually moves from a post-tonic syllable to the one bearing main stress (Kilpatrick 2010). However, the cases of trisyllabic words illustrate the independency of LDM from stress, as the liquid may leave the stressed syllable to land in an unstressed one, e.g. *catedrál* > *catradál* (31a), or travel from and to unstressed positions, as in *conúcla* > *krannúɣa* (28b).

According to general consensus, the diachronic LDM processes at hand operated within smaller morphological domains than the prosodic word. Through the examples Torres-Tamarit et al. (2015: 356) offer for Alguerese, e.g. *com-promitir *crom-pomitir* ‘to compromise’, we could posit that the /r/ does not cross the boundaries of the root. Along the same lines, in Neapolitan, in the prefixed word *cun-fromme* ‘compliant’ (cf. Italian *con-forme*) (Abete 2015: 253), the rhotic does not move outside the root, i.e. **crunfomme*.

LDM did not apply blindly to all medial OL in all the above Romance languages. A universal “blocker” of LDM is the lack of an onset consonant in the target syllable. In this case, the liquid never forms a simplex onset in the target syllable. For example, the post-consonantal /r/ stays put in the second syllable in Alguerese if the first syllable is onsetless, e.g. *ungra *rungua* ‘nail’ (Torres-Tamarit et al. 2012: 355).

However, unlike IG, there is some evidence that LDM is gradient in Romance, in the sense that the grammar resorts to alternative landing sites if the core pattern is blocked. For instance, in Alguerese, in case the original OL is found in the third syllable and the second, i.e. target, syllable consists of a single vowel, /r/ proceeds to an alternative destination and lands in the first syllable, e.g. *poagra* > *proaga* ‘podagra’ (Torres-Tamarit et al. 2012: 356). In a similar vein, in Neapolitan, a liquid moves from the third to the second syllable, should the first one be onsetless, e.g. *ottobre* > *ottrufe* ‘October’, *inchiostro* > *angresta* ‘ink’ (Abete 2015: 255). In Tertenian Sardinian, according to Lai (2015: 277), a recent development of medial OL clusters that failed to be split by LDM was the transformation into LC through local transposition, e.g. *aprile* > **aβrile* > *arβile* ‘April’, *acrus* > **aɣru* > *arɣu* ‘sour’.

A second generalization that can be drawn and stands in accordance with IG, is that liquid metathesis does not create phonotactically illicit clusters. For instance, in Tertenia

Sardinian, LDM failed to apply in words beginning with /m/, /s/, or /t͡ʃ/, as the outcome, i.e. *[mr], *[sr], *[t͡ʃr], would be inadmissible. In these cases, alternative strategies apply, e.g. metathesis leading to LC clusters, e.g. Sardinian *matrice* > *marði* 'sow', *socru* > *sorɣu* 'father-in-law', *[t͡ʃ]enap(u)ra* > *t͡ʃenarβa* 'Friday' (Lai 2013), or lateralization, e.g. Alguerese *mort* > *molt* 'dead' (Torres-Tamarit et at. 2012).

The intervocalic cluster /tr/ appears to resist LDM not only in IG but also in Sardinian, even though the target syllable constitutes a proper landing site (Lai 2013, 2015). For instance, the Latin *petra* 'stone' was not affected by LDM in Sardinian during the LDM period, but rather the /t/ was lenited to [ð] and, later, the order within the OL cluster was reversed, i.e. **peðra* > *perða* (cf. e.g. Piemontese *preja*, Piacentino *preda*, Kilpatrick 2010: 90). On the other hand, the introduction of /s/ in the cluster seems to increase the susceptibility of /str/ to LDM, *capistru* > *krapistu* 'halter', *castru* > *krastu* 'castle' (Lai 2015).[14]

Finally, overall, migrating liquids did not skip over another liquid, e.g. *kalabria* **kralabia* 'Calabria', *kolovra* **krolova* 'snake' (Tertenia, Lai 2013, 2015).

In the Italo-Romance family, a significant number of other metathesis processes affecting liquids in complex onsets or in codas is documented, none of which is systematically manifested in IG. In short, these cases include:

(a) reciprocal long-distance metathesis, i.e. inversion of /r/ and /l/, particularly in the diachrony of Spanish, e.g. *mirac(u)lum* > *milagro* 'wonder', *peric(u)lum* > *peligro* 'peril' (Ultan 1971).

(b) leftward local metathesis of pre-consonantal liquids, e.g. in dialectal varieties of Spanish, e.g. *abarcar* > *abracar* 'to cover', *pedernal* > *pedrenal* 'flint' (Lipski 1990; Russell-Webb & Bradley 2009) or in South-Western Campidanese Sardinian varieties, e.g. *porku* > *proku* 'pig', *suerʤu* > *sruezu* 'oak', *marmuri* > *mramuri* 'marble' (Wagner 1941; Bolognesi 1998; Lai 2013).

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[14] Traces of an idiosyncratic behavior of the intervocalic /tr/ can be detected also in Neapolitan, e.g. *cátetra* < Lat. *căthedra* 'chair' (D'Ascoli 1993; also reported as *cátreta*, Abete 2015: 254, fn.23). However, the low number of available tokens prevents the extraction of strong generalizations.

(c) rightward local metathesis of pre-consonantal /r/ affecting specific Cr clusters, such as [ɾ̥ð] > [ðɾ] in Judeo-Spanish, e.g. *taɾðe* > *taðɾe* ‘late’, *karða* > *kaðra* ‘blow struck with a stick’ (Lipski 1990; Bradley 2006, 2007), also found in Sestu Sardinian (Lai 2013), which is associated with particular phonetic cues (Bradley 2006, 2007).

5. Codas

5.1 Codas in Greek

In the native lexicon of MedG and the majority of Greek dialects,[15] only one coda consonant is licensed per syllable (e.g. Kappa 1995; Malikouti-Drachman 1984, 2001). The status of medial clusters is disputed. In this analysis I take all sonority plateaux and reversals to be heterosyllabic (Kappa 1995; Malikouti-Drachman 2001) for arguments regarding IG see chapter 2), with the set of consonants that are admissible in the coda varying depending on the conditions each dialect imposes with respect to MoA and PoA.

In light of this take, the surface coda inventory of Vernacular MedG, passed on to several dialects among which Standard Greek, encompasses fricatives of all PoAs, nasals (the PoA feature being dependent of the following onset), and liquids, with the lateral being rather marginal:

(36) Coda inventory – Vernacular MedG

fricatives	x, f, ɣ, v, s/z
nasals	n/n̪/m/ɱ/ŋ
liquids	r (l)

Note that Vernacular Greek has coexisted with a puristic version of Greek, henceforth referred to as Learned Greek (see Fliaturas & Anastassiadi-Simeonidi 2018), which essentially constituted a prescriptive attempt for reconstruction of Attic Greek, primarily relying on

[15] A large group of dialects spoken mainly in Northern Greece is characterized by deletion of high (and at times mid) vowels in unstressed position, which in turn creates innovative consonant clusters that are alien to other dialects (Hatzidakis 1892). The Northern group is not considered for comparison here.

conservative orthography conventions. This artificial language used to allow coda stops in addition:

(37) Coda inventory – Learned Greek

stops	k, p
fricatives	x, f, ɣ, v, s/z
nasals	n/n̪/m/ɱ/ŋ
liquids	r, l

In the dialects that have evaded the influence of diglossia, stops are in general banished via a coda condition (in the spirit of Ito 1986) excluding [–continuant] segments.[16] Moreover, adjacent continuants ceased to be admissible. These prohibitions led to MoA dissimilation of stop–stop and fricative–fricative clusters, including /rx/ and /rθ/, with the outcome always being a fricative–stop sequence, i.e. /kt/ → [xt], /xθ/ → [xt] (Newton 1972; Holton et al. 2019). The voiceless clusters were affected in MedG and all vernacular dialects, whereas the voiced ones, i.e. /ɣð/, /vð/, /vɣ/, were dissimilated in just a handful of South-Eastern dialects (Newton 1972) as well as IG. Continuant dorsals and coronals were dissimilated after /r/ in Mani, islands of the Eastern Aegean, Kephalonia (Heptanese), certain areas in the Dodecanese and Cyprus, and, of course, IG (Newton 1972). The sequences /sf/ and /rf/ were preserved intact in all dialects (except for /sf/ → [sp] in CIG, see chapter 2). The prohibition of non-continuants is stricter than the dispreference for cooccurring fricatives. Recall that, in OS clusters (/ks/, /ps/), which are heterosyllabic in IG, the non-strident obstruent turned into a fricative in a preliminary stage of SIG, i.e. /xs/, /fs/, despite creating a sequence of continuants. Interestingly enough, the same evolution is observed in Cretan (Kappa 2001) and Cappadocian (Dawkins 1916; Kontossopoulos 1998/2006).

As mentioned in chapter 2, onsets occupied by labial fricatives were not affected by dissimilation; in particular, *sf*, *zv*, *rf*, and *rv* were passed on from MedG to Modern dialects. However, at a later point, the sibilant–fricative sequences were not retained intact in a number of dialects. In SIG (see chapter 2), Cypriot varieties (Newton 1972; Vagiakakos 1973;

[16] A large group of dialects spoken mainly in Northern Greece is characterized by deletion of high vowels in unstressed position, which in turn creates innovative consonant clusters that are alien to other dialects. These dialects are not considered for comparison.

Christodoulou 2015), Farassian (Andriotis 1948), Cappadocian (Kontossopoulos 1998/2006), Koan (Karanastassis 1965), and the dialects of Crimea/Azov (Tzitzilis ed. in press), *sf* (and less frequently also *zv*) was inverted to *fs*, e.g. **sf**ázzo > **fs**ázzo 'I slaughter', **zv**ínno > **vz**ínno 'I erase', while a further development to [ss] is also reported, e.g. **ss**ázzo (data from North-Western Paphos, Cyprus; Christodoulou 2015). On the other hand, Pontic (Oikonomidis 1958) and Ikariotic (Hatzidakis 1907) followed the CIG evolution and dissimilated *sf* to *sp*.

The sibilant may be assimilated by the following consonant. Assimilation by /m/, e.g. kózmos > kómmos 'world', sizmós > simmós 'earthquake', takes place extensively in Cyprus (Vagiakakos 1973; Christodoulou 2015), Rhodes (Tsopanakis 1940), and sporadically in Chios (Pernot 1907). More cases of assimilation are observed in post-lexical clusters (see section 7).

Nasals are in principle admissible pre-consonantally and agree with the following onset with respect to place. Nasal–stop sequences come in three versions (e.g. Tzitzilis in press): (a) a $NO_{[+voi]}$ cluster that is interchangeable with a prenasalized voiced contour segment, e.g. /nt/ → [nd] ~ [^{n}d], in the vast majority of Greek dialects;[17] (b) a denasalized voiced obstruent, e.g. /nt/ → [d], in certain Southern varieties of the mainland and in Cretan; (c) a $NO_{[-voi]}$ cluster which may alternate with a geminate voiceless obstruent, e.g. /nt/ → [nt$^{(h)}$] ~ [tt], exclusively in SIG (see chapter 2). Moreover, cross-linguistic variation arises with respect to the realization of /n/ before a voiceless fricative. In several dialects, among which Standard Greek, /n/ simply assimilates with respect to PoA, e.g. /nθ/ → [n̪θ]. In Cypriot and IG, /n/ undergoes total assimilation to the following consonant and the resulting geminate may even despirantize, e.g. /nθ/ → [θθ] ~ [tt$^{(h)}$] (Pantelidis 1929; Newton 1972; Christodoulou 2015).[18] In Cretan, given that geminates are not allowed, the nasal is deleted, e.g. /nθ/ → [θ] (Pantelidis 1929; Granqvist 1997). Voiced fricatives also absorb the preceding nasal, e.g. Cypriot [maððías] vs. Standard [man̪ðías] 'cloak' (Payne & Eftychiou 2006: 182), Dodecanesian [sivvulí] vs. Standard [siɱvulí] 'advice' (Tsopanakis 1940: 126) whereas in other dialects they are typically realized as stops, e.g. /kinðinos/ → [cíndinos] 'danger' (Manolessou & Bassea-Bezantakou 2012; Newton 1972) (with the exception of Standard Greek, which retains the fricative due to the influence of the learned stratum, Triandafyllidis 1941/2012).

[17] Rare exceptions to this pervasive rule are found in Italian loans, e.g. [ménta] (but also [mé^{n}da]) 'spearmint' [kónte] 'count' (Newton 1972: 121).

[18] In Cypriot this also affects /ns/, e.g. /pensa/ → [péssa] 'pliers' (Payne & Eftychiou 2006: 182).

Leaving aside the exceptional behavior of certain clusters, such as nasal–fricative, in the majority of Modern Greek dialects, the coda position hosts the same set of segments as in Vernacular MedG, i.e. all fricatives, nasals, and at least one liquid ([r]) (see Tzitzilis in press for an overview). Moreover, all PoA features (dorsal, labial, coronal) can occur in the coda. IG is, from this respect, quite idiosyncratic, as, first, it gradually abolished dorsals and, later, labials from the coda and, second, in the most recent stages of certain varieties an additional condition has been imposed that disallows non-strident fricatives (see chapter 2). Aside from MoA features, IG is the only Modern Greek dialect that has systematically abolished dorsal and labial consonants from the coda. A comparable but not identical picture is exhibited by Tsakonian Greek, an isolated dialect spoken in Arcadia, Peloponnese. In particular, the dorsal /k/ and even the sibilant /s/ have undergone debuccalization before stop, e.g. *dáktilo* > *ðát*^{h}*ile* 'finger'; *stóma* > *t*^{h}*úma* 'mouth; *spíron* > *p*^{h}*iru* 'sower'; *askós* > *ak*^{h}*ó* 'skin sac'; /sx/ and /sθ/, on the other hand, is dissimilated into [sk, st], respectively (Liosis 2007: 346). Moreover, /ks/ and /ps/, which possibly comprised heterosyllabic clusters in the ancestor language, have been transformed to an aspirated affricate /ts^{h}/, e.g. *kseró* > *ts*^{h}*ere* 'dry' (Liosis 2007: 524), among other developments (e.g. *táksi* > *tákʃi* 'order' Liosis 2007: 352). However, crucially, /pt/ has simply been dissimilated into /ft/; in other words, Tsakonian allows at least one case of non-strident fricative that inevitably has a PoA feature of its own. Overall, although certain clusters seem to have followed parallel paths in Tsakonian and IG, it cannot be safely assumed that these changes were induced by the same coda conditions (Pernot 1934; Kostakis 1951/1999; Liosis 2007; Tzitzilis in press). Besides, given that Tsakonian is exceptionally isolated and substantially different even from its neighboring Peloponnesian dialects, a claim that contact has played a role in the partially comparable evolution of the two dialects is rather improbable.

Rhotics in principle remain intact in the coda (but cf. *ártos* > *ánde* 'bread' in Tsakonian varieties, Liosis 2007: 346). On the contrary, laterals are strongly dispreferred. Rhotacization of pre-consonantal laterals has its roots in MedG (see Holton et al. 2019) and is manifested to a greater or lesser extent in several descendant dialects, among which –apart from IG– Cypriot (Newton 1972), Cretan (Kappa 2001), and Tsakonian (see Kappa 2021 for examples and references).[19] As mentioned above, /r/ patterns with [+cont] consonants when it comes to MoA dissimilation (e.g. /rx/ → [rk]). Thus, the elimination of stops in the coda could also account

[19] At least in Cretan and Tsakonian, the lateral may be eliminated (via rhotacization, deletion, or another repair strategy) in onset position as well.

for the inadmissibility of the sonorant /l/ and its subsequent rhotacization: if /l/ is specified as [–cont], then the ban on non-continuant codas forces it to change its MoA and surface as a [+cont] liquid, i.e. [r]. In a different vein, Kappa (2021) accounts for the avoidance of /l/ in various positions in Tsakonian following Walsh-Dickey's (1997) hypothesis that delateralization corresponds to the loss of a dorsal node. Indeed, supporting evidence for the dorsality of Greek laterals is offered by the presence of a dark [l] in Constantinople and Central Macedonia (Tzitzilis in press). Although a similar behavior is not documented in IG, surrounding Romance dialects do exhibit realizations of coda /l/ as [w] (see next section). Thus, an approach along the lines of PoA shift instead of MoA change could also be plausible.

Regarding the word-final position, there is general consensus that the only two admissible consonants are /s/ and /n/, which are mainly part of inflectional suffixes (38) (Joseph & Philippaki-Warburton 1987; Kappa 1995, 1997). A final /r/ as well as the clusters /ks/ and /ps/ are also found in marginal examples inherited by Ancient Greek (39) (see also Liosis 2007 and references therein on final /r/ in the place of etymological /s/ in Tsakonian). Loanwords accommodate a much wider range of final consonants as well as clusters, instances of which are given in (40).

(38) Native final consonants in Standard Greek

a.	étreçes	'you (sg.) were running'
b.	étrexan	'they were running'

(39) Final consonants in loanwords from Ancient Greek

a.	ðélear	'lure'
b.	ápaks	'hapax'
c.	míops	'myopic person'

(40) Final consonants in other loanwords

a.	swág	'swag'
b.	kláb	'club'
c.	slájd	'slide'
d.	tóp módel	'top model'
e.	dzáz	'jazz'
f.	máts	'match, game'

g. flért 'flirt'

h. métr 'maitre'

i. táŋks 'tank'

Several dialects, among which IG (see chapter 2), avoid closed syllables at the right edge of words, especially those ending in /n/ (Tzitzilis in press), by employing in principle vowel epenthesis, but also consonant deletion. This tendency is traced back to early MedG, but became particularly evident in the subset of the descendant dialects that fall within the "open syllables" isogloss (Tzitzilis in press). Consider the following comparisons of Standard Greek (1st column) with dialectal forms (2nd column) (data taken from Tzitzilis in press):[20]

(41) Avoidance of final codas via vowel epenthesis

a.	aftó**n**	aftó**ne** (Heptanesian)	'these (gen. pl.)'
b.	ma**s**	ma**se** (Cretan)	'us'

(42) Avoidance of final codas via consonant deletion

a.	peðjó**n**	peðjóØ (Cretan)	'children (gen. pl.)'
b.	lákko**s**	lák^{h}oØ (Tsakonian)	'pit' (Liosis 2007:

On a side note, the nasal /n/, although admissible in word-final position, is susceptible to deletion in certain morphological contexts, such as the accusative of masculine and feminine nominals as well as the nominative and accusative case of neuter nominals in the singular. The elimination of the inflectional marker /n/ in the nominal paradigm has its roots already in MedG and has been identified by Tzitzilis (in press) as an isogloss that contains most descendant dialects, like Standard Greek, the entire so-called Northern group, Peloponnesian, the greatest part of Asia Minor, etc., but excludes Cypriot, Dodecanesian, and Pontic. According to Tzitzilis's classification, IG falls within the former subset, i.e. the dialects in which nominals do not retain the case marker /n/. However, in the majority of these dialects the abandoned /n/ has left no trace and can arguably be removed from the underlying structure, whereas, as shown

[20] Some preference for open syllables is nevertheless observed in dialects outside the "open syllables" isogloss, which is manifested via free alternation of forms with a final /n/ and an epenthetic vowel, especially in verbal forms, e.g. Standard *ímun* ~ *ímuna* 'I was', *tréxun* ~ *tréxune* 'they run', *étrexan* ~ *tréxane* 'they were running', etc.

in chapter 2, in IG, the /n/ is silenced phrase-finally but may surface as [n] before a vowel (and before a stop in CIG) or get incorporated into the following consonant, which is realized as a geminate. Consider the evidence in (43): Standard Greek has abolished the final /n/, which is not even re-employed in hiatus environments, let alone phrase-final positions (43a). On the contrary, in Cypriot, /n/ emerges in both intervocalic and phrase-final context (43b). IG is placed in the middle: the inflectional suffix /n/ is present underlyingly, yet it makes it to the surface on certain conditions, for instance when it is syllabified in an onset before a word-initial vowel (43c).

(43)	/n#/ in nominals			
	a.	/anθropo-~~n~~ asximo-~~n~~/ man-ACC ugly-ACC ‘ugly man’	án̪θropo ásçimo	Standard
	b.	/anθropo**n** asximo**n**/	án̪θropo**n** áscimo**n**	Cypriot
	c.	/anθropo**n** asximo**n**/	áθropo**n** áʃʃimoØ	CIG

In light of these observations, I suggest that IG in fact belongs to the dialectal group preserving the inflectional suffix /n/ in addition to final /n/ in other environments as well as final /s/, and, crucially, the realization of these consonants is contingent upon the phonological environment (see chapter 6 for a formal analysis).

5.2 Codas in Italo-Romance

According to criteria pertaining to definite article allomorphy (44a), vowel lengthening (44b), and Raddoppiamento Fonosintattico (44c) (see also section 7), all clusters of falling or flat sonority cline (LO, LN, NO, SO), as well as those with a shallow sonority rise (Os, sN, sL) are considered heterosyllabic (Chierchia 1982, 1986; Davis 1990; D’Imperio & Rosenthall 1999; Marotta 1993; Morelli 1999; Moren 1999; Nespor & Vogel 1986; Repetti 1989, 1991; Saltarelli 1970; Vogel 1977, 1982, 1994; Wiltshire & Maranzana 1998; Krämer 2009a; see also McCrary 2002, 2004). The generalization that can be drawn is that the definite article *il*, vowel lengthening, and sandhi gemination occur before tautosyllabic clusters, i.e. complex onsets (44, first column), and are blocked before heterosyllabic clusters (44, second column):

(44) Italian clusters (data from McCrary 2004)

a.	il [.pr]esident	'the president'	lo [s.t]udente	'the student'
b.	p[á:.dr]e	'father'	p[ás.t]a *[á:.st]	'pasta'
c.	citt[át.tr]iste	'sad city'	citt[ás.p]orca *[ás.sp]	'dirty city'

In the native lexicon, /s/, sonorants, and the first member of geminates (see immediately below) are allowed in the coda (Ito 1986; Krämer 2009a). The sibilant can be followed by stops (45a–b) as well as the labial fricative /f/ (45c). Notably, in Calabria, /sf/ surfaces as [sp] (45d) (Rohlfs 1966: 262). Allophonic variation between [s] and [z] is observed depending on the value of [±voice] of the adjacent onset.

(45) /s/ in native codas

a.	pa[s.t]a	'pasta'	*voiceless s+stop cluster*
b.	[z.b]aglio	'error'	*voiced s+stop cluster*
c.	[s.f]amáre	'to feed' (Standard)	*voiceless s+fricative cluster*
d.	[s.p]amáre	'to feed' (Calabrian)	*dissimilation of fricative*

The nasal codas agree with the following onset with respect to PoA. Unlike Greek, the distinction between voiceless (46) and voiced (47) stops is not neutralized.

(46) Voiceless post-nasal obstruents

a.	ma[ŋ.k]o	'I miss'	*voiceless velar*
b.	a[m.p]io	'ample'	*voiceless labial*
c.	po[n̪.t̪]e	'bridge'	*voiceless dental*
d.	li[n.t͡ʃ]e	'lynx'	*voiceless post-alveolar affricate*
e.	scie[n.t͡s]a	'science'	*voiceless alveolar affricate*

(47) Voiced post-nasal obstruents

a.	fu[ŋ.g]o	'mushroom'	*voiced velar*
b.	a[m.b]o	'both'	*voiced labial*
c.	mo[n.d]o	'word'	*voiced dental*

d.	ma[n.d͡ʒ]o	‘I eat’	*voiced post-alveolar affricate*

Italian has only labial non-strident fricatives, which do not always incite assimilation of the preceding nasal (48).

(48) Post-nasal fricatives

a.	trio[ɱ.f]o	‘triumph’	*voiceless labial*
b.	i[n.v]ado	‘I invade’	*voiced labial*

In dialects, nasals may fully assimilate to the following stop, e.g. Salentinian *cuttentu* ‘content’, Calabrian *cappa* < Greek *kampi*, ‘place name’ (Rohlfs 1966: 339). This reminds of the SIG pattern (see chapter 2).

Liquids surface intact in Standard Italian (49). In dialectal speech, though, laterals may be avoided in coda position via a change into glides (50a–c) or rhotics (50d–f), among other strategies (Rohlfs 1950; Walsh-Dickey 1997; Celata 2006; Müller 2011).

(49) Native word-internal codas in Standard Italian: liquids

a.	co[r.p]o	‘body’	rhotic
b.	co[l.p]o	‘stroke’	lateral

(50) Avoidance of lateral codas in Southern dialects

	Standard Italian	Dialect	
a.	a[l.t]ro	a[w.t]ru	‘other’ (Sicily, Rohlfs 1966: 343)
b.	ca[l.d]o	ca[w.d]u	‘hot’ (Calabria, Rohlfs 1966: 343)
c.	ca[l.t͡ʃ]e	ca[w.t͡ʃ]e	‘lime’ (Calabria, Rohlfs 1966: 343)
d.	pa[l.k]oscenico	pa[r.k]oscenico	‘stage’ (Florentine, Holton (ms.) cited in Walsh-Dickey 1997: 43)
e.	pu[l.p]o	pu[r.p]o	‘octopus’ (Calabrian, FW)
f.	u[l.t]imo	u[r.t]imo	‘last’ (Salentinian, FW)

Stops ceased to be admissible in Italo-Romance and they were assimilated by the following onset. Thus, in the place of Latin coda–onset clusters, we currently encounter ambisyllabic geminates (Krämer 2009a) (51; examples 51a–d are from Borelli 2000: 19; 51e–f are from *Dizionario Etimologico Online*[21]).

(51) Evolution of Latin clusters

a.	o[k.t]o	> o[t.t]o	‘eight’
b.	scri[p.t]u	> scri[t.t]o	‘written’
c.	fri[g.d]u	> fre[d.d]o	‘cold’
d.	fra[g.m]entu	> fra[m.m]ento	‘fragment’
e.	pro[k.s]ima	> pro[s.s]ima	‘next’
f.	la[p.s]u	> la[s.s]o	‘lapse’

Notably, there was no documented intermediate step between Latin and Italo-Romance during which dorsals were banned but labials were allowed. Within the Romance family, the only case of a diachronic *dorsal* > *labial* shift in the spirit of SIG (see chapter 2) comes from the evolution of several dialects of Romanian between the 3rd and the 6th century (Tzitzilis 2004; Seigneur & Pagliano 2005 and references therein). In addition, adapted loanwords from Latin to Albanian exhibit the same shift, e.g. *lu[k.t]em* > *lu[f.t]ë* ‘light’ (Tzitzilis 2004; Seigneur & Pagliano 2005 and references therein). According to Tzitzilis (p.c.; see also 2004, in press), this change is to be attributed to messapic substratic influence and was passed on from SIG to Albanian and Dalmatian.

(52) Dorsal > Labial shift in Romanian (Seigneur & Pagliano 2005: 327)

	Latin	Romanian	
a.	la[k.t]em	> la[p.t]e	‘milk’
b.	no[k.t]em	> noa[p.t]i ~ noa[f.t]i	‘night’ (Megleno-Romanian)
c.	ri[g.d]are	> ra[b.d]a	‘to bear’
d.	co[k.s]a	> coa[p.s]a	‘thigh’
e.	co[ŋ.n]atum	> cu[m.n]at	‘brother-in-law’

[21] https://www.etimo.it/

All the above "illicit" codas are attested in subparts of the Italian lexicon, as lexical borrowing has increased considerably the coda inventory (53a, d from Krämer 2009a: 139; 53b, d from McCrary 2004: 28).[22]

(53) Non-native word-internal codas

a.	ca[k.t]us	'cactus'	*dorsal stop*
b.	fu[k.s]ia	'fuchsia'	
c.	do[g.m]a	'dogma'	
d.	co[p.t]o ~ co[t.t]o	'Coptic'	*labial stop*

Even though Latin used to admit a great range of consonants and clusters in word-final position (Cser 2020), Italo-Romance has almost eradicated word-final consonants, with a significantly shrunk inventory, i.e. /d, n, r, l/, found word-finally in function words or infinitival forms that have undergone apocope. Again, recent loanwords may diverge from this in the native vocabulary (Krämer 2009a; Repetti 1993). Consider the following examples from Standard Italian:

(54) Final consonants in function words

a.	ɛ ~ ɛd	'and'
b.	con	'with'
c.	per	'for'
d.	il	'the (M)'

(55) Final consonants after apocope in infinitives

a.	aver**e**	'to have'
b.	averØ fatto	'to have done'

(56) Final consonants in loanwords

a.	bus	'bus'
b.	klub	'club'

[22] A heterosyllabic parsing may also be preferred for rising sonority clusters, e.g. *a[t.l]antico* 'atlantic', *e[t.n]ico* 'ethnic' (McCrary 2004; Krämer 2009).

c. film ‘film’
d. zlájd ‘slide’

6. Lexical geminates

6.1 Lexical geminates in Greek

The isogloss that distinguishes the Greek dialects retaining geminates from those that have simplified them involves roughly a center vs. periphery division, with the dialects spoken in the (South-)Eastern Aegean, the Dodecanese, Cyprus, and Southern Italy being on the conservative side (Tzitzilis in press). The number of consonants that appear geminated as well as the manifestation of the length distinction, at least at surface level, may vary cross-dialectally (see Manolessou & Bassea-Bezantakou 2012 for an overview and references). For instance, the nasal [nn] is attested in all the above dialects, whereas a lexical [rr] is found primarily in IG, but not in Cyprus or the Aegean. Voiced stops are overall extremely rare and voiced fricatives, e.g. [vv], occur exclusively as the outcome of sandhi assimilation. The lateral [ll] undergoes different changes depending on the dialect, e.g. retroflexion or dissimilation (see section 1). Finally, in Cypriot, length is accompanied by aspiration in plosives (Armostis 2009, 2011).

As mentioned in chapter 2, the surface lexical geminates may be of miscellaneous origin. In a not particularly large set of lexical items, etymological long consonants are inherited intact, e.g. Ancient Greek *téssera* > IG/Cypr/Dod *téssera* ‘four’. Old clusters as a potential source of geminates, mostly in IG but also in other dialects under certain circumstances have been elaborated on in section 5.1.

Outside Italy, innovative intervocalic geminates primarily originate from old singletons that got lengthened. Spontaneous gemination affected roughly the same lexical items across dialects, which suggests that the process in fact took place in MedG at regional level (see Christodoulou 2015 for discussion; Davy & Panayotou 2003). Spontaneous gemination has been mostly attributed to the influence of stress (Pernot 1907; Hatzidakis 1907; Tsopanakis 1940; Rohlfs 1950; Karanastassis 1965; Newton 1968; Minas 1970) which may have implications for the prosodic structure of the word (Malikouti-Drachman 2008, 2009). Nevertheless, as pointed out in chapter 2, a considerable number of exceptions showing that spontaneous gemination is not confined to post-tonic positions prevents a strong generalization. Relevant examples taken from Newton (1968) are presented below (aspiration was added to geminate stops, following Armostis 2011):[23]

(57) Post-tonic spontaneous gemination

a.	á**n**iksi	> á**nn**iksi	'spring'
b.	sí**mm**eris	> sí**mm**eris	'today'
c.	mí**t**i	> mú**tt^{h}**i	'nose'
d.	stí**l**os	> stí**ll**os	'pillar'
e.	ví**x**as	> ví**xx**as	'cough'

(58) Non-post-tonic spontaneous gemination

a.	vu**t**ó	> vu**tt^{h}**ó	'I dive'
b.	kri**f**á	> kri**ff**á	'secretly
c.	ma**s**ós	> ma**ss**ós	'lisping'
d.	ali**s**íða	> ali**ss**íða	'chain'
e.	a**c**íða	> a**cc**^{h}íða	'splinter'
f.	o**l**iɣa	> **ll**ía	'a few'
g.	**p**éfto	> **pp^{h}**éfto	'I fall'

In Modern Greek, length distinctions are relevant to intervocalic consonants. Word-initial geminates are significantly rare (also cross-linguistically, see Davis 1999; Topintzi 2006). The most remarkable exception is Cypriot, where a variety of lexical geminates is encountered in word-initial position, either in contrast with the singleton counterpart or as inherent geminates (/zz/ and /t͡sts/) (Armostis 2012). A few minimal pairs are demonstrated below (Newton 1968; Coutsougera 2003; Armostis 2011):

(59) Initial geminates in Cypriot

a.	**pp^{h}**éfti	's/he falls'	cf. **p**éfti	'Thursday'
b.	**kk^{h}**afé	'coffee'	cf. **k**afé	'brown'
c.	**ll**ía	'a few'	cf. **l**ía	'Lia (name)'

[23] A very similar picture is found in the Dodecanesian dialect of Kos (Karanastassis 1965).

d. **mm**áθca ‘eyes’ cf. **m**áθca ‘cloaks’

These geminates appear significantly longer than singletons utterance-initially in acoustic analyses, although the length distinction is not perceivable (Armostis 2012) (cf. IG). According to Topintzi’s recent phonological analysis of Cypriot geminates, these are best analyzed as tautosyllabic and constitute moraic onsets in the spirit of Topintzi (2006). Topintzi (2022) extends this view to medial geminates as well (see also Christodoulou 2007; Armostis 2011; cf. approaches that take Cypriot geminates to be light: Malikouti-Drachman 1987, 2003; Muller 2001, 2002; Arvaniti 2001, 2010 and discussion and references therein). However, there is no evidence for syllable weight in the language, thus the representation of surface geminates as two identical consonants is also possible (Arvaniti 2001, 2010 and discussion therein).[24] I will not investigate this subject further, as a detailed analysis of Cypriot falls beyond the scope of the present work.

6.2 Lexical geminates in Italo-Romance

Apart from the novel geminates that resulted from assimilation (see section 5), Southern Italo-Romance inherited etymological geminates from Latin as well as created innovative ones through doubling of former singletons. Both processes are arguably associated to stress. First, the retention of a geminate occurring after primary stress (60, first column of examples) was significantly more probable than in pre-tonic position (60, second column of examples) already in Latin (Loporcaro 1997; Giannini & Marotta 1989; Borelli 2000).

[24] Arvaniti invokes the asymmetry in the behavior of true clusters and geminates in morphophonological alternations (also citing Newton 1972; Malikouti-Drachman 1987); for instance, palatalization before front vocoids affects the entire geminate, e.g. [lákkos] – [lácci] ‘pit – pits’, but is confined to the consonant that immediately precedes the vocoid in other clusters, e.g. [ʝaxní] – [ʝaxɲá], *[ʝaʃná] ‘jahni (red sauce stew) – jahnis’ (see also Armostis 2009). Notably though, the contrast vanishes if we consider that the former is a heterosyllabic cluster, whereas the latter constitutes a complex onset. Thus, the spread of the palatal place could be attributed to the requirement that the two otherwise identical consonants also agree in PoA, similarly to NO and, in dialects with assibilating palatalization, SO, e.g. Cypriot [páŋgos] – [páɲɟi] ‘bench – benches’, [voskós] – [voʃʃí] ‘shepherd – shepherds’ (Armostis 2011: 274) (plus, note the agreement in voicing across syllable borders globally in SO and also in NO in most dialects; cf. complex onsets, where neither PoA nor voice agreement is enforced, e.g. [a.kmí], *[a.kŋí], *[a.gmí] ‘edge’).

(60) Post-tonic geminates and pre-tonic singletons in Latin (Borelli 2000: 27)

a.	c[átt]us	'cat'	c[at]éllus	'kitten'
b.	m[ámm]a	'breast'	m[am]ílla	'breast (dimin.)'

Furthermore, singletons in the antepenult (61–62, first column) were geminated (61–62, second column) under the influence of primary stress (Rohlfs 1966: 320–21). Gemination is more evident in the Southern dialects (62):

(61) Gemination in proparoxytones in Italian

a.	f[ém]ina	> f[émm]ina	'woman'
b.	m[ák]ina	> m[ákk]ina	'machine'

(62) Gemination in proparoxytones in Neapolitan

a.	k[ám]ara	> k[ámm]ara	'room'
b.	c[ár]ico	> c[árr]icu	'load'

Finally, geminates emerging after secondary stress are reported by Rohlfs (1966) in both Standard Italian and in Southern dialects:

(63) Gemination after secondary stress in Italian

a.	s[èp]ellíre	> s[èpp]ellíre	'to bury'
b.	[àk]adémia	> [àkk]adémia	'academia'

Geminates are word-medial in Italo-Romance. A geminate may occur word-initially as long as a word ending in a vowel precedes, but it deletes nevertheless after a consonant or in absolute initial position. Consider the behavior of the palatal /ʃː/, which, as mentioned in section 2.2 above, is intrinsically long:

(64) Word-initial inherently long consonants

a.	kásaʃ.ʃupáta	'ruined house'
b.	non ʃákwa	's/he doesn't rinse'
c.	ʃupáta	'ruined'

7. Sandhi phenomena

7.1 Sandhi phenomena in Greek

MedG as well as the vast majority of Modern dialects do not allow gemination and, consequently, they diverge significantly from IG with respect to phenomena observed in sandhi environments, e.g. between an article and a noun. In Cyprus and the Dodecanese, the interaction between the final /s/ and /n/ with the following onset in syntactic environments does yield post-lexical geminates, albeit in a reduced number of contexts. The sibilant is assimilated by onset[25] fricatives[26] and sonorants, but it is realized as [s] or [z] before stops (depending on the value of [±voice] of the stop). Like in IG, before sC clusters and sibilant geminates the final /s/ is deleted, instead of forming a super-geminate (Newton 1972) (this is true also for derived sibilants, e.g. /as xerete/ → [aʃʃérete] 'let him/her greet', Armostis 2012: 222). In non-geminating dialects, e.g. MedG and Standard, on the other hand, /s/ surfaces intact independently of the manner feature of the following onset consonant, and deletion is compulsory before sonority reversals or plateaux. Exceptionally, if it precedes a pre-vocalic sibilant, the derived geminate may optionally remain unsimplified (i.e. not degeminated). A comparison of the behavior of the final /s/ contained in the feminine definite article /tis/ (GEN.SG) in the Cypriot variety of North-Western Paphos (first column of outputs) and in Standard Greek (second column of outputs) is given below:

(65) /s# #_/

Before stops: realization

a.	/ti**s** petras/	ti**s**pétras	ti**s**pétras	'of the rock'

Before fricatives: assimilation

b.	/ti**s** fetas/	ti**f**fetas	ti**s**fétas	'of the slice'
c.	/ti**s** siras/	ti**s**sirás	ti**(s)**sirás	'of the series'

[25] In the spirit of Malikouti-Drachman (2000, 2001), clusters of falling or flat sonority and geminates are heterosyllabic in Cypriot (cf. Coutsougera 2003; Topintzi 2022).

[26] Christodoulou (2015: 260) reports optional progressive assimilation in [s##θ] and [z##ð], e.g. [tu**s** **θ**élis] ~ [tu**s** **s**élis] 'you want them', [te**z** **ð**uʎʎés] → [te**z** **z**uʎʎés] 'the jobs', possibly owing to the avoidance of cooccurring coronal fricatives.

Before sonorants: assimilation

d. /ti**s** limnis/ ti**l**límnis ti**z**límnis ‘of the lake’

Before clusters: contingent upon the syllabification

e. /ti**s** protis/ ti**s**prótis ti**s**prótis ‘of the first’

f. /ti**s** skonis/ tiØskónis tiØskónis ‘of the dust’

In the above geminating dialects, the final /n/ displays identical behavior as in CIG: before stops, /n/ acts as the trigger of voice assimilation and additionally undergoes place assimilation. The outcome is described as a NC$_{[+voi]}$ cluster or a coalesced prenasalized voiced obstruent (Kainada 2012).[27] Consider the following concatenations of the definite article /tin/ (F.ACC.SG) with nouns beginning with an onset voiceless stop:

(66) Cypriot: /n/ before stops

a. /ti**n p**eftin/ ti**mb**éftin ~ ti$^{\mathbf{m}}$**b**éftin ‘the Thursday (acc.)’

b. /ti**n t**asin/ ti**nd**ásin ~ ti$^{\mathbf{n}}$**d**ásin ‘the tendency (acc.)’

c. /ti**n k**risin/ ti**ŋg**rísin ~ ti$^{\mathbf{ŋ}}$**g**rísin ‘the crisis (acc.)’

Moreover, /n/ is assimilated before all fricatives as well as sonorants and surfaces as part of a geminate in Cypriot (Christodoulou 2015) (67, first column of outputs). By contrast, in dialects like Standard Greek (67, second column of outputs), /n/ is susceptible to deletion in these environments. Consider the following data:

(67) /n/ before fricatives and sonorants

a. /ti**n** feta/ ti**f**fetan tiØféta ‘the slice (acc.)’

b. /ti**n** sira/ ti**s**sirán tiØsirá ‘the series (acc.)’

c. /ti**n** mera/ ti**m**méran tiØméra ‘the day (acc.)’

[27] This fate of nasal–stop clusters in fact does not vary greatly across dialects (cf. Edessa and Florina Greek in Central/Western Macedonia, where the nasal is dropped, [myself confirming that for my mother dialect]; see also Revithiadou & Markopoulos 2021 for gradient application of PoA and voice assimilation in Standard as it is spoken in the North).

In all dialects, the /n/ is deleted before heterosyllabic clusters, including, when relevant, word-initial geminates (Newton 1972; Muller 2001, 2002; cf. Armostis 2011; Topintzi 2022, who take all initial sequences to constitute complex onsets). Alternatively, vowel insertion may also be employed after certain lexical items, such as the negation /en/ (data adapted from Armostis 2011: 273).

(68) /n/ before heterosyllabic sequences

a.	/en psinno/	éØpsínːo	~ én**i**psínːo	‘I don’t bake’
b.	/en ppefto/	éØpʰːéfto	~ én**i**pʰːéfto	‘I don’t fall’

In all the above cases, post-lexical assimilation leads to a geminate within a prosodic constituent, e.g. between an article and a noun. Interestingly, phonetic studies on Cypriot have shown that concatenation of different prosodic constituents may create super-geminates (denoted with [ːˑ]), when a word-final segment is found adjacent to a word-initial geminate. The affected sequences are /n#ll/ (Payne & Eftychiou 2006; cf. Eftychiou 2004), /n#ʃʃ/ (Armostis 2006, 2011), as well as in concatenation of plosives (e.g. /p#pp/) and affricates (e.g. /ts#tss/) (Armostis 2012). Compare the super-geminates in (69a–c), where a final consonant precedes a geminate, with the post-lexical geminates in (69a′–c′), where the second word begins with a singleton (adapted from Armostis 2011: 101; 69c–c′ are taken from Armostis 2012: 223):

(69) Post-lexical super-geminates vs. geminates in Cypriot

a.	/ipan ʃʃiljaste/	ípaʃːˑiʎáste	‘they said “get angry!”’
a′.	/ipan ʃiljaste/	ípaʃːiʎáste	‘they said “get to 1000!”’
b.	/ipan llia/	ípalːˑía	‘they said “a few”’
b′.	/ipan lia/	ípalːía	‘they said “Lia”’
c.	/to n͡tʃip ppefti/	tond͡ʒípʰːˑéfti	‘the jeep is falling’
c′	/en n͡tʃip palia/	[end͡ʒípːaʎːá]	‘they are old jeeps’

7.2 Sandhi phenomena in Italo-Romance

Raddoppiamento Fonosintattico (RF) or 'syntactic doubling' is a sandhi phenomenon broadly attested in Italo-Romance that has attracted a vast amount of attention in the literature (Vogel 1982; Chierchia 1986; Marotta 1986; Loporcaro 1997; Repetti 1991; Absalom & Hajek 1997; Borelli 2000; Absalom et al. 2003; Passino 2013; Amato 2019). In broad terms, RF refers to the sandhi gemination observed in certain contexts in Central and Southern Italo-Romance dialects.[28] The most prominent version of RF, found in Tuscany and other Central dialects and entirely absent in Greek, is conditioned by the presence of a stressed word-final vowel. As illustrated in (70), a word-initial consonant is geminated after a final stressed vowel (data from Borelli 2000: 30):

(70) Stress-driven RF

a.	tʃittá **b**élla	tʃittá **bb**élla	'beautiful city'
b.	víta **b**élla	*víta **bb**élla	'beautiful life'

Lexically induced RF, on the other hand, which is typical of Southern dialects (71, first column; cf. Standard Italian, second column), occurs after a small, closed set of monosyllabic or bisyllabic function words that historically contained a – currently silent – final consonant (71a–b) (Camilli 1965; Canepari 1991). Similarly, a preserved final consonant may be assimilated by the following onset (71c–d) (Rohlfs 1966).

(71) Lexically induced RF

a.	a**kk**áza	a **k**áza	'at home'
b.	kóme**vv**á	kóme **v**á	'how is it going?'
c.	nu**ll**u vidu (Sicilian)	no**n** **l**o vedo	'I don't see it'
d.	i**pp**áne (Florentine)	i**l** **p**ane	'the bread'

Notably, RF fails to occur before sC or other clusters that do not constitute a complex onset (72a; cf. 72b; Davis 1990):

[28] Northern dialects do not display RF patterns, as they lack contrastive quantity in general (see section 6).

(72) *Blocking of RF*

a.	tʃittá **sp**órka	→	tʃittá ***ssp**órka	'dirty city'
b.	tʃittá **tr**íste	→	tʃittá **ttr**íste	'sad city'

Furthermore, consonants that are inherently long in intervocalic positions, i.e. palatals and affricates (see section 2.2) are not affected by RF of any type (Borelli 2000; Payne 2005, 2006).

8. IG: Greek or Romance?

Within the Greek branch, IG has a deeper affinity to other peripheral Southern dialects, e.g. Cypriot and Dodecanesian in comparison to the core of the Greek-speaking territory, as shown, among others, by the presence of /ll/ retroflexion, the type of palatalization observed, the lenition processes, the retention of geminates, and the broader application of sandhi assimilation. A closer look at the details of these processes, though, suggests that IG, in general, seems to bear closer resemblance to Italo-Romance than to Greek.

- **Retroflexion**

Even though retroflexion affected other Greek dialects as well, the impact of Italo-Romance on IG seems fairly evident regarding the evolution of /ll/, if one considers the robustness of the phenomenon as well as the prevailing outcome of the process itself. Even more prominent is the influence of Romance in the retroflexion of /r/. In other Greek dialects, e.g. Cretan, retroflexion has targeted etymological and derived rhotics in onset position in general, unlike IG, where the process operated mainly after coronals. The etymological /tr/ was reanalyzed as an affricate complex segment in only one other Greek dialect, i.e. Tsakonian, which, however, has employed different intermediate processes and, in any case, is particularly isolated, thus it is virtually impossible that this idiosyncrasy was transmitted to IG via contact.

- **Palatalization**

A(ssibilating) S(top) P(alatalization) is found in both Romance and Greek. It could be assumed that IG leans slightly towards Romance, given that, in the Greek dialects that exhibit ASP resulting in post-alveolars, e.g. Cypriot, all dorsals are affected, while in IG only /k/ undergoes the process at hand. A potential reason for this discrepancy may be the absence of /ɣ/ and /x/ in Italo-Romance.

- **Lenition of onsets**

Both Greek and Italo-Romance feature similar lenition phenomena targeting intervocalic consonants. However, unlike Gorgia Toscana, onset voiceless stops do not spirantize in Greek. Rather, lenition mainly manifests itself by means of voicing and elision. Besides, the consonants that were affected in SIG remain largely unchanged in Salentinian Romance; in other words, the closest contact dialect could not have provided a sufficient trigger so that this change would be justified as contact-induced. Thus, it seems convincing that IG developed weakening processes in parallel to similar evolutions in other Greek dialects, potentially with external support by regional Romance.

Regarding the PoA shift *ɣ* > *v* in intervocalic positions in SIG, even though similar phenomena are observed in more than one Greek dialect, it is limited to a handful of lexical items and coexists with other, more systematic changes (e.g. the tendency to velarize simplex onsets in parts of Cyprus). I would therefore assume that, in IG in particular, the most plausible explanation is the influence of Romance. The shift from a velar fricative to non-velar consonants could be attributed to the absence of such segments in the phonemic inventory of Italo-Romance. Through this lens, occasional changes to the opposite direction in CIG, for example *f* > *x*, could be explained as hypercorrection, i.e. an attempt to create a more "Greek-sounding" output. In any case, the paucity of evidence and the lack of systematic patterning renders it difficult, if not impossible, to draw more robust generalizations.

- **Long-distance metathesis of liquids**

LDM constitutes one of the most straightforward instances of contact-induced change in IG. Its pervasive presence in Romance in comparison with the scattered comparable cases of Greek, provide compelling evidence regarding the driving force of this typological change. Besides, contact can be also assumed to have played a role with respect to Heptanesian, i.e. the only Greek dialect displaying the same pattern, although to a limited extent.

- **Codas**

In terms of its coda inventory, IG has been clearly influenced by Romance: in both cases, word-medial codas can be occupied exclusively by sibilants and sonorants, apart from the first member of geminates. By contrast, most Greek dialects retain at least non-sibilant fricatives, which goes hand in hand with non-coronal PoA.

Even though IG has undergone a significant typological change with respect to the set of consonants that can be found in a medial coda, at least some of its stages still share several characteristics with other Greek dialects, as, for instance, assimilation processes that target nasals preceding fricatives, or MoA dissimilation in OO (and rO) clusters resulting in $C_{[+cont]}C_{[-cont]}$ clusters, which however ignores /sf/. Other features, e.g. the preference for rhotics instead of laterals in the coda, are found across all three language groups. A possible assumption is that the absence of conflict with the contact language may have provided additional support to an endogenous tendency. On the other hand, the fact that SIG permits post-nasal voiceless stops reveals a substantial impact by Romance, which lacks obligatory voice assimilation in the clusters at hand.

Lastly, the repair of all final codas via deletion is more consistent with Italo-Romance, despite the respective isogloss in Greek. The majority of Greek dialects does preserve at least some final consonants. Tsakonian displays the exact same pattern by deleting most of the final codas; however, it is exceptionally hard to prove a parallel evolution of Tsakonian and IG. On the other hand, the dialects that overall display the closest affinity to IG, i.e. Cypriot and Dodecanesian, retain final codas.

- **Lexical geminates**

Given the existence of an isogloss including geminating dialects in Modern Greek, crucially spoken in the periphery, and provided the close resemblance among these dialects with respect to the lexical items that contain preserved etymological geminates or spontaneously created ones, it is rather counter-intuitive to maintain that this characteristic of IG is not endogenous. Nevertheless, it is not implausible that contact has facilitated the preservation of geminates and has encouraged the creation of novel ones, at least in the case of IG.

- **Sandhi gemination**

Sandhi gemination is found in both Romance and Greek, albeit not to the same extent. If one overlooks dialect-specific idiosyncrasies such as the behavior of /n##$O_{[-cont]}$/ in CIG (see chapter 2), IG is once again more similar to Romance, given that RF effects are encountered in a wider variety of phonological contexts.

Notably, stress-induced RF occurs in Central Italo-Romance, while lexical RF is typical of Southern dialects, e.g. Campania, Apulia, (Southern) Calabria, and Central and Southern Sardinia. Unsurprisingly, IG patterns with the dialects surrounding the Greek-speaking enclaves, i.e. the Southern ones. The table in (73) illustrates the distribution of RF in Italo-Romance and in IG (adapted from Borelli 2000: 30).

(73) Sandhi phenomena in Italo-Romance and IG

	Stress-conditioned RF	Lexical RF
Central I-R	yes	no
Southern I-R	no	yes
IG	no	yes

All comparisons are summarized in the color-coded table below (the degree of contrast between color shades reflects the similarity or the discrepancy between dialects):

(74) Italo-Romance vs. IG vs. Greek

	Italo-Romance	IG	Greek
retroflexion of /ll/	yes	yes	yes
retroflexion of /tr/	yes	yes	no
assibilating palatalization	yes	yes	yes
lenition	yes	yes	yes
LDM	yes	yes	no[29]
medial codas	sib, son cor	(fric), sib, son (lab), cor	(st), fric, sib, son dor, lab, cor
open final syllables	yes	yes	no[30]
lexical geminates	yes	yes	yes
sandhi geminates	yes	yes	yes

[29] Unless in close contact with Italo-Romance, e.g. Heptanesian.

[30] More specifically, as explained above, this trait is not found in the Greek dialects that are closer to IG with respect to other features, i.e. Cypriot and Dodecanesian.

Take-home message

- The main question this chapter answered was which innovations of IG are endogenous in Greek and which are to be attributed to language contact with Romance.

- IG departs from its immediate ancestor, MedG, with respect to several phonological processes, among which:
  - retroflexion of /ll/ and /tr/
  - assibilating palatalization of /k/
  - lenition of intervocalic onsets
  - long-distance metathesis of liquids (LDM)
  - reduction of the segment inventory hosted in word-medial coda position in terms of place and manner features
  - open final syllables
  - preservation (and expansion) of lexical geminates
  - post-lexical geminates

- All the above processes and phenomena can be found in Romance dialects, especially those surrounding the IG-speaking enclaves.

- These innovations could be also endogenous. For instance, IG displays a number of similarities with the respective systems of other Greek dialects, especially Cypriot and Dodecanesian. These include retroflexion of /ll/, assibilating palatalization of /k/, lenition of intervocalic onsets, post-lexical geminates. Other deviations from MedG, e.g. the tendency for open final syllables, are found in Greek dialects with which IG shares fewer characteristics, e.g. Cretan, as well as Tsakonian.

- Among the innovations observed in IG, at least retroflexion of /tr/, LDM, and the shrinkage of the coda inventory in terms of place and manner features are typically not found in other Greek dialects (crucially, not Cypriot or Dodecanesian, with which IG shares several characteristics). On the other hand, these processes are pervasive in Romance. Thus, it is likely that they were induced in IG owing to language contact.

- Notably, LDM and the modification of the coda inventory reveal a deeper restructuring of IG phonology which is worth exploring further. The next two chapters are dedicated to a formal analysis of these two cases of typological change.

CHAPTER 4

Typological analysis of changes in the coda

In chapter 2 it was argued that the evolution of the heterosyllabic clusters in IG was determined primarily by two factors: the Place of Articulation (PoA) and the Manner of Articulation (MoA) features licensed in the coda, with markedness decreasing as the dialects moved towards more recent stages. In this chapter, the typological variation is formalized in terms of *Property Theory* (Alber & Prince in prep.). The analysis addresses heterosyllabic clusters, i.e. clusters with S(onority)D(istance) smaller than 2.5, according to the Sonority Hierarchy suggested in chapter 2 (repeated in (1) for convenience; ‘O’ denotes [–strident] obstruents, ‘S’ denotes [+strident] obstruents, ‘N’ denotes nasals, ‘L’ denotes liquids). In practice, this chapter contemplates all but OL clusters, as summarized in (2).

(1) Sonority Hierarchy in IG

0	0.5	1	2	3
O[–cont]	O[+cont]	S	N	L

(2) Syllabification of clusters bequeathed in IG according to Sonority Distance

SD	**CC**	**Syllabification**	**Part of the analysis**
–3 to +2	LO, LS NO, LN, SO, OO, $C_\alpha C_\alpha$, OS, ON	C.C	✓
+2.5 to +3	OL	.CC	✗

I begin with introducing the reader to the premises of Property Theory (section 1). Sections 2 and 3 are devoted to the typological analysis of changes of the PoA and MoA features in the coda, respectively. Finally, section 4 elaborates on my take on minimal diachronic and diatopic variation among versions of IG regarding PoA and MoA in the coda and highlights the influence Romance exerted in the typological change IG exhibits.

1. Background on Property Theory

Property Theory (Alber & Prince 2015; in prep.; Alber 2015; Alber et al. 2016; Alber & Meneguzzo 2016; Danis 2017; Bennet & DelBusso 2018; DelBusso 2018; Merchant & Krämer 2018; Kokkelmans 2021; Alber & Kokkelmans 2022) relies on the idea that a set of *properties* is sufficient in order for an entire typology to be generated. Below (section 1.1) I sketch the basic hypotheses of Property Theory, on which the typological analysis to follow is built. For an in-depth introduction and further examples, the interested reader is referred to Alber & Prince (in prep., chapter 1). Section 1.2 presents the hypotheses of Property Theory regarding the formalization of minimal variation. In this section I additionally present my own hypotheses on minimality of variation. Note that throughout the thesis the Violation Tableaux (VT), the factorial typologies, as well as the property analysis were automatically calculated with the aid of OTWorkplace (Prince et al. 2017).

1.1 Properties of a typological system

A property A < > B (3) consists of two mutually exclusive values *a* and *b*, obtained by reversing the order of domination of the antagonists. Value *a* represents the dominance of the left side over the right side, i.e. A >> B, and value *b* the reversed ranking, i.e. B >> A. Each value is a predicate of the grammar and its components A and B are functions individually selecting a single constraint from a given linear order. Throughout the thesis, property values are color-coded in orange (value *a*) and light blue (value *b*).

(3) Schematic property A < > B

Property	**value *a***	**value *b***
A < > B	A >> B	B >> A

A specific member of a constraint class is selected by two operators, i.e. *.dom* (standing for *dominant*) and *.sub* (standing for *subordinate*), which create a function that returns the *highest-ranked* or the *lowest-ranked* member of the class they attach to, respectively. Importantly, these relations hold within individual linear orders on the constraints that belong to the grammar.

(4) Operators .dom and .sub

a. {C, D}.dom

- C >> D → {C, D}.dom = C
- D >> C → {C, D}.dom = D

b. {F, G}.sub

- F >> G → {F, G}.sub = G
- G >> F → {F, G}.sub = F

Properties in which a constraint class participates are represented as follows:

(5) Schematic properties containing classes

Property	value *a*	value *b*
{C, D}.dom < > E	{C, D}.dom >> E	E >> {C, D}.dom
{F, G}.sub < > H	{F, G}.sub >> H	H >> {F, G}.sub

If the dominant constraint of a class {C, D} outranks constraint E, then at least one constraint of the class outranks E. Conversely, if E dominates {C, D}.dom, then it ranks above both of them, regardless of the ranking between them (C >> D or D >> C), since dominating the dominant constraint entails dominating the subordinate one. In the case of the subordinate of a class dominating another constraint, e.g. {F, G}.sub >> H, it follows that the entire class {F, G}, i.e. both the constraints comprising it, outranks H, independently of whether F >> G or G >> F. The opposite ranking, i.e. H >> {F, G}.sub, translates into H dominating at least one constraint between F and G.

A typological system is generated via the free combination of property values (up to mootness and scope restrictions). A value is true of a grammar iff all the total rankings belonging to the grammar satisfy it, and false if all the total rankings belonging to the grammar do not satisfy it. Moreover, a property can be *moot* with respect to a grammar if neither value is true of that grammar, i.e. it holds of all its total orders. Mootness requires certain scopal arrangements, which are explained later in the section.

Let's illustrate property analysis applied to a typological system *S* through an abstract example. Let's assume an input sequence /ab/ that is considered marked, and four logically possible realizations: the faithful output [ab], the output [cb], where /a/ changes to [c], the output [ac], where /b/ changes to [c], and the output [cc], where both /a/ and /b/ change to [c]. The S.GEN consisting of the above candidates is given in (6):

(6) S.GEN

/ab/ → ab

→ cb

→ ac

→ cc

Let's also posit a CON including a markedness constraint (m.constraint) militating against the sequence [ab], i.e. m.ab, and two faithfulness constraints (f.constraints), each penalizing an input-output discrepancy. f.a punishes the unfaithful realization of /a/, and f.b protects /b/ from surfacing unfaithfully.

(7) S.CON

m.ab	Assign a violation mark for every [ab]
f.a	Assign a violation mark if /a/ is not realized faithfully
f.b	Assign a violation mark if /b/ is not realized faithfully

The violation profiles of the candidates are given in the Violation Tableau (VT)[1] in (8). Candidates (a–c) constitute optima, whereas candidate (d) is harmonically bounded (visualized via salmon pink shading) by virtue of S.CON (Prince & Smolensky 1993/2004; Samek-Lodovici & Prince 1999). Specifically, since (d) violates both f.a and f.b and candidates (b–c) violate one f.constraint each, (d) always loses against the more harmonic candidate between (b–c), i.e. the one satisfying the lower-ranked f.constraint.

(8) VT /ab/

Input	*Output*	m.ab	f.a	f.b
ab	a. ab	1		
	b. cb		1	
	c. ac			1
	d. cc		1	1

[1] Throughout the thesis, the order of columns in VTs does not reflect a ranking order (see Prince 2017).

In Property Theory, the distinction between a set of structures and mappings, on the one hand, and the grammar generating them, on the other hand, is crucial. In the words of Alber & Prince (in prep.: 38), "[a]n *extensional* typology is a set of languages, organized by shared and distinguishing *traits*. An *intensional* typology is a set of *grammars*. The principal goal of Property Theory is to explicate the extensional traits in terms of the intensional conditions that give rise to them".

The extensional typology of S contains three languages, each of which can be described by the optimum demonstrated in (9).

(9) Extensional typology of S

L.ab	/ab/	→	[ab]
L.ac	/ab/	→	[ac]
L.cb	/ab/	→	[cb]

The contrasts in extensional traits that are detected are:

(a) allowed vs. disallowed [ab] sequences

(b) faithful realization of /a/ vs. of /b/

Each language presents a unique combination of the above traits, illustrated in (10) (colors serve to enhance readability; the cell where none of the two contrastive traits is found remains white).

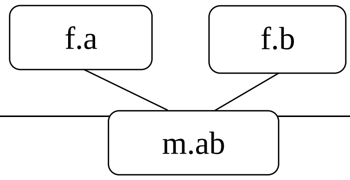
(10) Extensional traits of S languages

	allowed vs. disallowed [ab] sequences	faithful realization of /a/ vs. of /b/
L.ab	*allowed*	–
L.ac	*disallowed*	*/a/*
L.cb	*disallowed*	*/b/*

The three distinct grammars are demonstrated below in the form of Hasse diagrams as well as Skeletal Bases (SKB; Brasoveanu & Prince 2005/2011).[2]

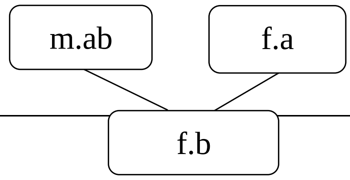
(11) L.ab

m.ab	f.a	f.b
L		W
L	W	



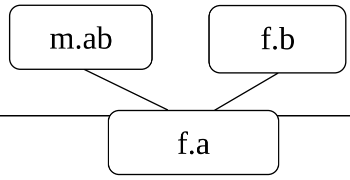
(12) L.ac

m.ab	f.a	f.b
W		L
	W	L



(13) L.cb

m.ab	f.a	f.b
W	L	
	L	W



Drawing from the distinctions in extensional traits we identified in (9), we notice that in L.ab, where [ab] is allowed, the subordinate of the f.constraints (thus both of them) outranks m.ab, whereas in both languages disallowing [ab], i.e. L.ac and L.cb, the reversed ranking is observed, i.e. m.ab dominates the subordinate f.constraint (i.e. at least one of them). Moreover, L.ac, where faithfulness to /a/ is respected, has the ranking f.a >> f.b, and the reversed ranking holds in L.cb, where faithfulness protects /b/.

Under the above analysis, the two f.constraints comprise a class F (14).

(14) Class F {f.a, f.b}

The intensional typology is defined by two crucial rankings, i.e. properties: the ranking between m.ab and the subordinate of class F, i.e. F.sub, determines the presence of the marked sequence [ab] (15a). The ranking within F, on the other hand, decides which f.constraint is

[2] An SKB is a maximally concise representation where multiple Elementary Ranking Conditions (Prince 2002) have been integrated into a single line and all Ls that are deducible from transitivity of ranking have been removed.

respected at the expense of the other (15b).[3] The opposite values each property takes are represented as options affixed to the name of the property, separated by '/'.

(15) Properties of S

a.	**SEQ.ab/*ab**	F.sub < > m.ab	ab is/is not allowed
	SEQ.ab	F.sub >> m.ab	ab is allowed
	SEQ.*ab	m.ab >> F.sub	ab is not allowed
b.	**F.a/b**	f.a < > f.b	a/b is faithfully realized
	F.a	f.a >> f.b	a is faithfully realized
	F.b	f.b >> f.a	b is faithfully realized

The property values each grammar takes are the following:

(16) Intensional typology of S

	SEQ.ab/*ab	**F.a/b**
L.ab	*ab*	*moot*
L.ac	**ab*	*a*
L.cb	**ab*	*b*

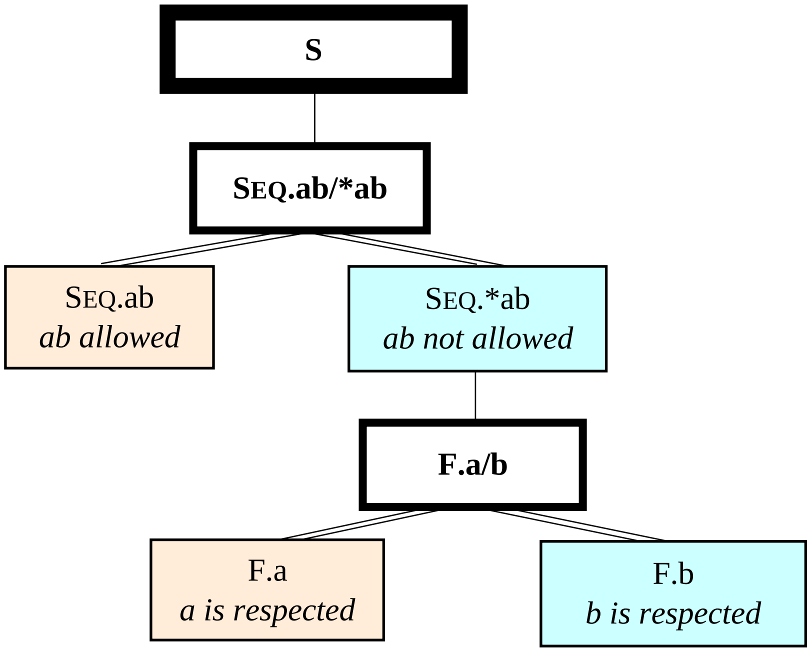
L.ab allows for the emergence of the sequence [ab] by virtue of the property value SEQ.ab, i.e. because m.ab is bottom-ranked. L.ac and L.cb, on the other hand, share the value SEQ.*ab, which prohibits [ab] at the cost of some f.constraint. The distinction between these two grammars lies in the value of F.a/b. In L.ac, the property is set to F.a (f.a >> f.b), thus faithfulness to /a/ must be respected. In L.cb, on the other side, it is /b/ that must surface faithfully due to value F.b (f.b >> f.a).

Expectedly, F.a/b is moot, i.e. not relevant, with respect to SEQ.ab, i.e. in grammar L.ab. Provided that F.sub outranks m.ab, there is no reason for the input /ab/ not to surface faithfully. Since both total orders f.a >> f.b >> m.a and f.b >> f.a >> m.a converge to the same grammar, none of the values of F.a/b is true of this grammar.

[3] The members of Class F are antagonists in a property of the system, thus the class is 'public' (Alber & Prince in prep.).

The difference in the scopes of the two properties is clearly demonstrated via the property treeoid in (17). The single lines terminate in properties and the double lines in the property values between which only one is selected in each grammar. Each property value has scope over the set of nodes that it c-commands in the treeoid (Alber & Prince, in prep.). Crucially, F.a/b branches below SEQ.*ab, thus further distinguishing the grammars taking the particular value, but does not have any association with SEQ.ab.

(17) Property treeoid of S



1.2 Minimal variation in Property Theory

A hypothesis made available by the notions of Property Theory is that differences between historically or geographically adjacent grammars represent *minimal* switches of the typological property values. According to Alber (2015), four possibilities are identified: reversion of the values from *a* to *b* or from *b* to *a*, acquisition of a value for a previously moot property, and loss of a value (i.e. novel mootness) (Alber 2015; Alber & Meneguzzo 2016; DelBusso 2018).

(18) Changes of property values that count for minimality (Alber 2015)

a. $a \rightarrow b$

b. $b \rightarrow a$

c. moot → *a/b*

d. *a/b* → moot

For illustration, let's apply this hypothesis to the property analysis in (16). L.ac and L.cb share value SEQ.*ab and vary with respect to F.a/b: L.ac has F.a and L.cb has F.b. Importantly, resetting F.a/b alone converts L.ac to L.cb and vice versa. The two minimally different grammars can thus correspond to successive historical stages of a language or varieties spoken in close vicinity.

However, in the spirit of Alber (2015), according to the above property analysis both grammars appear to be two switches away from L.ab (SEQ.ab vs. SEQ.*ab; F.a or F.b vs. mootness). This means that L.ab does not vary minimally with respect to the other two grammars of the typology. Differing from Alber, I propose that the switches from a specified value to mootness and from mootness to a specified value do not constitute an additional change, but rather they may follow from the resetting of a different property. Thus, I define minimal distance between grammars as follows:

(19) Minimal distance between grammars
Two grammars differ minimally if, with respect to the properties specified for values (*a* or *b*), the two grammars have all but one property value in common.

In the property analysis outlined in the previous section (20, repeated from 16), reversing the value SEQ.*ab to SEQ.ab converts any grammar to L.ab. Mootness with respect to F.a/b results by implication, as it poses a question that is no longer crucial: if both f.constraints outrank the m.constraint, which results in the extensional trait of having [ab] in the language, then the ranking between them is not crucial. Since the loss of a specified value is the direct outcome of resetting the value of another property, it does not count as an additional switch, thus the change is minimal.

(20) Intensional typology of S

	SEQ.ab/*ab	**F.a/b**
L.ab	*ab*	*moot*
L.ac	**ab*	*a*
L.cb	**ab*	*b*

Likewise, acquiring a value for a previously moot property is triggered by the reversion of the values of another property and does not compromise the minimality of change. For instance, if the starting point is L.ab, a reset of SEQ.ab to SEQ.*ab leads to either L.ac or L.cb. The need for distinguishing between the two arises and is satisfied by the acquisition of a new value for F.a/b, which again does not count for minimality.

The tables below illustrate the difference between this proposal and Alber's (2015) hypothesis. Table (21) demonstrates a non-minimal change along the lines of Alber, whereas the same change is taken to be minimal in my proposal, explicated in Table (22).

(21) Non-minimal change L.ab > L.ac following Alber (2015)

	SEQ.ab/*ab	**F.a/b**
L.ab	*ab* ↓	*moot* ↓
L.ac	**ab*	*a*

(22) Minimal change L.ab > L.ac in present proposal

	SEQ.ab/*ab	**F.a/b**
L.ab	*ab* ↓	*moot*
L.ac	**ab*	*a*

2. PoA typology

As shown in chapter 2, in the diachrony of IG, typologically different stages are distinguished with respect to the PoA features that are admissible in a coda in certain contexts. The common ancestor of all Modern Greek dialects, i.e. MedG, allows for codas occupied by dorsals (henceforth collectively *k*), labials (henceforth collectively *p*), and coronals (henceforth collectively *t*),[4] independently of the PoA specification of the adjacent onset.[5] In principle, this property is retained in the Modern Greek dialects that sprang from MedG (see chapter 3).

[4] A clarification is in order here. The placeholders *k*, *p*, *t* do not make reference to MoA features (e.g. [–cont]) or voice values. For instance, the abstract cluster *kt* may denote any of the attested clusters [xt, ɣd, ks, xs, kn, xn, ɣn] (as well as all omitted possible combinations of a dorsal and a coronal segment that are not found in MedG or IG).

[5] This holds on condition that an independent requirement that two heterosyllabic segments have the same PoA is not at work, e.g. in the case of NO clusters (see chapter 2).

However, within the IG branch, limitations were imposed that gave rise to typologically different stages. Some dialects, e.g. Early SIG and contemporary Martano SIG, turned *k* into *p* before *t*, e.g. /o**xt**o/ → [o**ft**o] ‘eight’. Etymological /ft/, though, remained intact, e.g. /e**ft**a/ → /e**ft**a/. Later evolutions of SIG, e.g. the several variants observed in Sternatia SIG (referred to as Sternatia⁺), proceeded to further shifts to *t* that affected both *k* and *p*. The novel *tt* structures may take the form of either a geminate, e.g. [o**tt**o], or a true cluster, e.g. [o**rt**o]. Recall that, based on the arguments I presented in chapter 2 (section 2.4), I posit that IG surface geminates correspond to two identical adjacent consonants, i.e. two distinct consonantal roots, rather than a long consonant. This view is carried throughout the analysis.

In the same phonological environment, i.e. before a *t*, *k* and *p* shifted directly to *t* in Bova CIG, e.g. /o**xt**o/ → [o**st**o], /e**ft**a/ → /e**st**a/. On the other hand, in Galliciano and Roghudi CIG, transposition is observed in both *kt* and *pt* clusters, that results in *tk* and *tp*, respectively; for instance, /e**ks**i/ → [e**sk**i] ‘six’,[6] /(o)**ps**ari/ → [a**sp**ari] ‘fish’.

Finally, changes in PoA do not seem to affect clusters such as *pk*, e.g. /a**vɣ**o/ ‘egg’,[7] or *tk* and *tp*, e.g. /a**sk**o/ ‘sac’, /a**sp**arangi/ ‘asparangus’, as well as all homorganic clusters, i.e. *kk*, *pp*, *tt*.

Table (23) summarizes:[8]

(23) Summary of PoA changes in the coda in IG

MedG	Early SIG	Sternatia⁺ SIG		
xt, ft	→ ft	→ tt ~ rt		
	→	→	st	Bova CIG
ks ps	→	→	sk sp	Galliciano CIG, Roghudi CIG
vɣ	= vg (~variants)			
sk, sp	= sk, sp			(all IG)

[6] And, more accurately, [e**ʃʃ**i] (see chapter 2 section 2.4).

[7] The particular cluster, however, does undergo changes in varieties imposing restrictions on MoA features (see chapter 2, section 3.4).

[8] Note that the particular clusters were selected because they render the processes at hand clear, as MoA changes do not interfere (but see chapter 2, section 3.4). For a more elaborate presentation of all clusters in all IG varieties see chapter 2; for a non-typological OT analysis see chapter 6.

Section 2 of this chapter aims at shedding light on the differences behind the typologically distinct grammars that correspond to the different stages of IG focusing on the PoA features admitted in the coda. The analysis adopts Rice's (1994) hierarchically organized Place node for the representation of PoA features and exploits stringency relations among m.constraints and gradiently violated f.constraints in order to generate the stepwise changes IG grammar underwent that led to decrease of markedness in the coda. Variation between historically or geographically adjacent stages is formalized as gradual demotion of f.constraints and subsequent promotion of m.constraints penalizing marked features in the coda.

After a brief recapitulation of what PoA features are allowed in the various diachronic stages of IG (section 2.1), I overview previous approaches to PoA shifts and highlight the insights they offer and their shortcomings in accounting for the variable IG landscape (section 2.2) and I propose modifications of the Coda Condition (Ito 1986) that allow for explaining the IG patterns (section 2.3). Then I proceed with the typological analysis (section 2.4).

2.1 Restrictions on PoA features in the coda

A careful look at the evolution of clusters in IG reveals that heterosyllabic clusters undergo changes when the coda is more marked than the onset, considering the markedness hierarchy *dorsal (k) ≺ labial (p) ≺ coronal (t)* (Ito 1986, 1989; McCarthy 1988; Paradis & Prunet 1991; Lombardi 1991, 2002; de Lacy 2002, 2006; Lahiri & Reetz 2002, 2010; Walker 2019; cf. Trigo 1988; Rice 1996, 2007; Hume & Tserdanelis 2002; Hayes & Steriade 2004; Krämer & Zec 2020). To summarize the conclusions drawn in chapter 2 (section 3.5), at an early stage of SIG, *k* was excluded from a coda position when not followed by another *k*. Undesirable heterorganic clusters were repaired via PoA shifts of the preconsonantal *k* to a *p*. Therefore, *pt*, homorganic *kk* clusters, *pk*, *tk*, and *tp* remained intact. *p* codas still persist in the variety of Martano SIG.

A more recent development took place and led to today's SIG as it is spoken in most villages, e.g. Sternatia and Calimera, where both *k* and *p*[9] further shifted to *t* before another *t*

[9] *p* subsumes both etymological and derived labials that occur within roots. According to Lexicon Optimization (Prince & Smolensky 1993/2004; Inkelas 1994; Beckman & Ringen 2004; cf. Krämer 2006b; Nevins & Vaux 2007), the output of each historical stage should serve as an input for the stage to come, even though the phonological changes can still be predictable by assuming the "original" input. For instance, once [x] has been eliminated from the surface in the context of [t], because it always emerges as [f], then /xt/ is replaced by /ft/ also in the lexicon. Even though I remain agnostic as to the possibility that root-internal changes were fossilized in the

(henceforth, the set of SIG varieties in which both *k* and *p* have been eliminated are simply referred to as *Sternatia SIG*). This means that the only heterorganic clusters that are possible in Sternatia are *pk*, *tk*, and *tp*.

On the other hand, in Bova CIG, PoA shifts of both *k* and *p* directly (i.e. without an intermediate *k* → *p* stage) to *t* were triggered. Roghudi and Galliciano CIG also abandoned both *k* and *p* codas at once. Remarkably, OS clusters do not follow the same path as in Bova, but they instead display local transposition that creates [SO] (i.e., in terms of our abstract representations, *tC*) clusters. I take the grammar of these two varieties to prioritize metathesis in order to ensure that the coda is occupied by a *t*. The failure of metathesis to apply in contexts other than OS, in which case the grammar resorts to PoA shifting, is explained in terms of phonotactics (see chapter 2, 6). For the purposes of this chapter, which abstracts away from exact representations, the selected optimum in Roghudi and Galliciano is taken to be the metathesized candidate.

Independently of the dialect, homorganic clusters, i.e. *kk*, *pp*, and *tt*, as well as *pk*, where the coda is less marked than the onset, are immune to PoA shifts or metathesis.

Table (24) demonstrates the input–output pairs in each of the four language types described above (the unfaithful mappings are colored for readability):

course of time, here I choose to associate all IG outputs, regardless of the stage, to the "original" input, i.e. MedG (for example, the input forms for Sternatia SIG still contain *k*). This choice is dictated by the observation that morphophonological alternations continue granting visibility to *k* codas, which, in turn, can be considered a legitimate input, at least with respect to the derived environments (consider also that positing both *k* and *p* in the input is in accordance with the Richness of the Base, Prince & Smolensky 1994/203). Thus, the choice of input–output pairs reflect the assumption that the *k*>*t* shift is synchronically active, independently of whether lexicalization has taken place.

(24) Attested PoA typology in IG

kk	**kp**	**kt**	**pk**	**pp**	**pt**	**tk**	**tp**	**tt**	
kk	kp	kt	pk	pp	pt	tk	tp	tt	MedG *faithful realization of all PoAs*
kk	pp	pt	pk	pp	pt	tk	tp	tt	Early SIG, Martano SIG *kC* → *pC*, when *C* = *p*, *t*
kk	pp	tt	pk	pp	tt	tk	tp	tt	Sternatia SIG, Bova CIG *kC* → *CC*, when *C* = *p*, *t* *pC* → *CC*, when *C* = *t*
kk	pk	tk	pk	pp	tp	tk	tp	tt	Galliciano CIG, Roghudi CIG *kC* → *Ck*, when *C* = *p*, *t* *pC* → *Cp*, when *C* = *t*

It is evident that each stage of IG requires a coda to have up to a certain degree of markedness determined by the following onset. In particular, Early SIG allows a coda *k* on condition that the onset is equally marked, i.e. it is also occupied by a *k*. When this requirement is not met, i.e. in the case of *kp* and *kt*, a shift of the *k* to *p* takes place in order for the markedness of the coda to be reduced. In Sternatia SIG and in CIG, on the other hand, neither *k* nor *p* survive, unless the following onset has an equal or higher degree of markedness. Therefore, in Bova CIG and the relevant SIG dialects, *kp* turns into *pp*, just like in Early SIG, and, additionally, *kt* and *pt* balance the difference in markedness between the coda and the onset by surfacing as *tt*. In this way, both members of the cluster are homorganic. Roghudi and Galliciano are ruled by the same principle, yet they repair some of the illicit clusters via metathesis.

An empirical fact is that, if a degree of markedness is intolerable in some stage of IG, then a higher degree of markedness is also disallowed. In other words, if *p* is disallowed in some context, then by implication *k* is not allowed either. In light of this, if an input contains an inadmissible structure and thus needs to change its place features, then the only viable option is that it improves its degree of markedness in the output.

The PoA features that are allowed before less marked onsets are summarized in (25):

(25) PoA features in coda in IG

Languages	PoA features in coda before a less marked onset
MedG	*k, p, t*
Early SIG, Martano SIG	*p, t*
Sternatia SIG, CIG	*t*

2.2 Previous approaches to changes of PoA in the coda

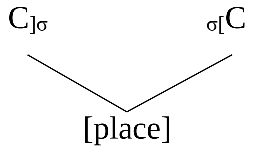
It has been often pointed out in the literature that codas can host a restricted consonant inventory in comparison to onsets (Vennemann 1988; Clements 1990; Lombardi 1991; Zec 1995; Baertsch 2002; VanDam 2004; Green et al. 2014; Krämer & Zec 2021). For example, heterorganic coda–onset clusters are avoided in several languages (Steriade 1982; Ito 1986, 1989; Yip 1991; McCarthy 2008; a.o.). To address these restrictions, Ito (1986, 1989; see also Yip 1991) puts forth the *Coda Filter* or *Coda Condition* (CodaCond) (26), which allows codas that are occupied by the first part of geminates as well as consonants that are homorganic to the following onset. In this way, place specification across heterosyllabic consonants is limited to one value.

(26) CodaCond (Ito 1989: 224)

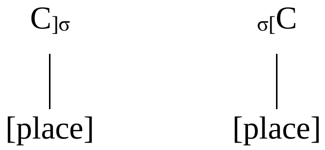
$$\begin{array}{c} *\ C]_{\sigma} \\ | \\ [\text{place}] \end{array}$$

Very similar is Steriade's (1982) *Coda Rule*, which states that "an obstruent can be syllabified in a coda only if it is segmentally linked to the following C". McCarthy (2008) also makes use of the CodaCond and assumes that a token of Place can only be associated with segments parsed in onset position. All these definitions essentially rely on a representation with a doubly linked place feature in geminates and homorganic clusters (27) via which undesirable structures involving place specification in the coda (28) is successfully avoided:

(27) Double linking: no violation of the CodaCond



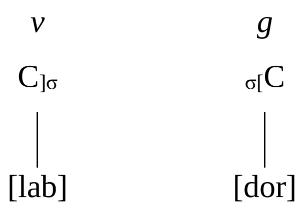
(28) Place specification in the coda: violation of the CodaCond



Given the assumption that it is the PoA feature of the onset that determines the output, the above approach seems suitable for explaining the changes observed in IG: an onset cannot be preceded by a more marked (with respect to PoA) coda; in this case, a change is triggered in order for the markedness of the coda to be reduced. However, employing the CodaCond in order to account for all related processes in IG runs into two obstacles.

First, despite the great tendency to create homorganic clusters (e.g. Bova CIG / Sternatia SIG *kt* → *tt*, *pt* → *tt*, *kp* → *pp*), heterorganic clusters in which the coda is less marked than the onset, e.g. [vg], [sk], [sp], seem to be perfectly admissible in IG (29). Thus, it cannot be argued that IG allows only for a geminate-like structure in which both consonants comprising a cluster are associated with a single PoA specification.

(29) Admissible clusters that violate the CodaCond



A second hurdle concerns the "intermediate" shift *kt* → *pt*, **tt* observed in Early SIG and Martano SIG. Specifically, the most marked segment *k* preceding a *t* does not convert to the least marked *t* in order to form a homorganic *tt* cluster, but rather it moves only one step along the markedness scale $k \prec p \prec t$ resulting in a heterorganic *pt* cluster. Although this move improves the markedness of the coda, it is not predicted by analyses employing the CodaCond. For instance, in McCarthy's (2008) Harmonic Serialism (HS) analysis, the relevant candidate is harmonically bounded. More precisely, McCarthy (2008) puts forward that heterorganic coda–onset clusters gradually become homorganic via two steps: (1) via loss of place features in the coda, and (2) via linking of a place feature so that the coda and the onset share the same specification. Along these lines, the change from MedG *kt* to Bova CIG *tt* would be the result of the derivation <*k.t, H.t, t.t*>, where *H* denotes a placeless segment. As illustrated in the condensed HS tableau below, loss of specification is enforced by CODACOND,[10] as the faithful output (30a) contains a coda that has its own place features. The output of the above evaluation round (30b) violates HAVEPLACE, which requires that a segment has Place specification (Padgett 1995; Smith 2002), thus a place feature is linked (output 30c), incurring a non-fatal violation of NOLINK[Place].[11] The latter output is selected as the winner.

(30) Harmonic improvement in <k.t, H.t, t.t> (adapted from McCarthy 2008: 285)

/kt/	CODACOND	HAVEPLACE	MAX [Place]	NOLINK [Place]
a. k.t *is **less** harmonic than*	*!			
b. H.t *is **less** harmonic than*		*!	*	
c. t.t				*

What the CODACOND and McCarthy's proposal do not predict, though, is a shift to a less marked consonant that is nevertheless heterorganic to the onset, i.e. the *kt* > *pt* change observed in Early SIG. Such a shift would still violate the CODACOND. In particular, in the HS analysis, the derivation <*k.t, p.t*> is harmonically bounded in the first step, thus it does not even

[10] The exact formulation in which McCarthy defines CODACOND is "assign one violation mark for every token of Place that is not associated with a segment in the syllable onset" (2008: 279).

[11] The full definition as given by McCarthy (2008: 278) is the following:

Let input segmental tier = $i_1i_2i_3\ldots i_m$ and output segmental tier = $o_1o_2o_3\ldots o_n$.

Let input Place tier = $p_1p_2p_3\ldots p_q$ and output Place tier=$P_1P_2P_3\ldots P_r$.

Assign one violation mark for every pair (P_y, o_z) where

P_y is associated with o_z,

p_w is in correspondence with P_y,

i_x is in correspondence with o_z, and

p_w is not associated with i_x.

constitute a viable intermediate step alongside a path that eventually leads to a homorganic cluster:

(31) Harmonic bounding of <k.t, p.t>

/kt/	CodaCond	HavePlace	Max[Place]	NoLink[Place]
a. k.t *is **more** harmonic under any ranking than*	*			
b. p.t	*		*!	*

The construction of a constraint system that generates this intermediate output has actually been rejected by de Lacy (2002), who, not being aware of any natural languages displaying this –admittedly extremely rare– pattern, maintained that a system should not predict unattested patterns. Following Trubetzkoy's early claim that segments neutralize exclusively to the least marked element available (Trubetzkoy 1939), he excludes that *k* can neutralize to *p*, since every inventory includes a less marked segment, i.e. a *t* or a glottal stop (de Lacy 2002: 269). In light of this, he posits a system that includes stringently formulated m.constraints banning specific PoA features, i.e. *{K}, *{KP}, and *{KPT},[12] and Ident (de Lacy 2002, 2006). Crucially, the output of the proposed system when neutralization takes place is always the least marked element available. For instance, in a language possessing *k*, *p*, and *t* but no glottal stops, like MedG and IG, the outcome of e.g. /k/-neutralization in a certain context –in our case, a preconsonantal coda– will systematically be *t* and never *p*. As demonstrated in the CT (32), the candidates /kt/ → [k.t] and /kt/ → [t.t] are preferred by different (sets of) constraints, thus they can both be selected. However, between the candidates /kt/ → [p.t] and /kt/ → [t.t], only the latter will be preferred, because it rates better on *{KP}.

(32) de Lacy's system (adapted from de Lacy 2002: 271)

Input	*W*	*L*	*{K}	Ident{K}	*{KP}	*{KPT}
/kt/	k.t	t.t	L	W	L	
	t.t	p.t			W	

[12] De Lacy additionally includes *{KPTʔ}, as he also discusses cases of debuccalization, which are here omitted.

As part of the argumentation against an "overgenerating" system, de Lacy (2002: 271–272) identifies types of f.constraints that should not be included in CON, precisely because they would allow for /k/ → [p] to win a competition. For instance, he rejects IDENT[–coronal], which does not penalize /k/ → [p], but assigns one violation to /k/ → [t]. Under the ranking assumed in (33), /kt/ → [p.t] would be preferred over /kt/ → [t.t] by IDENT[–cor].

(33) /kt/ → [p.t] predicted by employing IDENT[–coronal]

/kt/	*{K}	IDENT[–cor]	*{KP}	*{KPT}
a. k.t	*!		*	*
b. p.t ☜			*	*
c. t.t		*!		*

Along the same lines, i.e. in order to ensure that the constraint system successfully blocks a shift to the "next least marked element", de Lacy argues against a scalar IDENT, henceforth #IDENT, which is sensitive to the number of steps along the markedness scale $k \prec p \prec t$ that each shift represents, and, consequently, is violated depending on the IO discrepancy, e.g. one violation for /k/ → [p], two violations for /k/ → [t]. Such an assumption would have as a result that under the ranking *{K} >> #IDENT{K} /kt/ → [p.t] wins over /kt/ → [t.t]:

(34) /kt/ → [p.t] predicted by employing #IDENT (adapted from de Lacy 2002: 271)

/kt/	*{K}	#IDENT{K}	*{KP}	*{KPT}
a. k.t	*!		*	*
b. p.t ☜		*	*	*
c. t.t		**!		*

2.3 Proposal

A comprehensive account of IG should make reference to the markedness of the coda in comparison with the onset and be capable of capturing both the existence of unaltered heterorganic clusters, i.e. those with a less marked coda compared to the onset, and the shift from *kt* to *pt* instead of *tt*. On this basis, in the next sections I propose that more than one restriction in the spirit of CodaCond should be posited allowing for different levels of markedness in a coda that precedes a less marked onset. The crucial deviations from the previously proposed CodaCond are the following:

(a) PoA specification in the coda is not problematic per se; issues arise only when the following onset is less marked.

(b) It is not required that the PoA feature of the onset is also linked to the coda segment in order for a cluster to satisfy a CodaCond; instead, the two members of the cluster have to agree in the PoA features specified by the particular CodaCond. The onset segment may bear further specification.

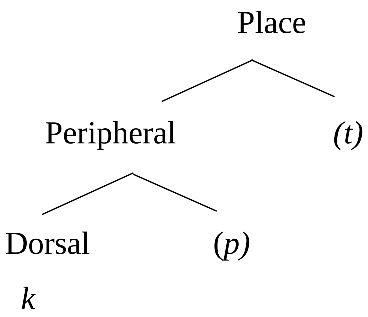
(c) Each CodaCond has different scope. A more stringent "CodaCond" prohibits all clusters in which the most marked segment is in the coda, e.g. both *kt* and *pt*, but a less stringent "CodaCond" allows for some such clusters, e.g. *pt* but not *kt*.

As far as the representation of the Place node is concerned, I adopt Rice's (1993) Peripheral model, according which the Place node is hierarchically organized so that *k* contains all the specification of *p* plus a Dorsal node and *p* contains all the specification of *t* plus a Peripheral node. Along these lines, a shift constitutes attrition of structure. I present Rice's model in the next section (2.3.1). Then, in section 2.3.2 I propose modifications of the CodaCond so that the emergence of certain previously excluded clusters can be predicted.

2.3.1 Rice's Peripheral model

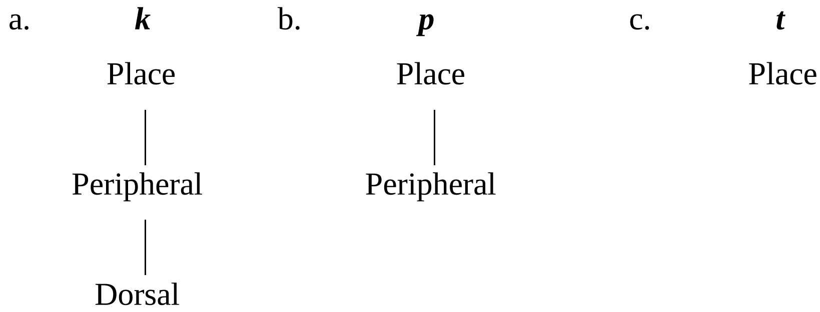
The observation that *k* and *p* pattern as a class inspired Rice's (1994) hypothesis of a hierarchically structured Place node. Building on ideas proposed by Rice & Avery (1993; based on previous work by Jakobson et al. 1952 and Hyman 1973), Rice proposes a hierarchically organized Place node (cf. the flat organization in Clements 1985; Clements & Hume 1995; Sagey 1986; McCarthy 1988, a.o.), where *p* and *k* group together to form the *Peripheral* node and *t* is a direct dependent of Place. *k* additionally contains a Dorsal node, whereas *p* is a default peripheral. Similarly, *t* is the default feature under the Place node.[13] The hierarchical structure is illustrated below (the parentheses indicate the default value under each node):

(35) Place node in Peripheral model (Rice 1994: 192)



The representations of *k*, *p*, and *t* are thus the following:

(36) Representation of PoA



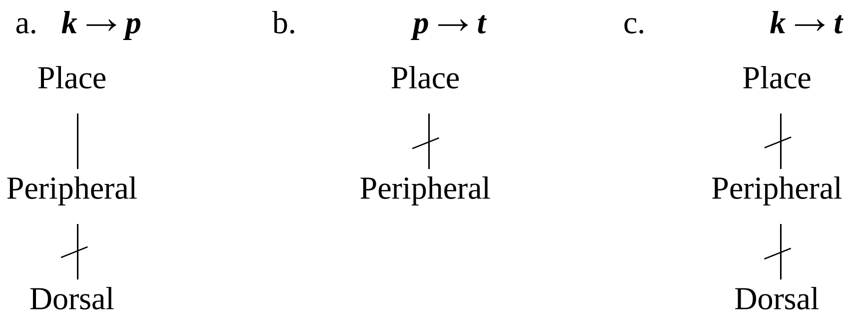
A core assumption is that the markedness relations among *k*, *p*, and *t* are determined by the amount of structure they contain, and the more complex a segment is the more marked it is considered. In particular, *k*, being specified as [dor(sal), per(ipheral), P(lace)N(ode)], contains more structure and is thus more marked than *p*, which is only [per, PN], and both are more complex and marked than *t*, which contains a bare Place node, i.e. [PN].

A shift is conceptualized as the (de)linking of place features. Shifts towards a default value, i.e. *p* for a non-dorsal peripheral and *t* for a non-peripheral consonant, are the outcome of structure attrition. If [dor] delinks (37a), then the consonant becomes a default *p* and the

[13] Each PoA feature eventually makes it to the surface on condition that the segmental inventory of the language encompasses the respective segments. Gaps in the implicational hierarchy may still appear. For instance, a language may display *k* and *t* but not *p* in the coda, if it lacks *p* altogether.

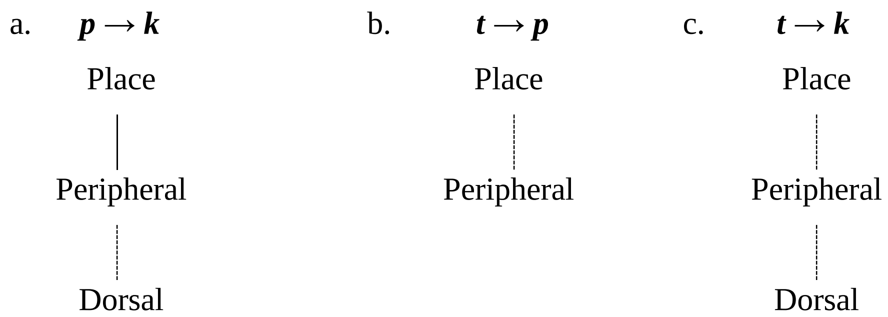
distinction between *k* and *p* is neutralized. Moreover, if the entire peripheral node is pruned (37b–c), then all places merge to *t*, i.e. the default feature for the bare Place node.

(37) Delinking of place features



Shifts to more marked segments, on the other hand, result from the linking, i.e. addition, of new nodes (represented as dotted lines in 38). The linking of [dor] under an existing peripheral node turns *p* into *k* (38a). Inserting [per] under a bare place node, realized as *t*, yields a default peripheral, i.e. *p* (38b) and the additional linking of [dor] converts *t* into *k* (38c).

(38) Linking of place features



Rice supports her claim by providing, among other evidence, examples from Romanian, where the shift /kt/ → [pt] is observed. The generated typology of PoA shifts (39, adapted from Rice 1994: 196) predicts certain historical stages that IG has gone through:

(39) PoA shift typology under the peripheral hypothesis

Process	*Result*	*Description*	*IG*
Do not delink	*k*, *p*, *t*	*k*, *p*, and *t* are distinct	MedG
Delink [dor]	*p*, *t*	*k* and *p* merge into *p*; *t* is distinct	Early SIG
Delink [per]	*t*	*k*, *p*, and *t* merge into *t*	Stern SIG, Bova CIG

2.3.2 CodaConds in stringency relation

I propose that, in order to accommodate more fine-grained distinctions, the definition of the CodaCond should be modified so that the restrictions it imposes are sensitive to particular marked PoA features. In particular, in light of Rice's (1994) representation of the Place node, I postulate CodaConds in stringency relation that refer to particular sub-constituents under the Place node. CodaCond-[dor] (40a) blocks the presence of [dor] in the coda, i.e. *k*, and the more stringent CodaCond-[dor/per] (40b) disallows [per] segments with or without additional specification ([dor]), i.e. *k* and *p*.

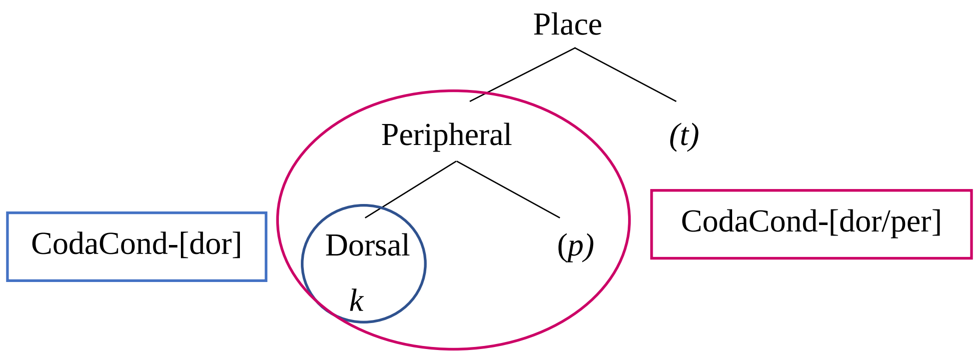
(40) a. CodaCond-[dor]

*C]σ
|
[dor]

b. CodaCond-[dor/per]

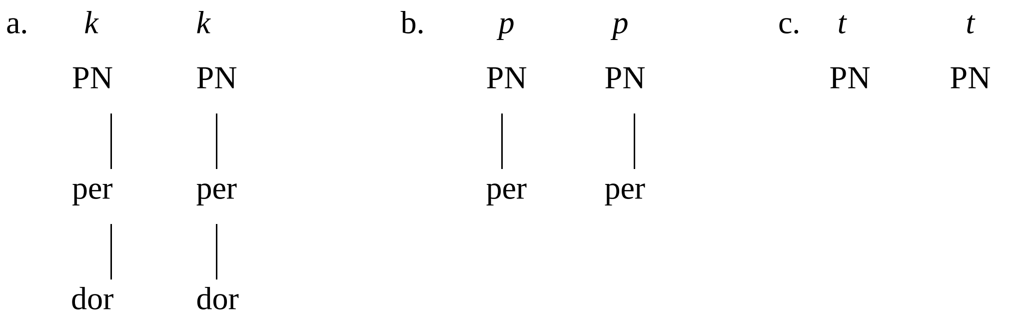
*C]σ
|
[dor/per]

(41) Scope of the proposed CodaConds

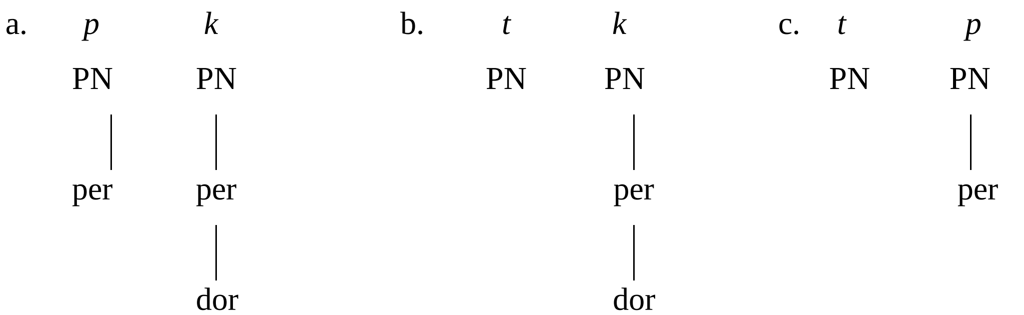


Crucially, as stated earlier (section 2), the onset constitutes the reference point based on which a coda is deemed either licit or illicit. Nevertheless, heterorganicity is not necessarily problematic. Provided that the onset is equally (42) or more (43) marked, a marked coda, i.e. a coda containing the features [dor] and/or [per] (i.e. *k* and *p*, respectively), is not targeted by any CodaCond.

(42) Homorganic clusters: coda and onset have identical place features



(43) Allowed heterorganic: onset has all features coda has, plus more



On the other hand, heterorganic clusters involving a more marked coda, i.e. a coda containing more PoA features than the adjacent onset, violate at least one CodaCond. More concretely, *kt* and *kp* (44a–b), in which the coda is [dor] but the onset is at most [per] (in the case of *kp*), are disallowed by both CodaCond-[dor/per] and CodaCond-[dor]. *Pt* (44c), though, violates only CodaCond-[dor/per], as *p* is only specified as [per].

(44) Disallowed heterorganic: coda has more features than coda

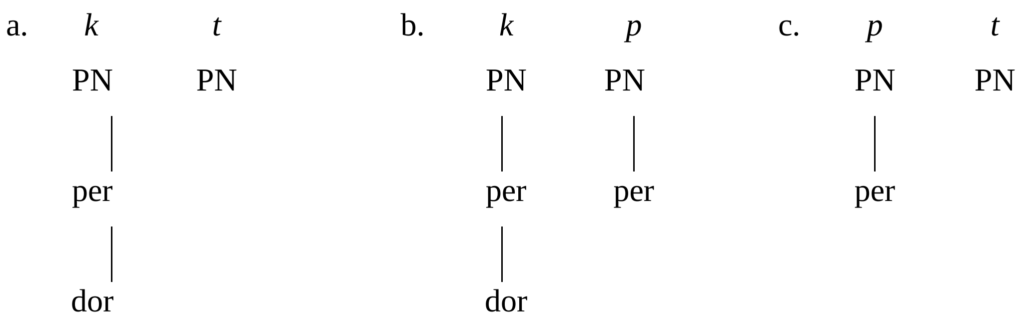


Table (45) summarizes:

(45) Allowed and disallowed clusters

Clusters	**Description**	
kk, *pp*, *tt*	coda and onset have the exact same PoA features	homorganic, allowed
pk	coda and onset have [per]; onset also has [dor]	heterorganic, allowed
tk	coda and onset have [PN]; onset also has [dor, per]	heterorganic, allowed
tp	coda and onset have [PN]; onset also has [per]	heterorganic, allowed
kt	coda and onset have [PN]; coda also has [dor, per]	heterorganic, disallowed by both CodaCond-[dor] and CodaCond-[dor/per]
kp	coda and onset have [per]; coda also has [dor]	heterorganic, disallowed by both CodaCond-[dor] and CodaCond-[dor/per]
pt	coda and onset have [PN]; coda also has [per]	heterorganic, disallowed by CodaCond-[dor/per]

As illustrated in the diagrams, a double linking of a (marked) PoA feature to both the coda and the onset is not necessary as long as the two constituents agree with respect to all PoA features the coda contains.[14] The onset – and only the onset – may also bear additional specification.

A CodaCond may trigger the delinking (in practice, deletion) of the intolerable features. Crucially, the avoidance of *k* alone, e.g. via a *k* > *p* shift, is predicted, owing to the hierarchical organization of the Place node: the deletion od [dor] does not necessarily affect [per]. The removal of [per], on the other hand, is not possible without the simultaneous delinking of [dor].

A caveat is in order here. The changes *kp* → *pp*, *kt* → *tt*, and *pt* → *tt*, result in homorganic clusters, comprised either of different consonants (true clusters) or of identical segments (geminates). The latter case could be analysed in terms of regressive complete

[14] Recall that in this thesis I consider geminates to also constitute sequences of identical consonants and I do not consider double linking.

assimilation. However, this approach would not only leave the shift that yields a *pt* cluster unaccounted for, but also in fact would face a problem of theoretical nature in the cases where the trigger is a *t*. Unlike *k* and *p*, *t* has been extensively claimed to be incapable of triggering assimilation, because it lacks a PoA feature that can spread (Rice 1994; Szigetvari 1994; Jun 1995, 2004; a.o.).

Another consideration that could point to an alternative approach of diachronic processes in IG is that, since in a substantial number of cases the outcome of the *k* → *t* and *p* → *t* shift is a geminate, e.g. /xn/ → [nn], /ft/ → [tt] (see chapter 2), the question arises whether an analysis positing deletion followed by compensatory lengthening specifically for these cases is preferable to the postulation of a CodaCond. However, at least regarding IG, there are no solid reasons to believe that compensatory lengthening is motivated. For instance, the shifts are not confined in post-tonic positions. Besides, stressed syllables do not need to be closed in IG (see chapter 2). Most importantly, the compensatory lengthening approach overlooks the cases of derived $C_\alpha C_\beta$ clusters. Thus, a solution along the lines of PoA shifts overrides the theoretical and empirical hurdles and achieves to provide a unified account of all attested changes.

2.4 Typological analysis of PoA changes

In the following sections I develop my typological analysis of PoA in the coda. I first present PoA.GEN (section 2.4.1) and PoA.CON (section 2.4.2) and continue with the discussion of the violation profiles of the candidates (section 2.4.3). In section 2.4.4 I discuss the grammars and the extensional typology. Section 2.4.5 contains the property analysis of the PoA typology.

2.4.1 PoA.GEN

The present analysis focuses on the realization of pre-consonantal codas at every diachronic stage of IG. Considering only clusters with SD lower than +2.5 (see 2 above), the analysis evaluates coda segments[15] that (a) are specified as [dor, per], i.e. *k*, (b) are specified as [per],

[15] Although I do not take the input to be syllabified, for simplicity, I use the term ‘underlying coda’ for any pre-consonantal segment that is bound to surface in this position given the sonority profile of the cluster in which it

i.e. *p*, and (c) do not bear further specification under the Place node, i.e. *t*. The behavior of each of the above segments is examined within the context of the adjacent segment, i.e. the historical onset, which is occupied by either *k*, *p*, or *t* and remains unaltered even if the segment moves. Since my aim is to account for the processes targeting the coda, I examine only part of the possible typology by omitting from PoA.GEN the logically possible candidates in which the onset undergoes featural change.[16] I therefore I consider only cases where what historically appears in the onset surfaces intact somewhere in the cluster. The schematic candidates are the following (subscript is used only for marking metathesized candidates, i.e. /C_1C_2/→ [C_2C_1]; all other output forms are considered to be [C_1C_2]):

(46) PoA.GEN

a. /k_1k_2/	→ k_1k_2	b. /p_1k_2/	→ kk	c. /t_1k_2/	→ kk
	→ pk		→ pk		→ pk
	→ tk		→ tk		→ tk
	→ k_2k_1		→ k_2p_1		→ k_2t_1
d. /k_1p_2/	→ kp	e. /p_1p_2/	→ kp	f. /t_1p_2/	→ kp
	→ pp		→ p_1p_2		→ pp
	→ tp		→ tp		→ tp
	→ p_2k_1		→ p_2p_1		→ p_2t_1
g. /k_1t_2/	→ kt	h. /p_1t_2/	→ kt	i. /t_1t_2/	→ kt
	→ pt		→ pt		→ pt
	→ tt		→ tt		→ t_1t_2
	→ t_2k_1		→ t_2p_1		→ t_2t_1

occurs, based on the Minimum Sonority Distance restrictions described right above. The goal of this analysis is to account for the changes codas undergo when they are more marked than the following onset. Thus, word-final codas are not examined.

[16] Similarly, Alber & Prince (in prep.) analyze stress systems by studying sub-typologies varying as to the candidate set (monosyllabic candidates; mono- and bi-syllabic candidates, etc.).

In sum, the above candidates represent all mappings from all PoAs in the coda to all possible PoAs of the language and, additionally, the possibility of metathesis between the two segments of a given cluster.

2.4.2 PoA.Con

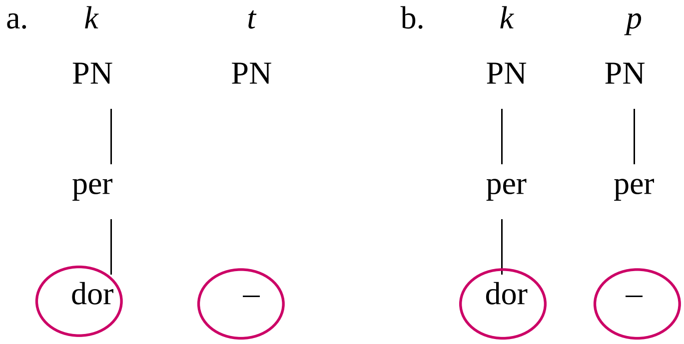
The fine-grained CodaConds postulated in section 2.3 (see Rice 1994; cf. Ito 1989; Yip 1991; McCarthy 2008) are formulated as positional m.constraints (Zoll 1996; 1998) organized stringently (Prince 1997a,b, 1999; de Lacy 2002, 2006; Alber & Meneguzzo 2016; Merchant & Krämer 2018; Krämer & Zec 2021): m.{[dor].[¬dor]} (henceforth m.{k.¬k}) and m.{[dor].[¬dor], [per].[¬per]} (henceforth m.{k.¬k, p.¬p}).

(47) m.constraints of PoA typology

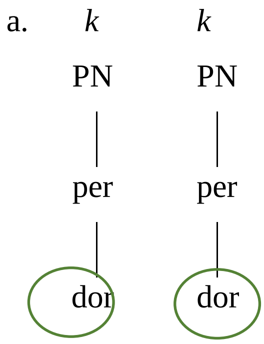
a.	m.{[dor].[¬dor]} (henceforth m.{k.¬k})	Assign a violation mark for each consonant in the coda that is specified as [dor] and occurs before an onset not specified as [dor]
b.	m.{[dor].[¬dor], [per].[¬per]} (henceforth m.{k.¬k, p.¬p})	Assign a violation mark for each consonant in the coda that is either specified as [dor] and occurs before an onset not specified as [dor] or specified as [per] and occurs before an onset not specified as [per]

m.{k.¬k, p.¬p} and m.{k.¬k} are not violated by the mere presence of [dor] and/or [per] segments in the coda, but by those consonants that do not agree with the adjacent onset with respect to the marked feature at hand, as explicated below:

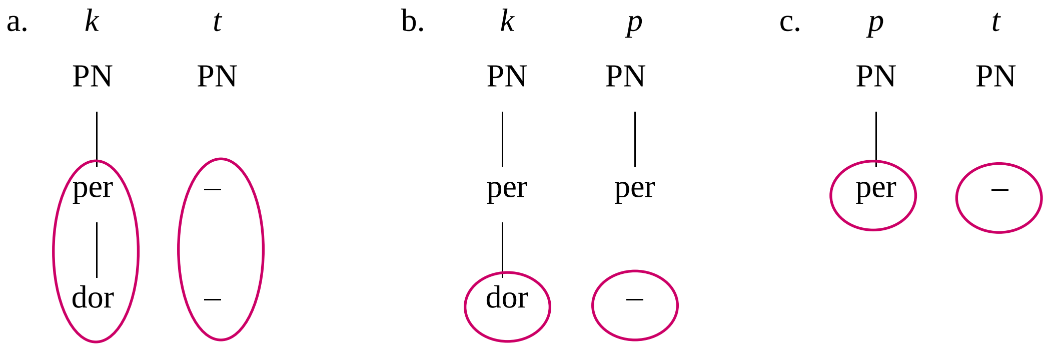
(48) Clusters involving *k* that violate m.{k.¬k}



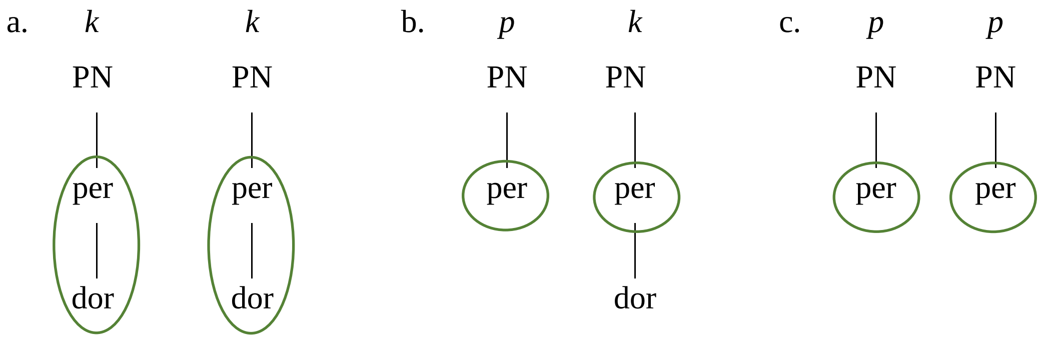
(49) Clusters involving *k* that satisfy m.{k.¬k}



(50) Clusters involving *k* and/or *p* that violate m.{k.¬k, p.¬p}



(51) Clusters involving *k* and/or *p* that satisfy m.{k.¬k, p.¬p}



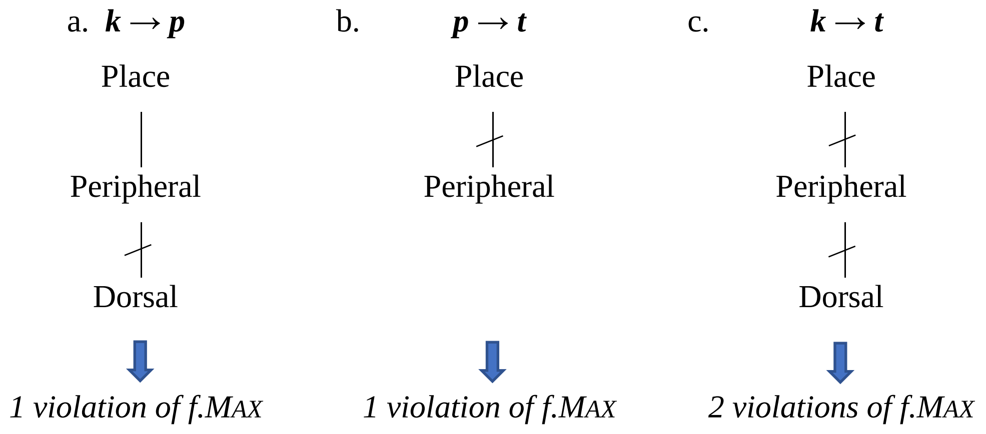
Input-output discrepancies are penalized by the f.constraints f.LINEARITY (f.LIN), f.MAX[place] (f.MAX), and f.DEP[place] (f.DEP) (McCarthy & Prince 1995). f.LIN is violated when the linear order of input segments is disrupted in the output. f.Max and f.Dep militate against the deletion or the insertion of any PoA feature under the Place node, i.e. either [per] or [dor].

(52) f.constraints of PoA typology

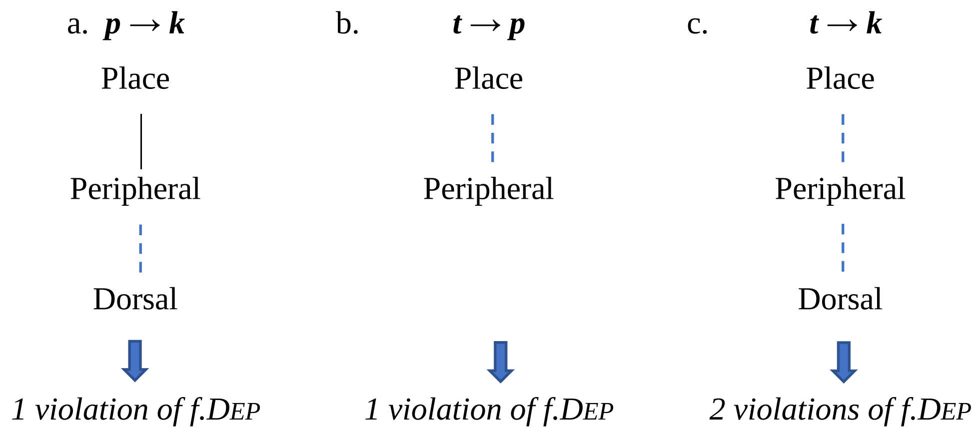
a.	f.Linearity (henceforth f.Lin)	Assign a violation mark if the precedence relations in the input are not preserved in the output
b.	f.Max[place] (henceforth f.Max)	Assign a violation mark for every place feature ([per], [dor]) in the input that has no correspondent in the output
c.	f.Dep[place] (henceforth f.Dep)	Assign a violation mark for every place feature ([per], [dor]) in the output that has no correspondent in the input

Crucially, the distance covered along the PoA scale $k \prec p \prec t$ must be reflected on the violation profile of shifting candidates with respect to the f.constraints (see #Ident, de Lacy 2002), so that shifts not resulting in absolute unmarkedness can also be generated. Shifts involving the delinking of one feature, like $k \rightarrow p$ (53a) and $p \rightarrow t$ (53b), incur one violation of f.Max, while $k \rightarrow t$, which requires the loss of two place features (53c), constitutes two violations. Similarly, the insertion of feature specifications may incur one (54a–b) or two (54c) violations of f.Dep, depending on the number of new place features being linked (represented as blue dotted lines).

(53) Violations of f.Max



(54) Violations of f.DEP



2.4.3 Violation Tableaux

The violation profile of the candidates is illustrated with the help of Violation Tableaux (VT). To begin with the homorganic clusters, the VTs (55–57) render evident that any violation of faithfulness results in harmonically bounded candidates (shaded cells). The faithful realizations, on the other hand, satisfy the entire PoA.CON. Therefore, homorganic clusters remain intact.

(55) VT Homorganic clusters: /kk/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
k_1k_2	a. k_1k_2					
	b. pk			1		
	c. tk			2		
	d. k_2k_1					1

(56) VT Homorganic clusters: /pp/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
p_1p_2	a. kp	1	1		1	
	b. p_1p_2					
	c. tp			1		
	d. p_2p_1					1

(57) VT Homorganic clusters: /tt/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
t_1t_2	a. kt	1	1		2	
	b. pt		1		1	
	c. t_1t_2					
	d. t_2t_1					1

The same holds for codas preceding a more marked onset, i.e. /pk/ (VT 58), /tk/ (VT 59), and /tp/ (VT 60). In the case of /pk/ → [pk], the onset and the coda share the feature [per], thus m.{k.¬k, p.¬p} is not violated. Coronal codas also satisfy markedness, since *t* is always less marked than a heterorganic consonant. Faithfulness is satisfied in all cases as well. Thus, every unfaithful candidate is harmonically bounded.

(58) VT Coda less marked than onset: /pk/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
pk	a. kk				1	
	b. pk					
	c. tk			1		
	d. k_2p_1	1	1			1

(59) VT Coda less marked than onset: /tk/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
tk	a. kk				2	
	b. pk				1	
	c. tk					
	d. k_2t_1	1	1			1

(60) VT Coda less marked than onset: /tp/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
tp	a. kp	1	1		2	
	b. pp				1	
	c. tp					
	d. p_2t_1		1			1

The possibility that at least one unfaithful candidate wins a competition is offered when the coda is more marked than the adjacent onset. In broad terms, a marked coda may either surface faithfully, thus satisfying f.MAX, f.DEP, and f.LIN, but violating at least m.{k.¬k, p.¬p}, or get repaired via either a shift to a less marked value, by violating f.MAX, or metathesis, by violating f.LIN. Shifts cannot head towards more marked values.

Specifically, as illustrated in VT (61), given the input /pt/, the *p* may either get realized unchanged, shift to *t* via the delinking of [per], or transpose with *t*; however, turning into *k* by linking the feature [dor] is not an option. The candidate /pt/ → [kt] always loses over /pt/ → [pt], since they have the same violations with respect to m.{k.¬k, p.¬p} and /pt/ → [kt] yields two additional violations, i.e. of m.{k.¬k} and f.DEP.

(61) VT Coda more marked than onset: /pt/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
pt	a. kt	1	1		1	
	b. pt		1			
	c. tt			1		
	d. t_2p_1					1

The input /kt/ can be associated to all four outputs [kt], [pt], [tt], and [tk]. No harmonic bounding is detectable.

(62) VT Coda more marked than onset: /kt/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
kt	a. kt	1	1			
	b. pt		1	1		
	c. tt			2		
	d. t_2k_1					1

Interestingly, once the coda has become equally marked as the onset, as, for instance, via the shift of *k* to *p* in /kp/ → [pp], further shifts to an even less marked value are blocked, i.e. /kp/ → *[tp] (VT 63). In particular, the candidate /kp/ → [pp] harmonically bounds the candidate /kp/ → *[tp] due to the violations of f.MAX (1 vs. 2, respectively).

(63) VT Coda more marked than onset: /kp/

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
kp	a. kp	1	1			
	b. pp			1		
	c. tp			2		
	d. p_2k_1					1

As mentioned in section 2.4.1, PoA.GEN may encompass additional logically possible candidates, which however were ignored in the present analysis. For example, consider candidates in which a shift affects the onset instead of the coda (64a) or both metathesis and increase/reduction of markedness are observed (64b–c, respectively):

(64) Omitted candidates

a. /kp/ → kk — change of onset
b. /k_1p_2/ → k_2k_1 — metathesis and increase of markedness
c. /k_1p_2/ → t_2k_1 — metathesis and reduction of markedness

Candidates like (64a) are possible given PoA.CON and the broader typology that is generated if they are included in GEN is definitely worth investigating in future research. Candidates like (64b–c), on the other hand, are harmonically bounded by the candidate that displays only metathesis, i.e. /k_1p_2/→ [p_2k_1]. Given that all metathesized outputs are equal with respect to markedness (0 violations of both m.constraints), violations of faithfulness are to decide. Crucially, candidates involving not only metathesis but also the addition (65a) or deletion (65c) of PoA features lose to the candidate involving just metathesis (65b) under every ranking among f.constraints. Therefore, this analysis predicts that metathesis and deletion/addition of PoA specification cannot cooccur.

(65) Harmonic bounding of metathesized candidates 64b–c

input	*output*	m.{k.¬k}	m.{k.¬k, p.¬p}	f.MAX	f.DEP	f.LIN
k_1p_2	a. k_2k_1				1	1
	b. p_2k_1			0	0	1
	c. t_2k_1			1		1

2.4.4 Extensional PoA typology

The typology contemplates five languages. In each language, coda *k* and/or *p* are avoided via some process when occurring before a less marked onset:

- L.kpt:f — *k*, *p*, and *t* are realized faithfully in the coda
- L.k:shift — *k* undergoes shift in the coda
- L.kp:shift — *k* and *p* undergo shift in the coda
- L.k:met — *k* undergoes metathesis in the coda
- L.kp:met — *k* and *p* undergo metathesis in the coda

The optima each grammar selects are presented below (the unfaithful candidates are colored and presented in bold for readability). The dialects that correspond to each language in the PoA typology are listed in the rightmost column.[17]

[17] L.k:met does not correspond to a documented stage of IG. In theory, it could have constituted an intermediate stage between L.kpt:f and L.kp:met.

(66) Extensional PoA typology

	/kk/	/kp/	/kt/	/pk/	/pp/	/pt/	/tk/	/tp/	/tt/	*IG*
L.kpt:f	kk	kp	kt	pk	pp	pt	tk	tp	tt	MedG
L.k:shift	kk	**pp**	**pt**	pk	pp	pt	tk	tp	tt	Early SIG, Martano
L.kp:shift	kk	**pp**	**tt**	pk	pp	**tt**	tk	tp	tt	Sternatia, Bova
L.k:met	kk	**pk**	**tk**	pk	pp	pt	tk	tp	tt	–
L.kp:met	kk	**pk**	**tk**	pk	pp	**tp**	tk	tp	tt	Galliciano, Roghudi

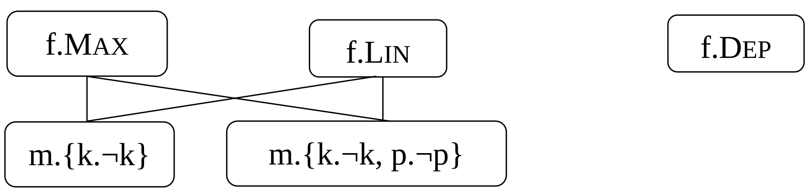
2.4.5 Grammars of PoA typology

The constraint hierarchies holding for each language are demonstrated below in SKB and Hasse diagrams.

(67) SKB L.kpt:f

f.DEP	f.MAX	f.LIN	m.{k.¬k}	m.{k.¬k, p.¬p}
	W		L	L
		W	L	L

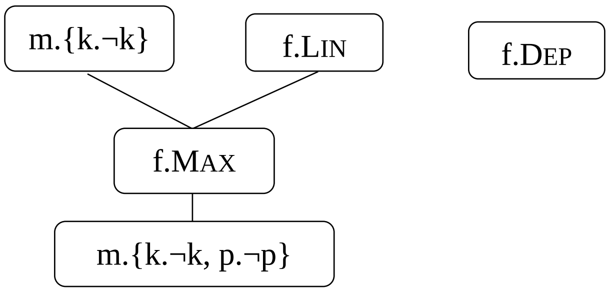
(68) Hasse L.kpt:f



(69) SKB L.k:shift

f.DEP	f.MAX	f.LIN	m.{k.¬k}	m.{k.¬k, p.¬p}
	L		W	
	L	W		
	W			L

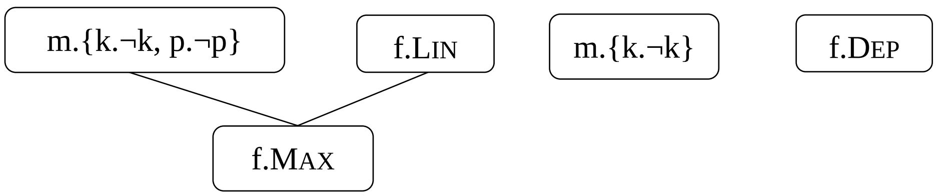
(70) Hasse L.k:shift



(71) SKB L.kp:shift

f.DEP	f.MAX	f.LIN	m.{k.¬k}	m.{k.¬k, p.¬p}
	L			W
	L	W		

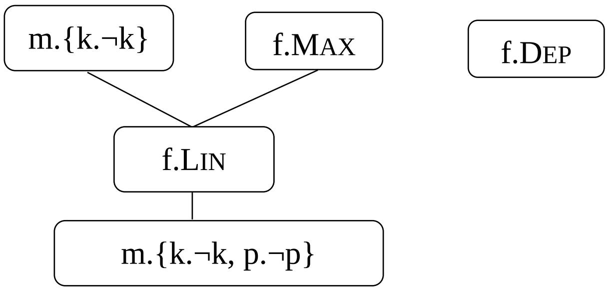
(72) Hasse L.kp:shift



(73) SKB L.k:met

f.DEP	f.MAX	f.LIN	m.{k.¬k}	m.{k.¬k, p.¬p}
		L	W	
	W	L		
		W		L

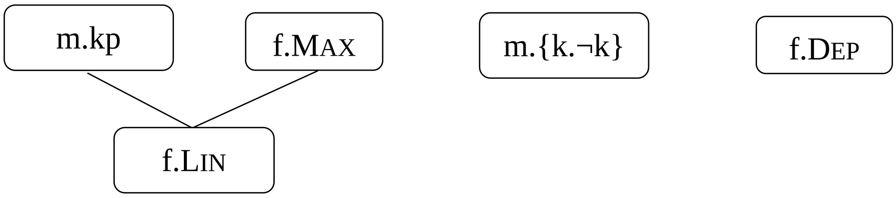
(74) Hasse L.k:met



(75) SKB L.kp:met

f.DEP	f.MAX	f.LIN	m.{k.¬k}	m.{k.¬k, p.¬p}
		L		W
	W	L		

(76) Hasse L.kp:met



An interesting aspect of this typology is that, although f.DEP does not participate in any of the above grammars, its elimination from PoA.CON is not without consequences. The candidates /pk/→ [kk] (58), /tk/→ [pk], /tk/→ [kk] (59), and /tp/→ [pp] (60) are harmonically bounded precisely because they incur violations of f.DEP. The removal of the particular constraint results in free variation among all outputs not violating m.constraints, i.e. /pk/→ [pk] ~ [kk], /tk/→ [tk] ~ [pk] ~ [kk], and /tp/→ [tp] ~ [pp]. Essentially, f.DEP penalizes going the wrong way up the (desired) markedness scale $k \prec p \prec t$.

2.4.6 Property analysis of PoA typology

Close examination of the above grammars reveals those ranking conditions that determine crucial distinctions among the languages of the typology. In particular, all grammars permitting some [per] segments, i.e. at least *p*, before less marked onsets (L.kpt:f, L.k:shift, L.k:met), have the ranking {f.MAX, f.LIN}.sub >> m.{k.¬k, p.¬p}, whereas grammars where coda must be equally or less marked than the onset, therefore *p* and everything above it on the markedness scale (i.e. *k*) is banned, have the reversed ranking, i.e. m.{k.¬k, p.¬p} >> {f.MAX, f.LIN}.sub. The ranking {f.MAX, f.LIN}.sub >> m.{k.¬k} is found in L.kpt:f, where *k* is admitted, while m.{k.¬k} >> {f.MAX, f.LIN}.sub appears to be significant whenever the exclusion of *k* is not entailed by the exclusion of *p*, i.e. L.k:shift and L.k:met. Finally, among languages not admitting some feature, those opting for shifting (L.k:shift, L.kp:shift) have the ranking f.MAX >> f.LIN and those choosing metathesis (L.k:met, L.kp:met) have f.LIN >> f.MAX.

The above rankings are enough to generate the entire PoA typology and account for all critical distinctions among language types. As the ranking of f.DEP is not significant, the constraint is henceforth ignored. Note that the two remaining f.constraints f.MAX and f.LIN participate as a class in the crucial rankings:

(77) Class F {f.MAX, f.LIN}

I posit three properties that are responsible for the emergence of some process and distinguish the languages of the typological system that display it and those in which it is blocked:

(78) Properties of PoA typology

a. **P.yes/no**

F.sub < > m.{k.¬k, p.¬p}	some/no [per] segments are allowed in the coda
F.sub >> m.{k.¬k, p.¬p}	some [per] segments are allowed
m.{k.¬k, p.¬p} >> F.sub	no [per] segments are allowed

b. **K.yes/no**

F.sub < > m.{k.¬k}	[dor] segments are/are not allowed in the coda
F.sub >> m.{k.¬k}	[dor] segments are allowed
m.{k.¬k} >> F.sub	no [dor] segments are allowed

c. **F.met/shift**

f.MAX < > f.LIN	marked clusters undergo metathesis/shift
f.MAX >> f.LIN	marked clusters undergo metathesis
f.LIN >> f.MAX	marked clusters undergo shift

Property P.yes/no, i.e. the ranking between the lowest-ranked f.constraint F.sub and the more stringent m.{k.¬k, p.¬p}, determines the presence of segments specified as [dor] and/or [per] before a less marked onset: if all faithfulness is dominant, then neither a shift nor metathesis is an option. Thus, some peripheral segments, i.e. at least *p*, emerge. Reversely, if at least one f.constraint is outranked by m.{k.¬k, p.¬p}, then the coda decreases in markedness.

Under the ranking F.sub >> m.{k.¬k, p.¬p}, *p* survives in L.kpt:f, L.k:shift, and L.k:met, but *k* might still be targeted by m.{k.¬k}. The decision is made by K.yes/no. The language having value K.yes allows *k*. In practice, *k* is permitted in addition to *p*, given the scopal relations: property K.yes/no has scope under the value P.yes. In the two languages having K.no, *p* is the only peripheral that emerges before a non-*k*, as *k* is ruled out.

The selection between the two available solutions to intolerable codas, i.e. shift or metathesis, is made by property F.met/shift. Within the F class, the subordinate constraint is not fatally violated. If f.LIN is dominated, the grammar exhibits metathesis, and if f.MAX is subordinate, then the grammar displays PoA shifts.

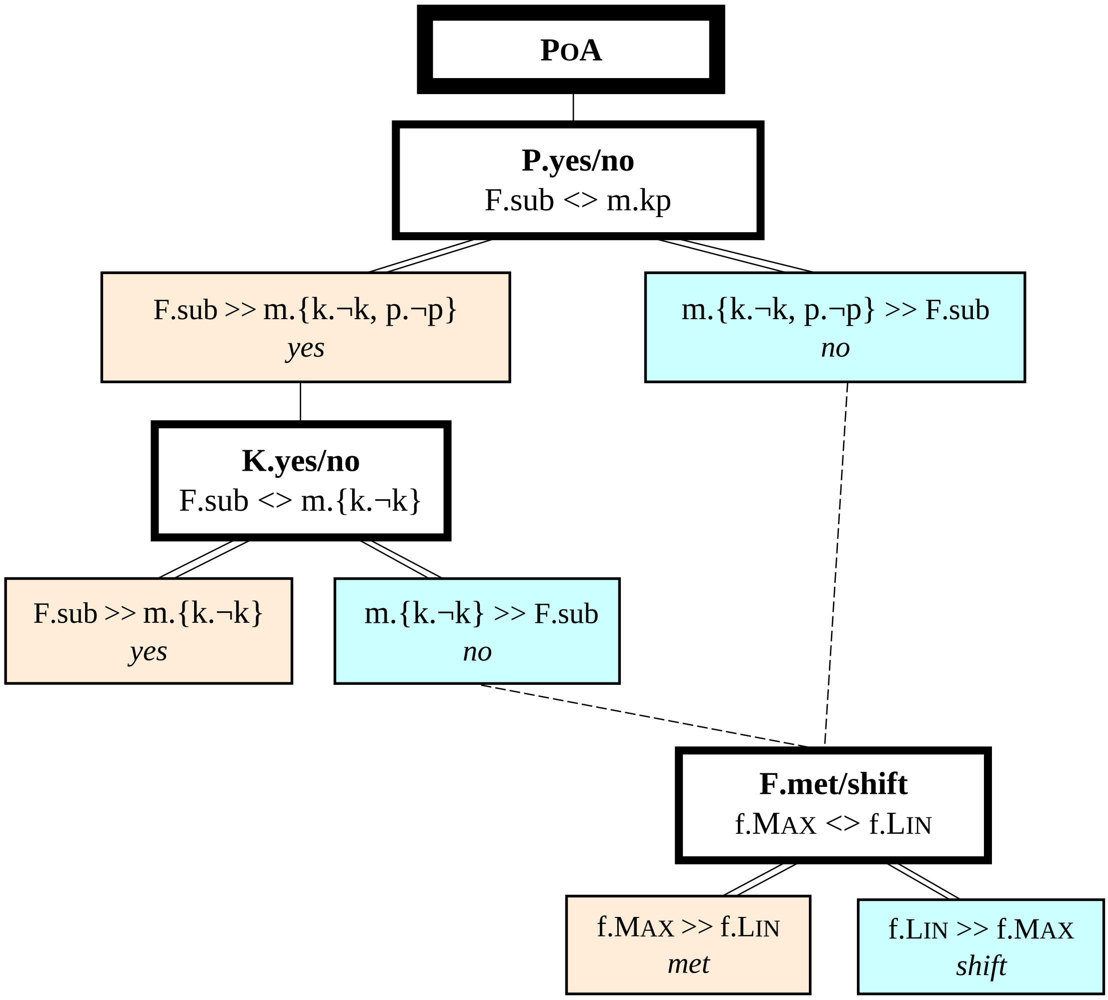
In sum, L.kpt:f, L.k:shift, and L.k:met allow consonants bearing a peripheral node (value P.yes), whereas L.kp:shift and L.kp:met prevent them from surfacing (value P.no). Among the languages allowing for *p*, L.kpt:f is the only language also admitting *k* (value K.yes), whereas L.k:shift and L.k:met take the value K.no. K.yes/no is moot with respect to property value P.no, hence it is not relevant in L.kp:shift and L.kp:met. In simple terms, given that they disallow a peripheral node, by implication, it is impossible that they admit further PoA specification. Finally, among the languages that employ some repair strategy at the expense of a non-fatal faithfulness violation, L.k:shift and L.kp:shift display a PoA shift, and L.k:met and L.kp:met opt for metathesis. The Property Table below summarizes the property values each language in the typology is assigned with respect to each property:

(79) Intensional PoA typology

	P.yes/no	**K.yes/no**	**F.met/shift**
L.kpt:f	*yes*	*yes*	*moot*
L.k:shift	*yes*	*no*	*shift*
L.k:met	*yes*	*no*	*met*
L.kp:shift	*no*	*moot*	*shift*
L.kp:met	*no*	*moot*	*met*

The scope of the above properties is represented in the property treeoid in (80). P.yes/no has wide scope, i.e. it does not depend on a specific value. K.yes/no, on the other hand, branches below the value P.yes and serves to determine the presence of *k* in addition to *p*. As mentioned above, as soon as [per] is removed from the picture (P.no), the need for another property to determine whether or not [dor] is allowed becomes redundant. Finally, F.met/shift is relevant in all grammars where markedness is dominant. It has disjunctive scope (represented via dotted lines; Bennett & DelBusso 2018; see also DelBusso 2018) over the values K.no and P.no, i.e. if either K.no or P.no hold, then F.met/shift must be decided.

(80) PoA Treeoid



The above PoA property analysis has offered insight into the stringency relationship between the presence of peripherals and of dorsals in a language. The problems posed by the dominance of m-constraints can be resolved by two possible ways of faithfulness breach, shift or metathesis.

3. MoA typology

In chapter 2, section 3.5, different stages of IG were detected on the basis of the admitted MoA features in the coda. In the ancestral language, i.e. MedG, the coda position could host stops, e.g. [(o)**ps**ari] ‘fish’, non-sibilant fricatives, e.g. [e**ft**a] ‘seven’, sibilants, e.g. [a**st**eri] ‘star’, and sonorants, e.g. [ma**nd**ili] ‘handkerchief’, [xa**rt**i] ‘paper’. In early stages of SIG as well as in Roghudi CIG, stops were banished from the coda and converted to non-sibilant fricatives, e.g. Early SIG /(o)**ps**ari/ → [a**fs**ari], Roghudi CIG /e**ft**a/ → [e**θt**a]. In more innovative versions of SIG, e.g. in Sternatia^{+} SIG, and in Bova CIG, non-sibilants are also abolished. Thus, stops and fricatives emerge as either a sibilant, e.g. Bova CIG /e**ft**a/ → [e**st**a], or a rhotic, e.g. Sternatia^{+} SIG [a**rs**ari],[18] [e**rt**a]. Other alternatives include the creation of surface geminates, e.g. Sternatia^{+} SIG [a**ss**ari], [e**tt**a], which share MoA features. All the above representative examples are presented in Table (81).

(81) Summary of MoA changes in the coda in IG

MedG	Early SIG	Sternatia^{+} SIG		
ps →	fs →	rs, ss		
=	ft →	rt, tt		
ft →			θt	Roghudi CIG
→			st	Bova CIG
st, nd, rt =	st, nd, rt			(all IG)

Drawing from the IG data, this section accounts for the typological differences across grammars with emphasis on the MoA features permitted in the coda. Markedness proceeding from the sonority hierarchy plays a central role, as the main assumption is that changes in MoA features in the coda aims at progressively eliminating marked structures in positions licensing restricted degrees of markedness. Constraints in stringency relationship, this time on the side of both markedness and faithfulness, highlight the interaction of processes targeting different marked MoA features.

[18] This particular variant is neither found in my data nor explicitly cited in other sources, even though it does constitute a possible form (note that not all lexical items are documented in all possible forms); it is included here for the sake of completeness.

The next section (3.1) provides a summary of the diachronic modifications the coda inventory of IG witnessed. The typological analysis of MoA follows (section 3.2).

3.1 Restrictions on MoA features in the coda

The six classes of consonants found in the coda in MedG and/or IG, and thus are pertinent to the analysis, are stops, non-sibilant fricatives, sibilants, affricates, nasals, laterals, and rhotics (trills). The MoA features defining each class are presented in (82).

(82) MoA features in IG

	stops	fricatives	sibilants	affricates	nasals	lateral	rhotic
[±continuant]	–	+	+	–	–	–	+
[±strident]	–	–	+	+	–	–	–
[±sonorant]	–	–	–	–	+	+	+
[±nasal]	–	–	–	–	+	–	–

The stepwise developments observed in IG are in line with M(inimum)SD requirements across syllable borders and reflect a progressive improvement of Syllable Contact through the increase of sonority in codas so that the –falling– sonority slope gradually becomes steeper. The first ban excludes the least sonorous segments, i.e. plosive obstruents (henceforth *t*), from the coda. The illicit structures are amended mainly via a change to [+cont]. Spirantization processes affecting OO clusters date back to Early MedG and continued being active in Early IG, whereas Cs and Cn were targeted only in Early SIG.

In Sternatia SIG, Bova CIG, and Galliciano CIG, as well as the parallel system dubbed SIG+,[19] non-strident fricative codas (henceforth *θ*) are also prohibited. Depending on the variety, the clusters at hand were converted into geminates, sC, or rC clusters.

The above stepwise changes shaped different coda inventories, each of which is comprised of less marked and more sonorous segments: *t* is eliminated first, and is followed

[19] SIG+ constitutes a set of non-systematic variants where a coda obstruent is replaced by [r], which are found in SIG next to the typical realizations (see chapter 2).

by *θ*. Stridents and sonorants, henceforth treated as a single class *s*, are allowed in all stages.[20] A summary is offered in Table (83) below:

(83) MoA features in coda in IG

	t	***θ***	***s***	***Sonority value allowed in coda***
MedG	✓	✓	✓	0–3
Early SIG, Martano SIG, Roghudi CIG		✓	✓	0.5–3
Sternatia SIG, Bova & Galliciano CIG			✓	1–3

3.2 Typological analysis of MoA changes

This section advances the proposed typological analysis of MoA in the coda. Sections 3.2.1 and 3.2.2 introduce MoA.GEN and MoA.CON, respectively. Section 3.2.3 explicates the violation profiles of candidates via Violation Tableaux. In section 3.2.4 I present the extensional MoA typology and in section 3.2.5 the grammars. Section 3.2.6 delves into the property analysis of the typology.

3.2.1 MoA.GEN

The set of candidates involved in the MoA typology includes preconsonantal segments specified as (a) [–cont, –son], i.e. *t*, (b) [+cont, –str, –son], i.e. *θ*, and (c) either [+str] or [+son], i.e. *s*. It is presupposed that the sonority value of the following consonant *C* is not high enough to enable a tautosyllabic parsing of the cluster. Possible interactions with the following segment (e.g. in the case of cooccurring continuants) are not examined. The full set of input–output pairs is given below:

[20] Recall that the lateral, despite being a sonorant, is prohibited in the coda in IG (chapter 2, section 2.1).

(84) MoA.GEN

/tC/	→ tC	/θC/	→ tC	/sC/	→ tC
	→ θC		→ θC		→ θC
	→ sC		→ sC		→ sC

In short, the candidates of the MoA typology represent all mappings from and to the three underlying MoAs *t*, *θ*, and *s* in the coda.

An important observation is that the sonority-based markedness scale $t \prec \theta \prec s$ (in the coda) is divided in two different ways. Based on the value of [±cont], the segments under investigation fall into two groups, i.e. *t* ([–cont]; more marked) vs. *θ and s* ([+cont]; less marked). Moreover, we notice the division between *t* and *θ* ([–s]; more marked) and *s* ([+s]; less marked).

(85) Divisions of sonority hierarchy

a.	*t*	vs.	*θ, s*	[–cont]	vs.	[+cont]
b.	*t, θ*	vs.	*s*	[–s]	vs.	[+s]

The abbreviation *O* (already introduced in chapter 2) is employed for the class of non-strident obstruents, i.e. *t* and *θ*.

3.2.2 MoA.CON

Positional m.constraints in a stringency relationship, militating against the occurrence of certain (sets of) MoA features in the coda are employed. The constraint m.[–cont].CODA (m.t) (Ito 1988) penalizes *t* and the constraint m.[–son∧–str].CODA (m.tθ) excludes both *t* and *θ*. As in the PoA typology (section 2), the suffix .CODA is dropped in the abbreviations, as all m.constraints refer to the coda position.

(86) m.constraints of MoA typology

a.	m.[–cont].CODA (henceforth m.t)	Assign a violation mark for every segment in a syllable coda that is specified as [–cont]

b. m.[–son∧–str].CODA (henceforth m.tθ) — Assign a violation mark for every segment in a syllable coda that is specified as [–str, –son]

Moreover, the analysis uses f.IDENT[±cont] (87a), which penalizes the change of the value of [±cont], and a disjunctively formulated constraint f. and f.IDENT[±str∨±son] (87b), which is violated when a non-strident obstruent, i.e. *t* or *θ*, becomes either a sibilant or a sonorant, i.e. *s*, and vice versa.

(87) f.constraints of MoA typology

a. f.IDENT[±cont] — Assign a violation mark for each output correspondent that does not have the same specification for [±continuant] as the input

b. f.IDENT[±str∨±son] — Assign a violation mark for each output correspondent that does not have the same specification for [±str] or [±son] as the input

A convenient way to represent f.constraints that highlights the symmetry with m.constraints as well as, most importantly, the stringency relationship in which they stand is to abbreviate f.IDENT[±cont] and f.IDENT[±str∨±son] as f.t and f.tθ, respectively. f.t essentially protects *t* from becoming *non-t* and vice versa, and f.tθ[21] prevents *t* and *θ*, i.e. class *O*, from surfacing as *non-O*. i.e. *s*, as well as *s* from converting to *O*.

3.2.3 Violation Tableaux

Let's begin the examination of the violations each candidate incurs with the underlying coda with the most marked MoA feature, i.e. [–cont] in coda (VT 88). The faithful candidate /tC/ → [tC] violates both m.constraints m.t and m.tθ. The two unfaithful candidates /tC/ → [θC] and /tC/ → [sC] both contain a continuant coda, which, at the cost of IDENT[cont], spares them a violation of m.t. Additionally, the output [θC] still includes a relatively marked coda, thus it

[21] Note that f.s would be interpreted as f.¬tθ.

incurs a violation of m.tθ, and [sC] fully satisfies markedness, yet it obtains its unmarked status via an additional faithfulness violation of f.tθ.

(88) VT /tC/

/tC/	f.t	f.tθ	m.t	m.tθ
tC			1	1
θC	1			1
sC	1	1		

The underlying *θ* may remain unchanged, i.e. /θC/ → [θC], at the expense of m.tθ, or switch to *s*, i.e. /θC/ → [sC], by violating f.tθ. Converting it to *t*, i.e. /θC/ → [tC], does not constitute an available option, as this incurs the same violations as /θC/ → [θC], plus one additional penalty with respect to m.t and f.t. Consequently, this candidate is harmonically bounded over MoA.CON.[22]

(89) VT /θC/

/θC/	f.t	f.tθ	m.t	m.tθ
tC	1		1	1
θC				1
sC		1		

Finally, underlying *s* always surfaces unaltered, since it satisfies the entire MoA.CON, whereas any change in MoA features violates a f.constraint and at least one m.constraint:

(90) VT /sC/

/sC/	f.t	f.tθ	m.t	m.tθ
tC	1		1	1
θC		1		1
sC				

[22] The reader is reminded that salmon pink cells in VTs indicate harmonically bounded candidates.

3.2.4 Extensional MoA typology

Free combination of the constraints generates four grammars corresponding to the following four languages:

- L.tθ *t* and *θ* are realized faithfully in the coda
- L.θθ *t* converts to *θ*, *θ* is realized faithfully in the coda
- L.ts *t* is realized faithfully, *θ* converts to *s* in the coda
- L.ss *t* and *θ* convert to *s* in the coda

The optima of each language are given in Table (91) (the unfaithful candidates are colored for readability). The rightmost column indicates the IG varieties corresponding to each language of the typology. No IG variety belongs to type L.ts, yet other languages outside the IG world do (e.g. Latin).

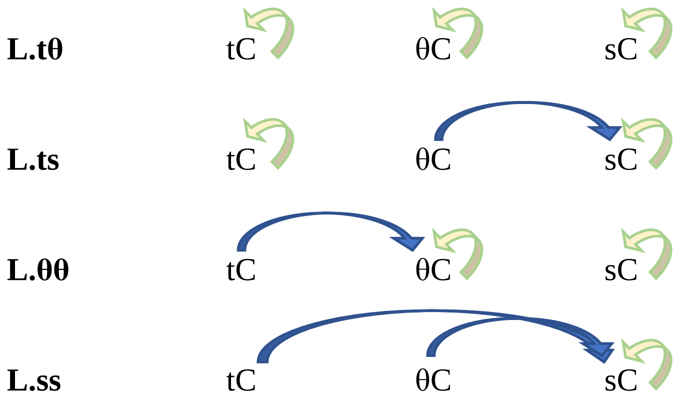
(91) Extensional MoA typology

	/tC/	/θC/	*Languages*
L.tθ	tC	θC	Early MedG
L.ts	tC	**sC**	(Latin)
L.θθ	**θC**	θC	Late MedG, Early IG, Martano SIG, Roghudi CIG
L.ss	**sC**	**sC**	Sternatia SIG, SIG+, Bova CIG, Galliciano CIG

/sC/ is not considered and in turn *s* is omitted in the language names and the descriptions, since /sC/ has only one possible realization, i.e. the faithful [sC]. Since all changes head to a less marked element, only *t* and *θ* may be targeted.

A general observation is worth noticing. If a marked value *x* changes to a less marked value *y*, then everything between *x* and *y*, i.e. any value less marked than *x* and more marked than *y*, must change to *y*. More specifically, given the markedness scale $t \prec \theta \prec s$, if *t* changes to some value, *θ* surfaces with the same value: in L.θθ where *t* is spirantized to *θ*, *θ* remains intact and in L.ss it imitates *t* in transforming into *s*. In grammar L.ts, where only *θ* becomes an unmarked *s*, *t* is not forced to change, as it is not found between *θ* and *s* on the markedness scale.

(92) Changes of MoA in the coda



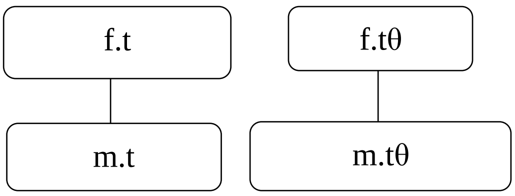
3.2.5 Grammars of MoA typology

The rankings holding for the above languages are demonstrated in the SKB tables and the Hasse diagrams below:

(93) SKB L.tθ

f.t	f.tθ	m.t	m.tθ
W		L	
	W		L

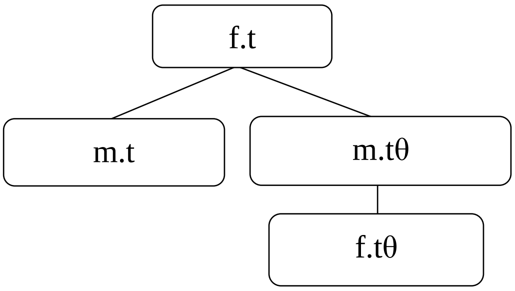
(94) Hasse L.tθ



(95) SKB L.ts

f.t	f.tθ	m.t	m.tθ
W		L	L
	L		W

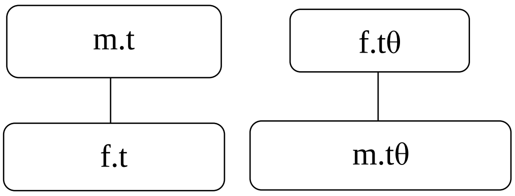
(96) Hasse L.ts



(97) SKB L.θθ

f.t	f.tθ	m.t	m.tθ
L		W	
	W		L

(98) Hasse L.θθ

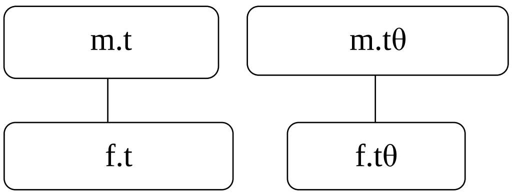


(99) SKB L.ss

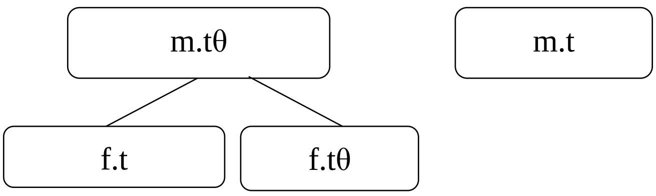
f.t	f.tθ	m.t	m.tθ
L		W	W
	L		W

(100) Hasse L.ss (either Hasse *a* or Hasse *b* holds)

a.



b.



3.2.6 Property analysis of MoA typology

Contemplating the four grammars allows us to extract the significant rankings in the MoA typology. First, all grammars in which *t* and *θ* surface as *O* segments and no change to the least marked *s* occurs, i.e. L.tθ and L.θθ, have the ranking f.tθ >> m.tθ. On the other hand, all grammars in which at least one marked segment changes to *s*, i.e. L.ts and L.ss, have the ranking m.tθ >> f.tθ. Among the grammars in which some faithfulness is respected, those allowing *t* in the coda (L.tθ, L.ts) have f.t >> m.t, and the one disallowing it (L.θθ) has the opposite ranking, i.e. m.t >> f.t. Finally, among the grammars where at least some change towards less marked MoA values occurs, if f.t dominates the dominant constraint of the class M (101),[23] i.e. M.dom, then *t* is not affected by the change (L.ts), whereas the reverse ranking M.dom >> f.t is found in the grammars where *t* surfaces as a less marked segment (L.θθ, L.ss).

(101) Class M {m.t, m.tθ}

The crucial rankings in the MoA typology are given in (102):

(102) Properties of MoA typology

a. **O=O.yes/no**

f.tθ < > m.tθ	all *O* are/are not realized as *O*
f.tθ >> m.tθ	all *O* are realized as *O*
m.tθ >> f.tθ	some *O* are realized as *s*

b. **FAITH.+T/–T**

f.t < > m.t	faithfulness does/does not protect *t* in the coda
f.t >> m.t	faithfulness protects *t* in the coda
m.t >> f.t	faithfulness does not protect *t* in the coda

c. **CHANGE.–T/+T**

f.t < > M.dom	changes in the coda ignore/affect *t*
f.t >> M.dom	changes in the coda ignore *t*
M.dom >> f.t	changes in the coda affect *t*

[23] Class M is not public, because its members are not antagonists in any property.

The property analysis is summarized below:

(103) Intensional MoA typology

	O=O.yes/no	**FAITH.+T/–T**	**CHANGE.–T/+T**
L.tθ	*yes*	*+T*	*moot*
L.θθ	*yes*	*–T*	*+T*
L.ts	*no*	*+T*	*–T*
L.ss	*no*	*moot*	*+T*

The first property, O=O.yes/no is assigned wide scope, i.e. one of its values is true for every language in the typological system. Its role in the typology is, as mentioned above, to classify the grammars into those blocking the change of *O* to *s*, thus allowing by definition some degree of markedness (L.tθ, L.θθ: O=O.yes) and those in which some member of the class *O* converts to the totally unmarked *s* (L.ts, L.ss: O=O.no).

Property FAITH.+T/–T becomes relevant only in the grammars where at least one member of class *O* is realized faithfully and determines whether *t* is (L.tθ, L.ts: FAITH.+T) or is not (L.θθ: FAITH.–T) among the MoA values protected by faithfulness. Moreover, some value of CHANGE.–T/+T holds in grammars where some change takes place and decides whether *t* is left intact (L.ts: CHANGE.–T) or is impacted by some changing process (L.θθ, L.ss: CHANGE.+T).

Each of the properties FAITH.+T/–T and CHANGE.–T/+T is moot with respect to one grammar. In the grammar where the entire class *O* surfaces unfaithfully, i.e. as *s* (L.ss), no value of FAITH.+T/–T is true of all possible total rankings. More specifically, the relationship between m.t and f.t is of note only in the total rankings in which m.t is the M.dom, in which case, by virtue of CHANGE.+T, m.t outranks f.t (see Hasse 100a). However, in the total rankings in which m.tθ is the M.dom, m.t may be ranked anywhere alongside the hierarchy (see Hasse 100b where m.t hangs on the side). As for the mootness of CHANGE.–T/+T in L.tθ, where no change takes place, no ranking condition is established between the m.constraints (see Hasse 94). By implication, the ranking of f.t with respect to M.dom is not crucial. Independently of which m.constraint is dominant, f.t only needs to dominate m.t.

Interestingly enough, certain property values are entailed by others. Specifically, CHANGE.–T, i.e. f.t >> M.dom entails FAITH.+T, i.e. f.t >> m.t. Evidently, if f.t outranks the dominant m.constraint, then it necessarily outranks both, which includes m.t. At the extensional level, if the changes affecting codas do not attack *t* (CHANGE.–T), then it follows that faithfulness does protect *t* in the particular language (FAITH.+T) Furthermore, FAITH.–T, i.e. m.t >> f.t, entails CHANGE.+T, i.e. M.dom >> f.t. If m.t is the M.dom, then m.t >> f.t coincides with M.dom >> f.t. If, on the other hand, m.t is the subordinate m.constraint, M.dom >> f.t is still satisfied given m.t >> f.t, with the total ranking being m.tθ >> m.t >> f.t.

(104) Entailments

a.	CHANGE.–T	=>	FAITH.+T
	f.t >> M.dom		f.t >> m.t
b.	FAITH.–T	=>	CHANGE.+T
	m.t >> f.t		M.dom >> f.t

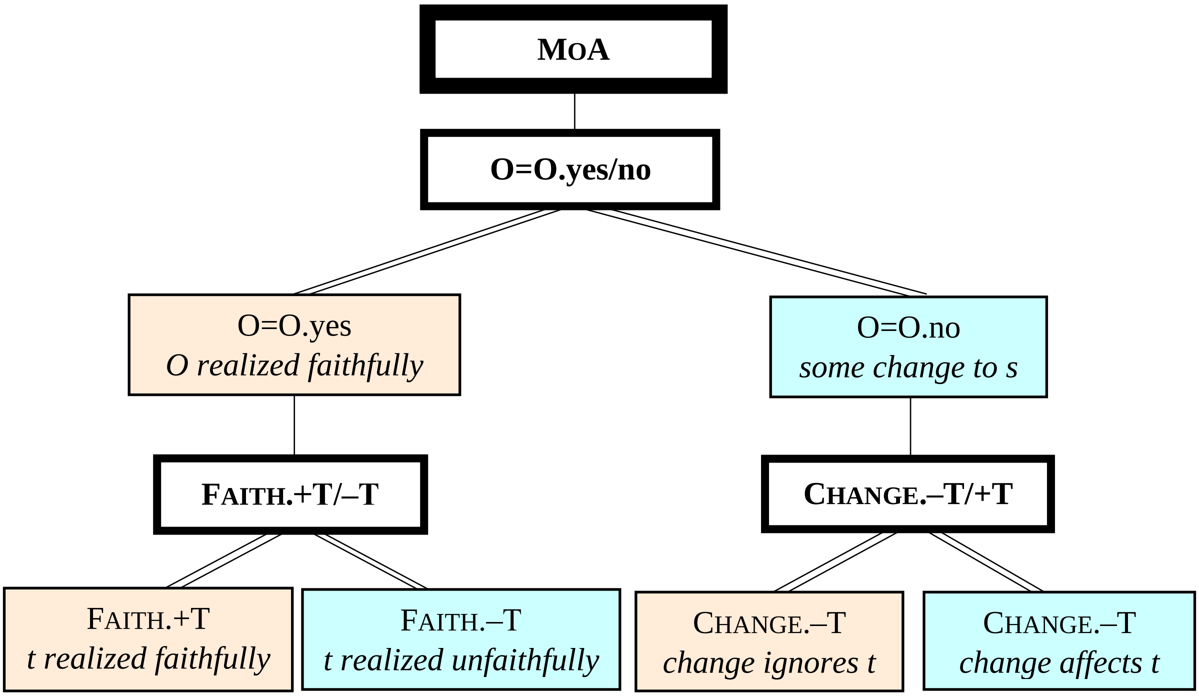
By removing the automatically assigned property values from the property analysis, the property table in (103) is modified to (105):

(105) Intensional MoA typology

	O=O.yes/no	**FAITH.+T/–T**	**CHANGE.–T/+T**
L.tθ	*yes*	*+T*	*moot*
L.θθ	*yes*	*–T*	<+*T*>
L.ts	*no*	<+*T*>	*–T*
L.ss	*no*	*moot*	*+T*

The scopal relations of the substantive property values of MoA typology are presented in the treeoid below:

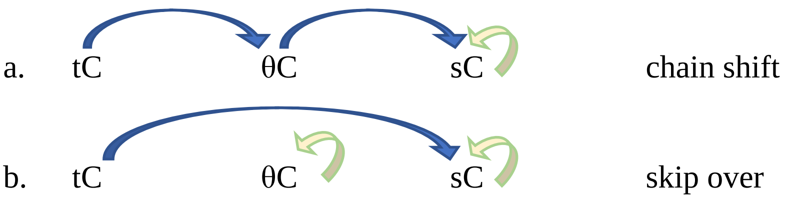
(106) Property treeoid of MoA typology



As a final note, it is interesting taking a glance at the logically possible combinations that are missing from the typology, i.e.:

- *L.θs   *t* converts to *θ*; *θ* converts to *s*
- *L.sθ   *t* converts to *s*; *θ* remains unchanged

(107) Impossible languages



The first case (107a) involves changes in counterfeeding order (Kiparsky 1965). The chain shift is excluded from the typology by contradiction: *t* becomes *θ* under O=O.yes, whereas *θ* becomes *s* under the opposite value, O=O.no. The second case (107b), where *t* changes to the completely unmarked *s* but *θ* does not come along, is contradictory given the proposed MoA.CON. In order for *t* to transform into *s*, m.tθ must dominate f.tθ (O=O.no). However, the opposite ranking is required for *θ* to surface faithfully (O=O.yes). As noticed above, once *t* changes to *s*, it drags *θ* with it.

4. Language change

As discussed in section 1.2, in terms of Property Theory, minimal diachronic change is captured as minimal, i.e. one-at-a-time, switches in the property values. Whenever a value has to be established as the consequence of some other change, minimality is not compromised (cf. Alber 2015). My definition of minimal distance between grammars is thus the following (108, repeated from 19 above):

(108) Minimal distance between grammars
Two grammars differ minimally if, with respect to the properties specified for values (*a* or *b*), the two grammars have all but one property value in common.

In this section a closer look is cast at the critical re-sets that gave rise to different historical stages within the IG dialectal branch. I first give a detailed presentation of the rerankings that underlie the diachronic and diatopic variation in IG with respect to PoA (section 4.1) and MoA (section 4.2) features in the coda. Then (section 4.3), I highlight the role of contact in typological change via the comparison of the directions typological change took in Greek, IG, and Romance.

4.1 Diachronic PoA changes

When MedG (L.kpt:f) evolved to Early SIG (L.k:shift), the grammar ceased to tolerate *k* in the coda, i.e. property value K.yes was reset to K.no. P.yes remained unchanged. F.met/shift is moot with respect to K.yes, i.e. in the ancestor language, however, it becomes relevant in all grammars having an f.constraint dominating at least one m.constraint, thus disallowing some marked codas, because selecting between the two repair strategies at hand is imperative. Consequently, the new value F.shift is acquired in Early SIG and is still true of the grammar of contemporary Martano SIG. Along the lines of my definition of minimal distance between grammars (108), this addition of a property value does not count for minimality.

(109) PoA languages: L.kpt:f > L.k:shift

	P.yes/no	**K.yes/no**	**F.met/shift**
L.kpt:f *MedG*	*yes*	***yes*** ↓	*moot*
L.k:shift *Early SIG, Martano SIG*	*yes*	***no***	***shift***

The passage from Early SIG to contemporary Sternatia SIG was determined by a switch of the value P.yes to P.no. In this way, the most recent development of SIG banned all peripherals from pre-consonantal codas.

(110) PoA languages: L.k:shift > L.kp:shift

	P.yes/no	**K.yes/no**	**F.met/shift**
L.k:shift *Early SIG, Martano SIG*	***yes*** ↓	*no*	*shift*
L.kp:shift *Sternatia SIG*	***no***	*moot*	*shift*

In the case of the change from MedG to Bova SIG, it was P.yes that was reset to P.no. K.yes/no became moot in the new stage. Furthermore, just like in SIG, the value F.shift was acquired by Bova speakers.

(111) PoA languages: L.kpt:f > L.kp:shift

	P.yes/no	**K.yes/no**	**F.met/shift**
L.kpt:f *MedG*	***yes*** ↓	*yes*	*moot*
L.kp:shift *Bova CIG*	***no***	*moot*	***shift***

Finally, the CIG varieties of Roghudi and Galliciano also seem to have banished all peripherals right from the beginning. These varieties vary minimally with respect to Bova CIG as to the preferred avoidance strategy. In property value terms, the grammars of Roghudi and Galliciano CIG were assigned F.met.[24]

(112) PoA languages: L.kpt:f > L.kp:met

	P.yes/no	K.yes/no	F.met/shift
L.kpt:f *MedG*	***yes***	*yes*	*moot*
L.kp:met *Roghudi/Galliciano CIG*	***no***	*moot*	***met***

Recall that the value F.met in Roghudi and Galliciano CIG is manifested exclusively via the realization of /Os/ clusters as [sO], since all other clusters undergo shifts due to phonotactic reasons that block metathesis. Notably, though, derived /Cs/ clusters found in verbal inflection (see chapter 2, section 3.4, 3.5) have the additional, presumably more recent variant [ss], through a shift. It is therefore plausible that these CIG varieties (dubbed Roghudi and Galliciano CIG^{+}) have started to oscillate between F.met and F.shift.

(113) PoA languages: L.kp:met > L.kp:shift

	P.yes/no	K.yes/no	F.met/shift
L.kp:met *Rogh./Gallic. CIG*	***no***	*moot*	***met***
L.kp:shift *Rogh./Gallic. CIG^{+}*	***no***	*moot*	***shift***

4.2 Diachronic MoA changes

Early MedG, i.e. L.tθ, abandoned *t* in the coda by resetting property value FAITH.+T to FAITH.–T. The illicit codas were avoided via spirantization, i.e. *t* was replaced by *θ*. The previously moot CHANGE.–T/+T took the value CHANGE.+T by implication, given FAITH.–T. Early SIG

[24] Note that the effect of this property value is evident only via the evolution of Cs clusters, as transposition of other sequences was blocked by language-specific top-ranked constraints, targeting, among others, manner features in the coda (see chapter 6).

as well as contemporary Martano SIG and Roghudi CIG did not proceed to further modifications of the coda inventory as to the MoA features.

(114) MoA languages: L.tθ > L.θθ

	O=O.yes/no	**FAITH.+T/–T**	**CHANGE.–T/+T**
L.tθ *Early MedG*	*yes*	***+T***	*moot*
L.θθ *Late MedG* *Early SIG, Martano SIG* *Roghudi CIG*	*yes*	***–T***	*<+T>*

The majority of contemporary SIG varieties, though, ceased to permit *θ* via a switch to O=O.no. Bova CIG sprang from Late MedG through the same path. *t* continued being inadmissible, as CHANGE.–T retained its value. In the innovative language, both *θ* and *t* turned into *s*. FAITH.+T/–T losing its specified value does not count as an additional reset, as this ensued from the switch of O=O.yes to O=O.no. Simply put, the effect of the latter change was that no *O* is realized faithfully in the new stage, which entails that *t* is not realized faithfully.

(115) MoA languages: L.θθ > L.ss

	O=O.yes/no	**FAITH.+T/–T**	**CHANGE.–T/+T**
L.θθ *Early SIG* *Late MedG*	***yes***	*<+T>*	*–T*
L.ss *Sternatia SIG* *Bova CIG*	***no***	*moot*	*–T*

4.3 The convergence with Romance

Interestingly enough, through the lens of the observed typological changes, IG seems to diverge from the Greek dialectal group and lean toward an Italo-Romance grammatical system. With respect to PoA, regardless of the repair strategy primarily employed, the most recent versions of IG belong to language types that prevented segments specified as [per] from being parsed in a coda. As for MoA, a substantial subset of IG allows only *s*.

These characteristics are also found in Italo-Romance, which no longer allow peripherals and non-strident obstruents in the coda (Krämer 2009a; see chapter 3). On the contrary, Greek dialects (e.g. Standard, Cypriot) mostly prove conservative enough to line up with MedG with respect to PoA and MoA features found in the coda. This typological divergence can reasonably be attributed to the century-long linguistic contact between IG and the surrounding Romance languages, which most plausibly exerted such influence that triggered a fundamental typological change.

From the property analysis perspective, whereas MedG and the vast majority of Greek dialects as well as Latin have the value P.yes, the greatest part of IG and today's Italo-Romance take P.no. In other words, IG in principle followed the same evolution as Romance. This could be maintained also for the value F.shift, assuming that even Roghudi and Galliciano CIG are leaning towards it (see 113).

(116) Typological distinctions between Greek, Romance, and IG: PoA

	P.yes/no	**K.yes/no**	**F.met/shift**
L.kpt:f *MedG; Standard, Cypriot,…* *Latin*	***yes*** ↑	*yes*	*moot*
L.kp:(some_process) *IG* *Italo-Romance*	***no*** ↓	*moot*	*shift*

Moreover, the various stages of most Greek dialects group together under O=O.yes. L.tθ dialects (Early MedG, Learned Greek) are differentiated from L.θθ dialects (Late MedG, most non-standard varieties –e.g. Cypriot–, Early SIG, and conservative contemporary IG, i.e. Martano SIG and Roghudi CIG) based on their tolerance of *t*, which translates in the competition FAITH.+T vs. FAITH.–T, respectively. On the other side, Latin and Italo-Romance together with the most innovative versions of IG (Sternatia SIG, Bova CIG, Galliciano CIG) eliminate *θ* because their grammars have O=O.no. IG patterns with Modern Italo-Romance, as stridentization affects *t* as well via CHANGE.+T, unlike Latin, which allows it via CHANGE.–T.

(117) Typological distinctions between Greek, Romance, and IG: MoA

	O=O.yes/no	**FAITH.+T/–T**	**CHANGE.–T/+T**
L.tθ *Early MedG; Learned Greek*	***no***	*+T*	*moot*
L.θθ *MedG; Cypriot Greek; Early SIG, Martano SIG; Roghudi CIG*		*–T*	*<+T>*
L.ts *Latin*	***yes***	*<+T>*	*–T*
L.ss *Sternatia SIG, Bova/Gallic. CIG* *Italo-Romance*		*moot*	*+T*

Changes involving entailed values, i.e. FAITH.+T to <FAITH.–T> and CHANGE.–T to <CHANGE.+T>, are excluded. It could be argued that Ancient Greek is a L.ts language, however its consonant inventory lacks *θ*, which makes it hard to predict whether the absence of *θ* in the coda is observed due to grammatical factors or it is an accidental gap. Via examination of data from other linguistic families, it would be of great interest to investigate whether minimal variation is affected by the change from or to an entailed value.

A final remark is in order for the sake of completeness. As mentioned in chapter 3, the rare change from L.kpt:f to L.kp:shift is also found in the evolution of Dalmatian and Romanian as well as in Latin loanwords in Albanian. Just like in the passage from MedG to Early SIG, in the Romance languages the value of K.yes was reset from K.no. This shift, though, was possibly motivated due to the influence of IG on other languages (Tzitzilis p.c.).

(118) Typological distinctions between MedG, Early SIG, Latin, Romanian: PoA

	P.yes/no	**K.yes/no**	**F.met/shift**
L.kpt:f *MedG* *Latin*	*yes*	*yes*	*moot*
L.k:shift *Early SIG* *Romanian etc.*	*yes*	*no*	*shift*

Take-home message

- This chapter offers a property analysis (Alber & Prince 2015, in prep.) of two typologies:
  - the typology of place (PoA) features allowed in codas occurring before onsets of certain PoA specification.
  - the typology of manner (MoA) features allowed in coda position.

- The various IG versions differ both from MedG and from one another with respect to the admissible PoA features in coda–onset clusters and MoA features in the coda. Diachronic and synchronic micro-variation among the several IG varieties was formalized as minimal variation in the property values of the grammars. It was proposed that two grammars differ minimally if, with respect to the properties specified for values (*a* or *b*), they have all but one property value in common. Along these lines, the change from and to mootness does *not* count as an additional point of difference (cf. Alber 2015).

- The coda inventory of IG has shrunk considerably, with a tendency to gradually dispense with marked PoA and MoA features.
  - As for PoA features, the markedness hierarchy that holds in IG is *dorsal (k) ≺ labial (p) ≺ coronal (t)*. In the history of the Greek language, three stages are distinguished:
    (1) all PoA features are encountered in the coda independently of the PoA feature of the adjacent onset.
    (2) only *p* and *t* are encountered in the coda (unless *k* precedes *k*).
    (3) only *t* is encountered in the coda (unless *k* precedes *k* and *p* precedes *p* or *k*).
    In other words, restrictions are imposed in comparison with the markedness of the onset: a marked feature cannot occur in the coda when the adjacent onset is less marked (henceforth a simple reference to (dis)allowed PoA features in the coda is made for simplicity).
  - As for MoA features, the markedness hierarchy that holds in IG is *plosive (t) ≺ non-strident fricative (θ) ≺ strident or sonorant (s)* (in accordance with the Sonority scale). Within Greek, three stages are distinguished:
    (1) All MoA features are encountered in the coda.
    (2) only *θ* and *s* are encountered in the coda.
    (3) only *s* is encountered in the coda.

- PoA features and licit/illicit clusters
  - Rice’s (1994) representation of the Place node was adopted according to which *k* and *p* aggregate together under the Peripheral node and *k* additionally bears a Dorsal node; along these lines, stringent Coda Conditions, i.e. CodaCond-[dor] and CodaCond-[dor/per], were proposed that are sensitive to particular PoA features (Figure 1).

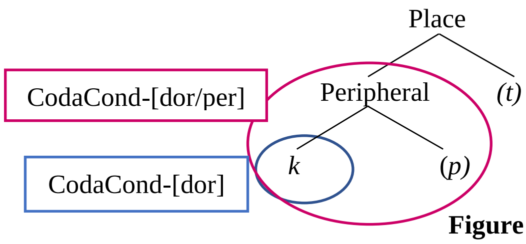


Figure 1

  - It is not required that the PoA feature of the onset is also linked to the coda segment in order for a cluster to satisfy a CodaCond; the two members of the cluster have to agree in the PoA features specified by the particular CodaCond. The onset segment may bear further specification.

- The PoA typology was generated on the basis of:

  (a) PoA.Gen: input and output set consisted of coda–onset clusters in which the coda is specified as (i) [dor, per], i.e. *k*, (ii) [per], i.e. *p*, and (iii) bare Place node, i.e. *t*; the onset is occupied by either *k*, *p*, or *t* and remains unaltered (even if the segments move). Candidates containing tautosyllabic clusters or featural changes of the onset consonant were not examined.

  (b) PoA.Con including two m.constraints in stringency relation, i.e. m.{k.¬k, p.¬p} and m.{k.¬k} (in the spirit of the proposed stringent CodaConds), and three f.constraints, i.e. f.Max([Place]), f.Dep([Place]), and f.Lin(earity).

  - The presence of f.Dep in PoA.Con leads to harmonically bounding of candidates involving addition of PoA features in the coda. However, f.Dep does not play any role in the typological analysis. The other two f.constraints, f.Max and f.Lin, form class F, which becomes relevant in the property analysis.
  - The crucial distinctions among grammars that were accounted for were:

    (a) whether *p* is/is not allowed in the coda.

    Property **P.yes/no**: F.sub < > m.{k.¬k, p.¬p}

    (b) whether *k* is/is not allowed in the coda.

    Property **K.yes/no**: F.sub < > m.{k.¬k}

    (c) whether illicit clusters are avoided via a shift or via metathesis.

    Property **F.met/shift**: f.Max < > f.Lin

- Property P.yes/no has wide scope. Property K.yes/no has scope under P.yes. F.met/shift has disjunctive scope under either P.no or K.no.
- Five grammars were distinguished. The property values defining each grammar were:

L.kpt:f	*k*, *p*, and *t* are realized faithfully	P.yes, K.yes
L.k:shift	*k* undergoes shift	P.yes, K.no, F.shift
L.kp:shift	*k* and *p* undergo shift	P.no, K.no, F.shift
L.k:met	*k* undergoes metathesis	P.yes, K.no, F.met
L.kp:met	*k* and *p* undergo metathesis	P.no, K.no, F.met

- The MoA typology was generated on the basis of:

  (a) MoA.GEN: input and output set consisted of coda–onset clusters in which the coda is specified as (i) [–cont, –son], i.e. *t*, (ii) [+cont, –str, –son], i.e. *θ*, and (iii) either [+str] or [+son], i.e. *s*. Interactions with the following segment (onset) and candidates containing tautosyllabic clusters were not examined.

  (b) MoA.CON including two m.constraints, i.e. m.[–cont].CODA (m.t) and m.[–son∧–str].CODA (m.tθ), and two f.constraints, i.e. f.IDENT[–cont] (f.t) and f.IDENT[±str∨±son] (f.tθ).

  - The two [–str, –son] segments, i.e. *t* and *θ* form class *O*.
  - The two m.constraints m.t and m.tθ form class M, which becomes relevant in the property analysis.
  - The crucial distinctions among grammars that were accounted for were:

    (a) whether all *O* are/are not realized as *O*.

    Property **O=O.yes/no**: f.tθ < > m.tθ

    (b) whether faithfulness protects/ignores *t*.

    Property **FAITH.+T/–T**: f.t < > m.t

    (c) whether changes in the coda ignore/affect *t*.

    Property **CHANGE.–T/+T**: f.t < > M.dom
  - CHANGE.–T entails FAITH.+T and FAITH.–T entails CHANGE.+T. Entailed values were removed from the property analysis.
  - Property O=O.yes/no has wide scope. Property FAITH.+T/–T has scope under O=O.yes. Property CHANGE.–T/+T has scope under O=O.no.
  - Four grammars were distinguished. The property values defining each grammar were:

L.tθ	*t* and *θ* are realized faithfully	O=O.yes, FAITH.+T
L.θθ	*t* converts to *θ*, *θ* is realized faithfully	O=O.yes, FAITH.–T

L.ts	*t* is realized faithfully, *θ* converts to *s*	O=O.no, CHANGE.–T
L.ss	*t* and *θ* convert to *s*	O=O.no, CHANGE.+T

- The historical path throughout the several stages of IG was reconstructed in terms of stepwise minimal re-sets in the property values of the PoA and the MoA typology.

- The role of contact in the historical changes IG grammar has undergone was highlighted. IG was shown to converge with the Italo-Romance grammatical system with respect to the admissible PoA and MoA features in the coda, rather than retaining characteristics of the Greek dialectal group.

CHAPTER 5

Typological analysis of long-distance metathesis

Long-distance metathesis (LDM) of liquids (L) is pervasively attested in the diachrony of IG as well as several Romance languages. The main LDM pattern involves movement of post-consonantal L (i.e. LDM targets CL), e.g. Late Latin *capís**tr**u* > Sardinian *k**r**apístu* (Lai 2013), Calabrian *c**r**apésto* (Rohlfs 1966), Gascon *c**r**abéste* (Grammont 1905–1906), Judeo-Spanish *cab**r**ésto* (Lipski 1990) (see chapter 3). In addition, L from a pre-consonantal position, i.e. LC, may also be displaced regularly in a subset of the LDM languages, e.g. Campidanian Sardinian *coope**r**tura* > *k**r**oβetura* 'roof' (Frigeni 2009), Judeo-Spanish *tabe**r**na* > *taβ**r**ena* 'tavern' (Torres-Tamarit et al. 2012) (cf. IG *xó**r**to* **x**r**óto* 'grass').

The profound susceptibility of L to displacement (Ultan 1971) has been attributed to certain properties of their acoustic profile. Specifically, L, and especially rhotics, display long-domain anticipatory resonances (Kelly & Local 1986; Russell-Webb 2002; Blevins & Garrett 2004; Russell-Webb & Bradley 2009) that are experimentally found to span even five syllables away (Heid & Hawkins 2000). According to non-teleological approaches of LDM (Blevins & Garrett 2004; Czaplicki 2009), the spreading of acoustic cues may favor misperception of the linear origin of L, which in turn triggers *perceptual metathesis*. In essence, L may be reanalyzed in a non-etymological position within the elongated span and surface in a novel position, thus giving the impression of movement. The reinterpreted L is more easily misperceived as originating in a position of enhanced saliency, such as the first syllable (σ1).

It seems indisputable that phonetic and perceptual factors play a pivotal role in the generation of multiple variants containing L in different positions of various degrees of prominence. Nevertheless, it has been convincingly argued that the ultimate selection among these variants is in the hands of the grammar (Coffman 2013a,b; see also Hume 2004), and, in particular, that sound change is triggered by a call for optimization of syllable structure. Here, I recognize the major contribution of phonetic and perceptual biases in the motivation of metathesis of L, however, I maintain that LDM does not merely describe the re-interpretation of certain words, but rather it is determined by the phonotactic grammar. Specifically, I hypothesize that diachronic LDM and related processes are triggered by the reconstruction of grammar and serve to avoid certain marked structures that are rendered inadmissible in a given historical stage. In a nutshell, I posit that the grammar of MedG permits medial CL clusters and prohibits metathesis, but the grammar of IG does not tolerate them and allows for metathesis. Consequently, when the grammar changed and a new historical stage dawned, LDM moved post-consonantal liquids to the first syllable, thus eliminating medial CL.

In this chapter, I offer a typological analysis of LDM within the Property Theory (Alber & Prince 1995; in prep; see chapter 4 section 1 for background and references). The next section (1) summarizes the traits of the LDM languages (see chapter 2 section 3.2 for examples). Section 2 offers an overview of existing literature on LDM and nails down the points that render previous accounts non-viable for a typological analysis. My proposal is advanced in section 3. Section 4 presents my hypotheses on how language change evolved in terms of Property Theory and concludes that IG has undergone typological changes that have brought it closer to Romance than to Greek.

1. The LDM typology

In all languages displaying LDM, movement from and to a post-consonantal position is observed, which may cooccur with metathesis from pre-consonantal position. Special requirements pertaining to the distance covered by the migrating L may be in effect. The attested combinations are the following:

(1) The three attested LDM languages

a. LDM from medial CL to the first syllable; no metathesis from LC

$\#C_1\_\quad C_2\quad C_3\mathbf{L}$ *kapist**r**i* > *k**r**apisti*

$\#C_1\quad C_2\quad \mathbf{L}C_3$ *xo**r**to* = *xó**r**to*

b. LDM from medial CL and metathesis from LC to the first syllable

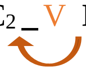
$\#C_1\_\quad C_2\quad C_3\mathbf{L}$ *kapist**r**u* > *k**r**apistu*

$\#C_1\_\quad C_2\quad \mathbf{L}C_3$ *coope**r**tura* > *k**r**oβetura*

c. LDM from medial CL and LC; L skips over one V

$\#C_1\quad C_2\_\quad V\quad C_3\mathbf{L}$ *capist**r**u* > *cab**r**esto*

$\#C_1\quad C_2\_\ V\quad \mathbf{L}C_3$ *tabe**r**na* > *taβ**r**ena*



The landing site is in all cases a post-consonantal position. The differentiation among the three above languages is determined by two criteria:

(a) the environment in which L affected by metathesis originates, i.e. only medial CL or both medial CL and LC.

(b) whether or not locality restrictions are in effect, i.e. if L moves all the way to the first onset of the root or if it lands in an intermediate position.

As to the first criterion, the classification is summarized in Table (2).

(2) LDM languages with/without metathesis from LC

LDM languages	Metathesis from LC
IG (both CIG and SIG), Tertenian Sardinian, Gascon, Southern Italo-Romance (a)	✗
Campidanian, Southern Italo-Romance (b), Northern Italo-Romance, Alguerese, Judeo-Spanish	✓

According to the criterion pertaining to the distance a migrating L may travel, regardless of the original phonological context, the languages at hand are grouped together as follows:

(3) LDM languages with local/non-local metathesis

LDM languages	Local metathesis
IG, Sardinian, Gascon, S. Italo-Romance	✗
Alguerese Catalan, Judeo-Spanish, N. Italo-Romance	✓

In what remains, I assume that the rising sonority slope CL clusters display guarantee their syllabification as a complex onset in all languages under examination.[1] Similarly, LC is parsed heterosyllabically. Along these lines, metathesis either decomposes a medial complex onset or eliminates a coda and forms a novel complex onset in a syllable closer to the left edge of the

[1] For the Minimum Sonority Distance requirements holding in IG see chapter 2, section 3.1.

word. Henceforth, the terms “CL” and “(complex) onset”, on the one hand, and “LC” and “(pre-consonantal) coda” are used interchangeably.

Going back to the identified traits that may characterize a LDM language, I introduce the following abbreviations to be used throughout the chapter:

- LDM from onset to onset OnOn
- Metathesis from coda MetLC
- Local / distal metathesis Loc / Dist

The attested LDM languages are classified into three typological categories. The first type consists of those languages that manifest non-local LDM from medial CL to the initial onset, but metathesis of codas is banned (henceforth L.OnOn.Dist). The second type includes languages displaying metathesis from both onsets and codas to the first onset (henceforth L.OnOn.MetLC.Dist). Finally, the third type accommodates languages where both environments are targeted by metathesis; however, all movements are restricted within a local domain (henceforth L.OnOn.MetLC.Loc). Moreover, a language type in which L does not move regardless of the phonological context is included in the typology, labelled as L.NoMet. Most LDM languages belong to the Romance family. IG is the only Greek dialect that falls into L.OnOn.Dist, whereas the source language, i.e. MedG, as well as the rest of Modern Greek (with the possible exception of Heptanesian) belongs to L.NoMet. The logically possible L.OnOn.Loc (i.e. a *yes–no–yes* combination), is not attested. The LDM typology is presented in Table (4):

(4) Classification of attested LDM languages

Type	Languages	OnOn	MetC	Locality restrictions
L.NoMet	Latin, MedG, Modern Greek	*no*	*no*	–
L.OnOn.Dist	Tertenian Sardinian, Gascon, IG (Heptanesian), S. Italo-Romance (a)	*yes*	*no*	*Dist*
L.OnOn.MetLC.Dist	Campidanian Sard., S. Italo-Romance (b)	*yes*	*yes*	*Dist*
L.OnOn.MetLC.Loc	Judeo-Spanish, Alguerese Catalan N. Italo-Romance	*yes*	*yes*	*Loc*

2. Previous accounts of LDM

Each LDM pattern has been addressed by a number of language-specific studies within different frameworks. The next sections review previous accounts of LDM and highlight the insights they have offered and their limitations with respect to the typology. Section 2.1 presents analyses of non-local (i.e. distal) LDM couched within OT (2.1.1) and Government Phonology (GP) (2.1.2). Section 2.2 presents an analysis of local LDM. Then, section 2.3 adduces arguments against the validity of these accounts when it comes to capturing the broader picture.

2.1 Non-local (distal) LDM

2.1.1 OT-based analyses

A quite striking property of LDM is its leftward directionality. The observation that the migrating L in principle aims for the left edge, brought up also by Blevins & Garrett (2004), is in line with general consensus that exceptionally prominent positions, such as the initial position, license more complex structures (Beckman 1998; Zoll 1996, 1998; de Lacy 2001; Smith 2005; Walker 2011). This assumption is the cornerstone of Alber's (2001) account of synchronic metathesis in Campidanian Sardinian, where she puts forth that the accrual of segmental material from non-initial positions to the first onset enhances the salience of an already prominent position, which has clear advantages in word recognition. In Campidanian, in nouns beginning with a vowel, medial rhotic climbs up to the root-initial onset on condition that a determiner or a demonstrative ending with a consonant precedes. Compare for instance (5) and (6):

(5) No metathesis to absolute initial position

	a.	a**r**ku	'bow'
	b.	e**r**ba	'grass'

(6) Metathesis next to a consonant

	a.	s:**r**a_ku	'the bow'
	b.	kus:**r**e_βa	'this grass'

Alber employs the positional markedness constraint COINCIDE-ONSET1 'all segments must be in the first onset of the root' (Alber 2001: 4), which returns a violation for every segment that is not found in the particular position. Thus, this constraint is responsible for attracting segmental material to the left edge of the root. Metathesis is penalized by LINEARITY (LINEAR; McCarthy & Prince 1995; Hume 1998, 2001)[2] Finally, the absence of metathesis in bare nouns is accounted for in line with Bolognesi's (1998: 422) argumentation against the occurrence of

[2] More accurately, in order to account for the disproportionally high mobility rhotics exhibit compared to other segments (see Ultan 1971), Alber proposes that LINEAR be parametrized so that it penalizes movement of certain segment types. Thus, she assumes that the LINEAR(¬RHOTIC) is universally ranked higher than LINEAR(RHOTIC) (Alber 2001: 5).

rhotics at the left edge of prosodic words, formalized as constraint $*_{PW[}r$. The analysis is illustrated in the Tableaux below:

(7) No LDM to onsetless σ1 of PW

/a**r̲**ku/	$*_{PW[}r$	COINCIDE-O1	LINEAR
a. a**r̲**ku ☜		**** (a, r, k, u)	
b. **r**aku	*!	*** (a, k, u)	*

(8) LDM to onsetful σ1 of PW

/s: a**r̲**ku/	$*_{PW[}r$	COINCIDE-O1	LINEAR
a. s:a**r̲**ku		****! (a, r, k, u)	
b. s:**r**a_ku ☜		*** (a, k, u)	*

In his analysis of Gascon, IG, and Nuorese Sardinian (all belonging to L.NoMet), Coffman (2013a,b) slightly modifies the positional markedness constraint as COINCIDE-σ1, positing that it is the first *syllable* that should host all segments (2013: 116). Moreover, he emphasizes the similarity between the source and the target environment, i.e. C_V. Drawing on evidence regarding L coarticulation (Kelly & Local 1986) and cluster duration (McCrary 2004; see also Chitoran et al. 2008), he suggests that inserting L in a C_V context is less perceptually invasive than in a V_C context. This proposal translates into a fixed ranking of *MAP constraints (Zuraw 2007) that reflects a hierarchy of perceptual invasiveness (Steriade 2001; Fleischhacker 2005; Zuraw 2007). In a nutshell, *MAP(X, Y) dictates that element X in string *S1* must not correspond with element Y in string *S2* and vice versa. Simply put, an input configuration such as CLV should not surface as CV and an output configuration CLV should not map onto an input CV. The *MAP constraint penalizing the particular unfaithful mapping CLV ↔ CV is placed at the bottom of this fixed hierarchy (9, adapted from Coffman 2013b: 119). Along these lines, perceptually invasive mappings such as VLC ↔ VC are ruled out by higher-ranked constraints.

(9) Hierarchy of perceptual invasiveness and *MAP constraints

VLC ↔ VC > CLV ↔ CV

⇩ ⇩

*MAP(VLC, VC) >> *MAP(CLV, CV)

The implementation of the analysis is demonstrated in (10) below. If L originally found in a post-consonantal position cannot retain its position due to the pressure exerted by COINCIDE-σ1, it metathesizes to a post-consonantal (output d) rather than a pre-consonantal position (output c), as the latter option incurs a violation of the dominant *MAP(VLC,VC). Notably, L may only metathesize all the way to σ1, as stopping to an intermediate station (e.g. output b) is equally dispreferred as not moving at all (output a) with respect to positional markedness.[3]

(10) LDM in the *MAP model (adapted from Coffman 2013b: 120)

/kapist**r**u/	*MAP(VLC,VC)	COINCIDE-σ1	*MAP(CLV,CV)
a. kapist**r**u		p, i, s, t, r, u!	
b. kap**r**ist_u		p, r, i, s, t, u!	(pi~pri), (tru~tu)
c. ka**r**pist_u	(ap~arp)!	p, i, s, t, u	(tru~tu)
d. k**r**apist_u ☜		p, i, s, t, u	(ka~kra), (tru~tu)

Given that the mapping VLC ↔ VC is disallowed, metathesis from LC is prohibited, as expected in L.OnOn.Dist (11).

(11) Underapplication of metathesis from LC

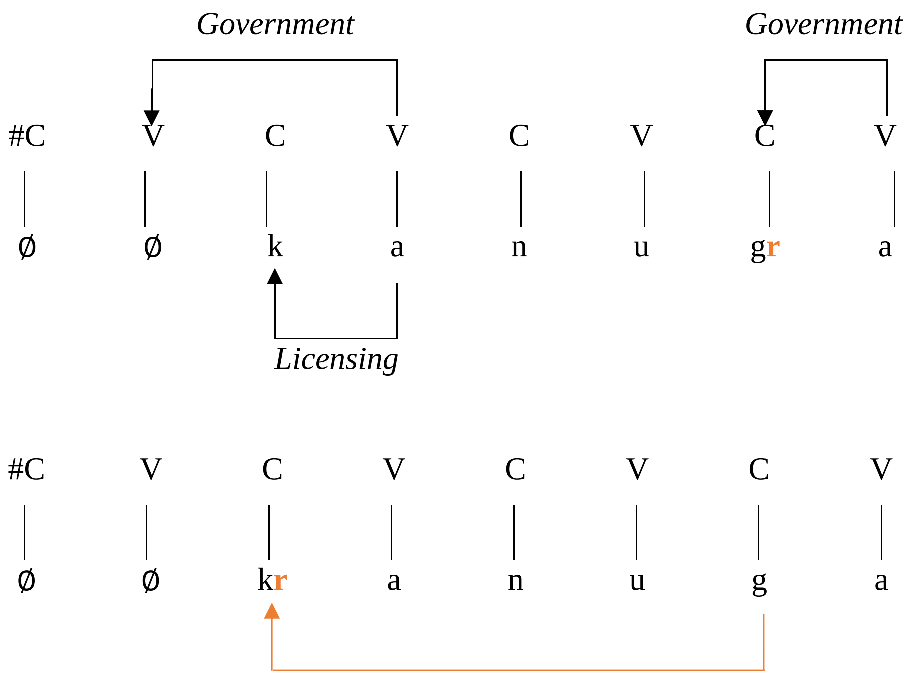
/po**r**ku/	*MAP(VLC,VC)	COINCIDE-σ1	*MAP(CLV,CV)
a. po**r**ku ☜		k, u	
b. p**r**o_ku	*(ork~ok)!	k, u	(po~pro)

[3] The preference for L movement as opposed to metathesis of other segment types, e.g. **ksapitru*, is blocked by the high-ranked *MAP(CCV, CV).

2.1.2. GP-based analyses

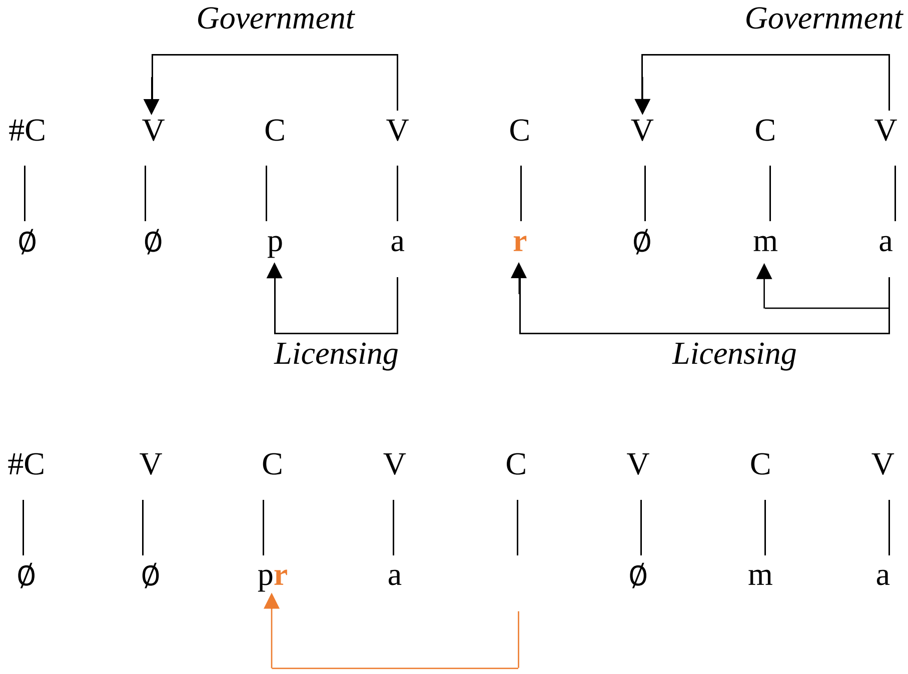
Coming from a different theoretical background, Lai (2013, 2015) proposes an account of Tertenian Sardinian within the Government Phonology (GP) framework (Kaye et al. 1990; Kaye 1990) and, in particular, its extension known as Strict CV (Lowenstamm 1996, 1999), and the Coda Mirror theory (Scheer 2004; Ségéral & Scheer 2005; Ziková & Scheer 2010), which establishes a relative strength hierarchy among positions. Lai (2013, 2015) argues that CL sequences not enclosing an empty nucleus are targeted by lenition intervocalically, which fuels metathesis of L to the strongest position available. Crucially, an empty #CV is taken to exist (Scheer 2007). Thus, the strongest position able to serve as a docking site is next to the first C of the word: since the preceding empty nucleus needs to be governed, the word-initial consonant escapes government and can be licensed (Figure 12).

(12) Metathesis from a governed to a licensed position



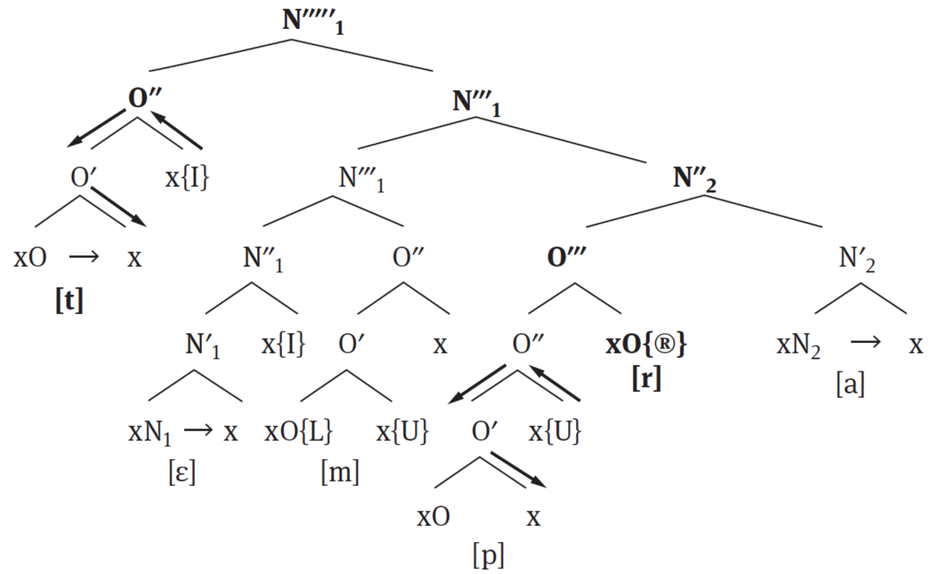
In a similar vein, Lai posits that the migration of L from a coda, i.e. a C slot preceding an empty nucleus, next to the first phonetically expressed consonant is also the outcome of lenition, which attacks codas this time (Figure 13):

(13) Metathesis from unlicensed/ungoverned to licensed position

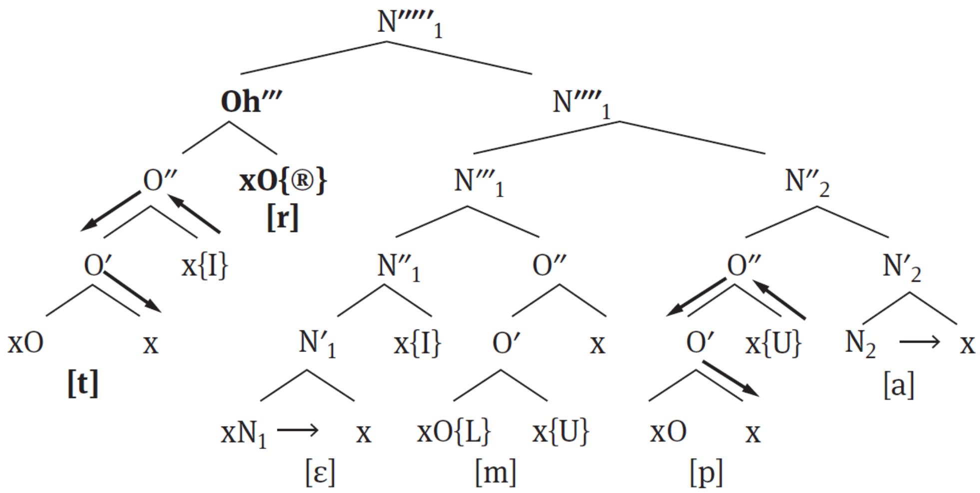


In his 2020 paper on CL clusters, Tifrit offers a different view of Sardinian metathesis within another offspring of the GP framework, i.e. GP2.0 (Pöchtrager 2006; Živanovič & Pöchtrager 2010). Adopting the basic assumptions of Element Theory (Backley 2011), he posits that L found in non-initial positions does not in fact *move*, but rather it percolates within a structure and transfers all of its content to the highest available onset projection. In simple words, the model predicts the non-local pattern identified in L.OnOn.Dist and L.OnOn.MetLC.Dist. LDM from medial CL, e.g. *templa* > *trempa* 'cheek', and LC, e.g. *korbu* > *kroβu* 'raven', are illustrated in Figures (14–15) and (16–17), respectively.

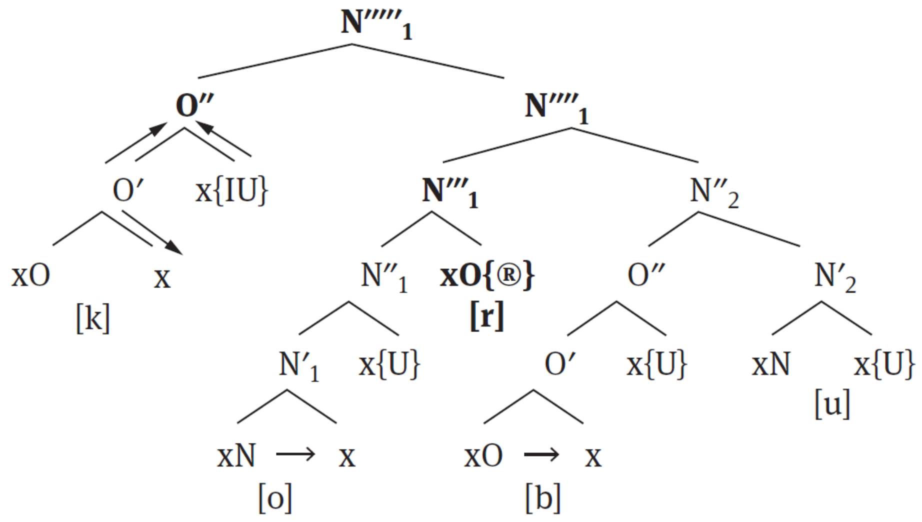
(14) temp**l**a (Tifrit 2020: 375)



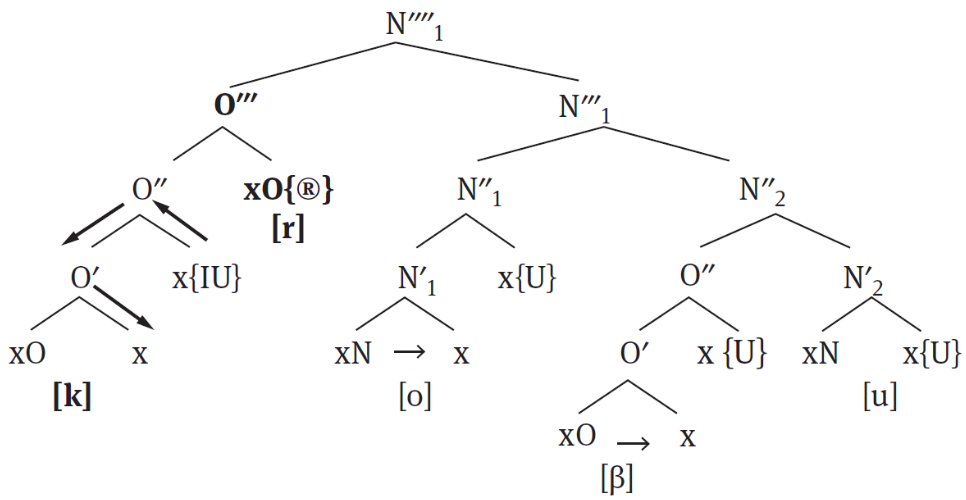
(15) t**r**empa (Tifrit 2020: 375)



(16) ko**r**bu (Tifrit 2020: 376)



(17) k**r**oβu (Tifrit 2020: 376)



2.2. Local LDM

Locality restrictions were addressed by Torres-Tamarit et al. (2012) (see also Cabrera-Callís et al. 2010), who propose an account of metathesis in Alguerese Catalan (L.OnOn.MetLC.Loc) couched within Harmonic Serialism (HS; McCarthy 2010), according to which, what looks like LDM is in fact the final result of several stepwise leftward movements.

Torres-Tamarit et al. (2012) employ two LINEAR constraints that stand in a stringency relation. LINEAR militates against metathesis in general, by returning one violation for every candidate in which the linear order of the input segments has been disrupted in the output. In addition, LINEAR$_{non\text{-}local}$ penalizes only non-local metathesis, that is, any movement that does not simply involve transposition of two adjacent segments (pp. 356–357).

The markedness constraints the analysis uses prohibit the presence of a rhotic in specific positions. Three constraints *COMPLEXONSET/Left-stem (*CL/L), *COMPLEXONSET/Mid-Stem (*CL/M), and *COMPLEXONSET/Right-Stem (*CL/R) penalize CL onsets in the leftmost, the middle, and the rightmost syllable of the stem, respectively. Finally, *LC disfavors candidates containing rhotics parsed in a pre-consonantal coda.

The proposed constraint hierarchy is *CL/R, LINEAR$_{non\text{-}local}$ >> *LC >> LINEAR, *CL/M, *CL/L. The evaluation of the candidates by the constraint system takes place in consecutive rounds. In the first step (Tableau 18; adapted from Torres-Tamarit et al. 2012: 360), a complex onset CL in the rightmost, i.e. the third syllable of the trisyllabic stem incurs a fatal violation of the dominant *CL/R (candidate a). As metathesis is triggered, the rhotic may be transposed with the preceding consonant and end up in coda position (candidate b), which, in turn, violates *LC. Nevertheless, at this point, farther movements (candidates c–d) have been eliminated by LINEAR$_{non\text{-}local}$. Therefore, candidate (b) wins the first round of evaluation.

(18**)** Metathesis from original CL in HS – Step 1

/kated**r**al/	*CL/R	LINEAR$_{non\text{-}loc}$	*LC	LINEAR	*CL/M	*CL/L
a. kated**r**al	*!					
b. kate**r**d_al ☜			*	*		
c. kat**r**ed_al		*!		*	*	
d. k**r**ated_al		*!		*		*

The winner output of the first step serves as input at the second step (Tableau 19; adapted from Torres-Tamarit et al. 2012: 360). The faithful output (b), which contains a pre-consonantal rhotic, fatally violates *LC. The option that the rhotic returns to its original position via rightward movement (candidate a) is ruled out by the high-ranked *CL/R. LDM to the first onset (candidate d) is prohibited, because of the non-local movement it involves, which violates LINEAR$_{non\text{-}local}$. On the other hand, leftward transposition to the onset of the same syllable (output c), is selected as the winner of step 2, since the violation of the low-ranked *CL/M is not fatal.

(19) Metathesis from original CL in HS – Step 2

/kate**r**dal/	*CL/R	LINEAR$_{non-loc}$	*LC	LINEAR	*CL/M	*CL/L
a. kate_d**r**al	*!			*		
b. kate**r**dal			*!			
c. kat**r**e_dal ☜				*	*	
d. k**r**ate_dal		*!		*		*

The evaluation is concluded when the violation profile of the optimal candidate does not yield violations of faithfulness constraints, as demonstrated in Tableau 20 (adapted from Torres-Tamarit et al. 2012: 358). Candidates (a) and (b), which contain CL in the rightmost syllable and rC, respectively, are eliminated by the relevant markedness constraints in the same spirit as during the previous evaluation rounds. Candidates (c) and (d) are equally marked, given that *CL/L and *CL/M are not ranked with respect to each other. Candidate (d), though, loses over candidate (c) with respect to both faithfulness constraints.

(20) Metathesis from original CL in HS – Step 3 (convergence)

/kat**r**edal/	*CL/R	LINEAR$_{non-loc}$	*LC	LINEAR	*CL/M	*CL/L
a. kat_ed**r**al	*!	*		*		
b. ka**r**t_edal			*!	*		
c. kat**r**edal ☜					*	
d. k**r**at_edal		*!		*		*

In the same vein, the HS model accounts for leftward intrasyllabic metathesis of a coda rhotic.[4] The first round (Tableau 21; adapted from Torres-Tamarit et al. 2012: 358) selects candidate (b), i.e. opts for local movement of /r/ to the onset of the same –and middle– syllable:

[4] Torres-Tamarit et al. (2012) use the example *formatge* > *fromatge* 'cheese' (orthographic form), where /r/ is in the first syllable, thus the distinction between movement to the same vs. the first syllable is obscure. In order to render this difference clearer, here I use the Judeo-Spanish example *taberna* > *taβrena* (p. 355).

(21) Metathesis from original rC in HS – Step 1

/taβe**r̲**na/	*CL/R	LINEAR$_{non\text{-}loc}$	*LC	LINEAR	*CL/M	*CL/L
a. taβe**r̲**na			*!			
b. taβ**r**e_na ☜				*	*	
c. t**r**aβe_na		*!		*		*

The loop ends when the optimal candidate satisfies all faithfulness constraints (Tableau 22):

(22) Metathesis from original rC in HS – Step 2 (final)

/taβ**r̲**ena/	*CL/R	LINEAR$_{non\text{-}loc}$	*LC	LINEAR	*CL/M	*CL/L
a. ta**r**β_ena			*!	*		
b. taβ**r̲**ena ☜					*	
c. t**r**aβ_ena		*!		*		*

2.3 Criticism

The analyses presented in section 2.2 have shed light on important aspects of LDM from a language-specific, or, rather, type-specific point of view, and they have contributed crucially to our understanding regarding the directionality of the process, the ideal landing sites, as well as the distance limitations that are encountered in certain language types. Nevertheless, when it comes to different patterns that compose the bigger typological picture of LDM, the suggested solutions encounter problems.

Let's begin with non-local LDM. An OT-based account that exploits a COINCIDE constraint (Alber 2001; Coffman 2013a,b) makes the claim that L from a medial CL has to end up in the first onset, and no intermediate position is good enough a landing site. Inevitably, such a model predicts only two out of the three types of LDM languages, i.e. L.OnOn.Dist and L.OnOn.MetLC.Dist, and proves insufficient when it comes to capturing L.OnOn.MetLC.Loc, where complying with certain locality restrictions may lead to a derived non-initial CL. More precisely, as shown in the Comparative Tableau (CT; Prince 2002), the input /kapistru/ has two possible outputs: the unmarked [krapistu] (L.OnOn.Dist, L.OnOn.MetLC.Dist), via the ranking

PositionalMarkedness[5] >> Faithfulness, and the faithful [kapistru] (L.NoMet), via the reversed ranking Faithfulness >> PositionalMarkedness. The candidate [kapristu], whereby metathesis has not resulted in a complex O-1 (L.OnOn.MetLC.Loc), is harmonically bounded by the other candidates.

(23) Predicted winners *à la* Alber (2001) and Coffman (2013a,b)

Input	*Winner*	*Loser*	PositionalMarkedness	Faithfulness
kapist**r**u	k**r**apist_u	kapist**r**u	W	L
kapist**r**u	k**r**apist_u	kap**r**ist_u	W	e
kapist**r**u	kapist**r**u	kap**r**ist_u	e	W

Moreover, both models can only accommodate one type of distal LDM. An analysis in the spirit of Alber (2001) successfully captures L.OnOn.MetC.Dist, where every L moves to the initial onset regardless of its etymological position in the syllable. L.OnOn.Dist, where codas remain unaffected, is left unaccounted for, as nothing protects codas from metathesizing. For instance, the Italiot Greek word *xorto* 'grass', is wrongly predicted to surface as *xroto*, where fewer segments are found outside the first onset (Tableau 24).

(24) Metathesis from LC *à la* Alber (2001) – L.OnOn.Dist

/xo**r**to/	Coincide-O1	Linear
a. xo**r**to ☹	o, r, t, o!	
b. x**r**o_to 💣	o, t, o	*!

On the other hand, Coffman's (2013a,b) L.OnOn.Dist-oriented proposal fails to explain L.OnOn.MetLC.Dist. In the *Map model, a coda L in a non-initial syllable migrates to the first onset as long as Coincide-σ1 outranks the *Map constraints (Tableau 25). However, if LC is already in the σ1, as in Latin *porcu* 'pig', no ranking condition can motivate intrasyllabic metathesis to the first onset and yield the output Sestu Sardinian selects, i.e. *prokku*. As illustrated in Tableau (26), the faithful candidate (a) incurs an equal number of violations with respect to Coincide-σ1 as candidate (b), and additionally wins against (b) with respect to all *Map constraints. In this case, candidate (b) cannot be selected by any constraint hierarchy.

[5] PositionalMarkedness is used here as a cover term for Coincide-O1 and Coincide-σ1.

(25) Metathesis from the 2nd LC *à la* Coffman (2013a,b) – L.OnOn.MetLC.Dist

/kope**r**tura/	COINCIDE-σ1	*MAP(VLC,VC)	*MAP(CLV,CV)
a. kope**r**tura	p, e, r, t, u, r, a!		
b. kop**r**e_tura	p, r, e, t, u, r, a!	(ert~et)	(pe~pre)
c. ko**r**pe_tura	p, e, t, u, r, a	(op~orp), (ert~et)!	
d. k**r**ope_tura ☜	p, e, t, u, r, a	(ert~et)	(ko~kro)

(26) Metathesis from the first LC *à la* Coffman (2013a,b) – L.OnOn.MetLC.Dist

/po**r**ku/	COINCIDE-σ1	*MAP(VLC,VC)	*MAP(CLV,CV)
a. po**r**ku 💣	k, u		
b. p**r**o_ku ☹	k, u	(ork~ok)!	(po~pro)

Lai's (2013) Coda Mirror analysis does not suffice to provide a comprehensive typological account either. Although it explains L.NoMet, L.OnOn.Dist, and L.OnOn.MetLC.Dist, it faces the same problem other analyses of distal metathesis encounter, i.e. it fails to capture L.OnOn.MetLC.Loc. Recall that all word-internal intervocalic positions are taken to be weak, hence the migration of L to a presumably stronger position. By implication, all non-initial intervocalic positions are disqualified as landing sites. Consequently, instances like *catedral* > *catredal* are left accounted for.

Tifrit (2020), on the other hand, employs bisyllabic tokens in which L moves either from the second to the first onset, or from the coda to the onset of the σ1. Based on his claim that Ls percolate targeting the highest onset of the structure, one would assume that the proposed model is also capable of predicting movement from farther positions to the first onset, e.g. *kapistru* > *krapistu*, *coperculu* > *kroβekku*. However, the paper does not make specific assumptions about lower heads that could serve as a potential intermediate host for a percolating L, in spite of the availability of the highest realized onset. Thus, it remains unclear whether L.OnOn.MetLC.Loc can be accounted for in terms of GP2.0.

On the other side, the HS analysis offered by Torres-Tamarit *et al*. (2012) can only accommodate languages in which metathesis targets both medial CL and LC, i.e. L.OnOn.MetLC.Loc (addressed in the original proposal) and L.OnOn.MetLC.Dist. In the latter case, the ranking should be adjusted so that derivation continues until rhotics originating in all marked positions arrive to the first onset, i.e. *CL/R, *CL/M, LINEAR$_{\text{non-local}}$ >> *LC >> LINEAR, *CL/L. Under this ranking, the middle syllable of the stem becomes an illicit host. In the case of L.OnOn.Dist, though, (recall *kapistri* > *krapisti*, *xorto* > *xorto* in MedG > IG), the HS model proves less efficient. In essence, once L migrating from a non-initial CL arrives in a coda position, the derivation should converge, although the desired optimum should contain an initial CL instead. The impression is given that the ranking CL/Right, *CL/Middle >> LINEAR >> *LC >> LINEAR$_{\text{non-local}}$, *CL/Left successfully blocks movement from etymological codas, while allowing for an onset L to travel long-distance to the first onset already in the first round of evaluation. However, this solution faces a problem of theoretical nature: due to the stringency relation between LINEAR and LINEAR$_{\text{non-local}}$, faithfulness returns two violations in total for every non-local movement. Crucially, though, HS posits that only one change, i.e. a single penalty with respect to faithfulness, is allowed per candidate during each step of evaluation. Thus, strictly, the candidates violating both LINEAR constraints should not be available for evaluation.[6] If the candidate involving non-local metathesis, e.g. candidate (c), Tableau (27), is not part of GEN during the initial round, then L first moves locally to the coda of the adjacent syllable to the left (candidate b), and in the next step the derivation converges (Tableau 28). By the end of the loop, the faithful candidate (a) is incorrectly selected, whereas the attested candidate (b) is ruled out, as further movement, which is blocked by LINEAR >> *LC.

(27) Metathesis from CL in HS – L.OnOn.Dist – Step 1

/pik**r**o/	*CL/R	*CL/M	LINEAR	*LC	LINEAR$_{\text{non-loc}}$	*CL/L
a. pik**r**o	*!					
b. pi**r**k_o ☜			*	*		
c. p**r**ik_o ✗			*		*	*

(28) Metathesis from CL in HS – L.OnOn.Dist – Convergence

/pi**r**ko/	*CL/R	*CL/M	LINEAR	*LC	LINEAR$_{\text{non-loc}}$	*CL/L
a. pi**r**ko 💣				*		
b. p**r**i_ko ☹			*!			*

[6] In fact, this also holds for candidates involving LDM in the original proposal: they are not eliminated from the race due to a fatal violation, but rather they do not participate in the respective rounds of evaluation at all.

Furthermore, Torres-Tamarit et al's (2012) proposal predicts that no movement occurs from the third syllable of a four-syllable word if *CL/M is low-ranked. This leads to non-uniformity across candidates: three-syllable words display metathesis, whereas four-syllable words do not. A final potential problem is that the analysis predicts rightward metathesis under the ranking *CL/L >> *CL/R, which is not only unattested as a systematic process, but also unmotivated on the premises of the assumption that L tends to move into more salient positions.

3. Typological analysis of LDM

In this section I present my analysis of the LDM typology, which is framed within Property Theory (see chapter 4, section 1 for background and references). I show that the LDM typology is built on four cornerstones that can be described with the following questions:

(a) is non-initial CL targeted by metathesis?
(b) is LC targeted by metathesis?
(c) is metathesis local?
(d) in case some marked structure is allowed, does grammar opt for CL_2 or LC?

The section is organized as follows: first I introduce LDM.GEN (section 3.1) and LDM.CON (section 3.2). In section 3.3 I illustrate the violation profiles of the candidates. Then I present the extensional traits (section 3.4) and the grammars of the languages the extensional typology contains (section 3.5). Finally, I elaborate on the properties that generate the intensional typology (section 3.6).

3.1 LDM.GEN

The set of candidates consists of input and output forms containing pre- or post-consonantal L in all possible positions. Inputs and outputs having final L are not considered. With the aim of abstracting away from language-specific requirements and data, schematic candidates are used, comprised of sequences of consonants (c), vowels (v), and L variably ordered.

The realization of bi-syllabic inputs, e.g. /cvcLv/, show whether metathesis does or does not take place, e.g. consider the outputs [cv.cLv] (faithful), [cvL.cv] (metathesis to coda), [cLv.cv] (LDM to onset), but do not offer any insight into locality restrictions. In this respect, tri-syllabic candidates are maximally informative. Including four-syllable strings in LDM.GEN does not influence the typology. Thus, given that theoretical adequacy is not compromised, the analysis uses only tri-syllabic inputs (syllabified here for clarity of presentation):[7]

(29) Set of inputs

a.	cLv.cv.cv		*L in the first onset (CL_1)*
b.	cvL.cv.cv		*L in the first coda (LC_1)*
c.	cv.cLv.cv		*L in the second onset (CL_2)*
d.	cv.cvL.cv		*L in the second coda (LC_2)*
e.	cv.cv.cLv		*L in the third onset (CL_3)*

Each input is associated with a set of outputs containing L in all available positions, given the assumption that, in theory, any position could serve as a potential landing site. Post-consonantal Ls are treated as onsets and pre-consonantal ones as codas, based on sonority sequencing generalizations, and alternative syllabifications are not considered.

(30) Set of outputs

a.	cLv.cv.cv		*L in the first onset (CL_1)*
b.	cvL.cv.cv		*L in the first coda (LC_1)*
c.	cv.cLv.cv		*L in the second onset (CL_2)*
d.	cv.cvL.cv		*L in the second coda (LC_2)*
e.	cv.cv.cLv		*L in the third onset (CL_3)*

LDM.GEN maps each input onto each possible output, thus generating input-output pairs that are either faithful or display leftward or rightward metathesis.

[7] Besides, from an empirical point of view, at least to my knowledge, metathesis occurs within a domain of maximally three syllables in the case of CL, and within two syllables in the case of LC.

(31) LDM.GEN

a. cLvcvcv	→ cLv.cv.cv	b. cvLcvcv	→ cLv.cv.cv	c. cvcLvcv	→ cLv.cv.cv
	→ cvL.cv.cv		→ cvL.cv.cv		→ cvL.cv.cv
	→ cv.cLv.cv		→ cv.cLv.cv		→ cv.cLv.cv
	→ cv.cvL.cv		→ cv.cvL.cv		→ cv.cvL.cv
	→ cv.cv.cLv		→ cv.cv.cLv		→ cv.cv.cLv

d. cvcvLcv	→ cLv.cv.cv	e. cvcvcLv	→ cLv.cv.cv
	→ cvL.cv.cv		→ cvL.cv.cv
	→ cv.cLv.cv		→ cv.cLv.cv
	→ cv.cvL.cv		→ cv.cvL.cv
	→ cv.cv.cLv		→ cv.cv.cLv

3.2 LDM.CON

The proposed LDM.CON consists of two m.constraints and two f.constraints that suffice to describe the distinct LDM patterns we witness in IG and Romance. The typological data suggest that CL onsets are preferred in the left periphery of the root, in line with models associating the licensing of marked structures with prominent positions (Beckman 1998; Zoll 1996, 1998; de Lacy 2001; Alber 2001; Smith 2005; Walker 2011). Therefore, LDM is taken to be motivated by the need to remove complexity from a non-prominent, medial syllable and place it in a more salient one, such as the first syllable.[8] As shown in section 2.3, a COINCIDE constraint (Zoll 1996), e.g. COINCIDE-ONSET1 (Alber 2001) or COINCIDE-σ1 (Coffman 2013a,b) excludes those candidates in which L does not end up in the first onset or syllable, respectively. The same problem would arise if I used a LICENSE constraint (Zoll 1996; Walker 2011), e.g. LICENSE(CL, ONS1) 'CL is licensed in the first onset; Assign a violation for every CL not found in the first onset'. Thus, I formalize the preference for complex onsets to exist as close to the left edge of the word as possible, but not necessarily exclusively in the first onset,

[8] It should be underscored that LDM as well as related metathesis phenomena are not driven by a general avoidance of complex onsets (cf. Armenian, Zukoff 2012), as, in the LDM languages under investigation, L already occurring in the first syllable typically stays put, e.g. Calabrian *v**r**azzu* 'arm' (Rohlfs 1966), IG *v**r**adi* 'evening' (Karanastassis 1984–1992).

by means of the alignment constraint m.ALIGN(Complex Onset, Left edge-root) (see Zoll 1998). This constraint, henceforth abbreviated as m.ALIGN, penalizes non-initial complex onsets gradiently, by counting the number of syllables between each CL and the left edge of the root. Therefore, outputs containing CL_3 incur two violations of m.ALIGN, as they are two syllables away from the left edge, outputs containing CL_2 incur only one violation, and outputs containing CL_1 satisfy m.ALIGN.

Furthermore, I employ *{r,l}-CODA, henceforth m.LC (Baković 2007; see also McCarthy 1993; Orgun 2001 for *r-CODA), which prevents L from being syllabified in a coda position.

The faithfulness constraint penalizing the disruption of the linear order from the input to the output is f.LINEARITY (f.LINEAR; McCarthy & Prince 1995), which penalizes metathesis. In the spirit of Alber (2001) (a.o.), f.LINEAR is violated in a Boolean fashion, i.e. it returns zero violations if the candidate is faithful and one violation if metathesis takes place (cf. Hume 1998, 2001; McCarthy 2003).

In languages with locally restricted LDM, a pre-consonantal L moves to the onset of the same syllable, and if it is already in a complex onset CL, then it creates a new CL in the adjacent syllable to the left. The two movements can be unified under the generalization that L is allowed to skip over maximally one vowel. Based on this observation, I posit the faithfulness constraint f.LOCALITY (f.LOCAL) that demarcates a local domain within which L may move without incurring a violation. A *local* movement involves L leaping over maximally one vowel/nucleus. f.LINEAR and f.LOCAL are in stringency relation (Prince 1997, 1999; de Lacy 2002, 2006). The more stringent constraint, i.e. f.LINEAR, penalizes *all* cases of metathesis, while f.LOCAL penalizes *some* cases of metathesis, i.e. movements farther away from a certain boundary. Thus, a violation of f.LOCAL necessarily entails a violation of f.LINEAR, but not vice versa.

The definitions of the employed constraints are given below:

(32) m.constraints of LDM typology

a.	m.ALIGN(Complex Onset, Left edge-root)	Assign a violation for each syllable that separates a complex onset from the left edge of the root
b.	m.LC	Assign a violation for every L that is syllabified in coda position

(33) f.constraints of LDM typology

a. f.LINEARITY — Assign a violation if the precedence relations in the input are not preserved in the output

b. f.LOCALITY — Assign a violation if a segment in the output is realized outside its local domain in the input, i.e. farther than one nucleus away from its original position

3.3 Violation Tableaux

VT (34) clearly demonstrates that /cLv.cv.cv/, i.e. the input with CL_1, always surfaces faithfully, as the relevant candidate (a) satisfies the entire constraint system. Thus, it harmonically bounds (Prince & Smolensky 1993/2004; Samek-Lodovici & Prince 1999) any other competitor, which incurs at least one violation, i.e. of f.LINEAR. Consequently, independently of the constraint hierarchy, candidate (a) will always be selected.

(34) VT /cLv.cv.cv/

/cLv.cv.cv/	m.ALIGN	m.LC	f.LINEAR	f.LOCAL
a. [cLv.cv.cv]				
b. [cvL.cv.cv]		1	1	
c. [cv.cLv.cv]	1		1	
d. [cv.cvL.cv]		1	1	1
e. [cv.cv.cLv]	2		1	1

Given an input containing CL_2 (VT 35) the possible optima are two: the unmarked candidate (a), where L is found in the first onset, and the faithful candidate (c). The two candidates incur the same number of violations with respect to m.LC (0) and f.LOCAL (0), however, competition arises with respect to m.ALIGN, which favors candidate (a) (0 vs. 1), and f.LINEAR, which favors candidate (c) (1 vs. 0).

The candidates (b) (metathesis to VL_1) and (d) (metathesis to VL_2), are harmonically bounded by (a): all three incur equal violations of m.ALIGN (0), f.LINEAR (1), and f.LOCAL (0), but candidates (b) and (d) lose to candidate (a) with respect to m.LC (1 vs. 0), therefore, there is no ranking under which one of them can be selected. Similarly, candidate (a) bounds candidate (e), which involves metathesis to CL_3, as they have identical violation profiles with respect to m.LC (0), f.LINEAR (1), and f.LOCAL (0), yet m.ALIGN favors candidate (a) (0 vs. 2).

(35) VT /cv.cLv.cv/

/cv.cLv.cv/	m.ALIGN	m.LC	f.LINEAR	f.LOCAL
a. [cLv.cv.cv]			1	
b. [cvL.cv.cv]		1	1	
c. [cv.cLv.cv]	1			
d. [cv.cvL.cv]		1	1	
e. [cv.cv.cLv]	2		1	

In the case of /cv.cv.cLv/ (VT 36), all generated candidates are preferred by some constraint. To begin with the faithful output (e), it has an evident advantage with respect to f.LINEAR. Among the unfaithful candidates, on the one hand, those displaying metathesis to a coda position, i.e. candidates (b) and (d), are penalized by m.LC, but satisfy m.ALIGN and f.LOCAL, and, on the other hand, those exhibiting LDM to CL, i.e. candidates (a) and (c), incur a violation of f.LOCAL or of m.ALIGN, respectively, yet are preferred by m.LC. Within the two groups, candidates (b) and (d) display the exact same violation profile as to the present constraint system, therefore none of them prevails over the other. As observed above, (a) wins over (c) with respect to m.ALIGN (0 vs. 1), and (c) wins over (a) with respect to f.LOCAL (0 vs. 1).

(36) VT /cv.cv.cLv/

/cv.cv.cLv/	m.ALIGN	m.LC	f.LINEAR	f.LOCAL
a. [cLv.cv.cv]			1	1
b. [cvL.cv.cv]		1	1	
c. [cv.cLv.cv]	1		1	
d. [cv.cvL.cv]		1	1	
e. [cv.cv.cLv]	2			

Moving on to inputs containing pre-consonantal L, a pre-consonantal L in the first syllable (VT 37) may surface faithfully (candidate b), which is favored by f.LINEAR, although violating m.LC. Alternatively, it may move intrasyllabically to the onset of the same syllable (candidate a), thus satisfying markedness at the expense of f.LINEAR. The remaining unfaithful candidates are again harmonically bounded, as they violate not only f.LINEAR, but also a markedness constraint and, in the case of candidate (e), f.LOCAL in addition.

(37) VT /cvL.cv.cv/

/cvL.cv.cv/	m.ALIGN	m.LC	f.LINEAR	f.LOCAL
a. [cLv.cv.cv]			1	
b. [cvL.cv.cv]		1		
c. [cv.cLv.cv]	1		1	
d. [cv.cvL.cv]		1	1	
e. [cv.cv.cLv]	2		1	1

Finally, a coda in the second syllable, aside from being realized in its original position (candidate d), may move to an onset. Given that this time the syllable L originates in does not coincide with the first syllable, two different patterns arise: on the one hand, candidate (c) displays local movement that creates CL_2, thus violating m.ALIGN once for the sake of f.LOCAL (0 violations); on the other hand, candidate (a) sacrifices locality requirements (1 violation of f.LOCAL) in order to form an initial CL and satisfy m.ALIGN. Candidate (b) is harmonically bounded by candidate (d), as, in spite of their very similar violation profiles, the former incurs an extra violation of f.LINEAR. Moreover, candidate (e) is bounded by (c) with respect to m.ALIGN (2 vs. 1 violation, respectively).

(38) VT /cv.cvL.cv/

/cv.cvL.cv/	m.ALIGN	m.LC	f.LINEAR	f.LOCAL
a. [cLv.cv.cv]			1	1
b. [cvL.cv.cv]		1	1	
c. [cv.cLv.cv]	1		1	
d. [cv.cvL.cv]		1		
e. [cv.cv.cLv]	2		1	

3.4 Extensional LDM typology

The generated typology includes eight languages, each of which displays one or more of the following extensional traits:

(a) Metathesis from onset vs. no metathesis from onset

(b) Metathesis from coda vs. no metathesis from coda

(c) Local / distal metathesis

(d) Permitted CL_2 only vs. permitted LC only

The following notations are used for the language names:

• No metathesis	NoMet
• LDM from onset to onset	OnOn
• Metathesis from onset to coda	OnCd
• Metathesis from coda (always to onset)	MetLC
• Local / distal metathesis	Loc / Dist

Table (39) demonstrates the optima selected in each language of the typology. The inputs are displayed in the first row, and the non-external columns include the winning output(s). The candidates associated with the input /cLv.cv.cv/, i.e. those that contain L in the first onset, are omitted, as they are always faithfully mapped, therefore they do not contribute to the typological distinction among different languages.

(39) Extensional LDM typology: optima

	cv.cLv.cv	cvL.cv.cv	cv.cv.cLv	cv.cvL.cv	
L.OnOn.MetLC.Dist	cLv.cv.cv	cLv.cv.cv	cLv.cv.cv	cLv.cv.cv	*S. ItRom (b), Campidanian*
L.OnCd.MetLC.Loc	cLv.cv.cv	cLv.cv.cv	cvL.cv.cv ~ cv.cvL.cv	cv.cvL.cv	–
L.OnOn.MetLC.Loc	cLv.cv.cv	cLv.cv.cv	cv.cLv.cv	cv.cLv.cv	*N. ItRom, Alguerese, Jud.-Spanish*
L.OnCd.Loc	cLv.cv.cv	cvL.cv.cv	cvL.cv.cv ~ cv.cvL.cv	cv.cvL.cv	–
L.OnOn.Dist	cLv.cv.cv	cvL.cv.cv	cLv.cv.cv	cv.cvL.cv	*IG, S. ItRom (a), Tertenian, Gascon*
L.MetLC.Loc	cv.cLv.cv	cLv.cv.cv	cv.cv.cLv	cv.cLv.cv	*Dialectal Spanish*
L.MetLC.Dist	cv.cLv.cv	cLv.cv.cv	cv.cv.cLv	cLv.cv.cv	–
L.NoMet	cv.cLv.cv	cvL.cv.cv	cv.cv.cLv	cv.cvL.cv	*Latin, MedG, Standard Greek*

In each of the eight languages, an underlying L that participates in a marked cluster, i.e. CL_2, CL_3, or LC, may be targeted by metathesis in order for the marked structure to be repaired. However, they may need to remain within their local domain. In this case, they may opt for a marked landing site, i.e. they may create an innovative CL_2 or LC.

The output mappings of the input /cv.cLv.cv/ (first column of optima) distinguish between languages in which medial CL are not avoided (L.MetLC.Dist, L.MetLC.Loc, L.NoMet) and languages in which LDM takes place in order to repair the structures at hand (L.OnOn.MetLC.Dist, L.OnOn.MetLC.Loc, L.OnCd.MetLC.Loc, L.OnO.Dist, L.OnCd.Loc). As far as metathesis targeting LC is concerned, the candidates in the second column classify the typology in languages which do exhibit metathesis from LC (L.OnOn.MetLC.Dist, L.OnOn.MetLC.Loc, L.OnCd.MetLC.Loc, L.MetLC.Dist, L.MetLC.Loc) and those which do not (L.OnOn.Dist, L.OnCd.Loc). The outputs in which L has moved are given in blue.

The third column, i.e. the output mappings of /cv.cv.cLv/, illustrates the further classification of the LDM languages into those in which metathesis is distal (L.OnOn.MetLC.Dist, L.OnOn.Dist) (in yellow), and those displaying local metathesis, which may be manifested via either movement of L into a coda (L.OnCd.MetLC.Loc, L.OnCd.Loc) (in green) or a non-initial complex onset (L.OnOn.MetLC.Loc) (in red). The fourth column sheds light on the distinction between distal (L.OnOn.MetLC.Dist, L.MetLC.Dist) (in yellow) and local (L.OnOn.MetLC.Loc, L.OnCd.MetLC.Loc, L.MetLC.Loc) (in red) metathesis of codas.

Unless metathesis eliminates both CL_2 and LC by displacing L in the first syllable, as happens in L.OnOn.MetLC.Dist, at least one marked structure needs to be tolerated. In the languages where metathesis targets only one environment, it ensues that the relevant marked structure is repaired and thus no longer admitted, while the unaffected structure is still possible. Specifically, L.OnOn.Dist and L.OnCd.Loc repair only CL_2 and thus allow LC, and L.MetLC.Loc and L.MetLC.Dist repair only LC and thus allow CL_2. Between the remaining two metathetic languages, where both environments are affected, the creation of innovative CL_2 appears to be possible only in L.OnOn.MetLC.Loc: L in both the third onset and the second coda land in the second onset. In L.OnCd.MetLC.Loc, respecting locality restrictions means that some LC inevitably emerge. In particular, L in the third onset moves into a coda, leading to a derived LC, and a pre-consonantal L in the second syllable does not move at all. Lastly, L.NoMet allows both structures, as none of them can be avoided via metathesis.

Note that, in the absence of an additional LOCAL constraint penalizing, for instance, metathesis farther than one segment away, locally metathesized L may head to the coda of either the adjacent syllable to the left, i.e. second syllable, or the first syllable, since it still skips maximally one nucleus, hence the co-optima /cv.cv.cLv/ → [cvL.cv.cv] ~ [cv.cvL.cv] in L.OnCd.MetLC.Loc and L.OnCd.Loc.

Table (40) summarizes the patterns (entailed descriptions are enclosed in ‘< >’):

(40) Extensional traits of languages of LDM typology

	MetCL	MetLC	Metathesis Loc /nLc	allowed LC or CL_2
L.OnOn.MetLC.Dist	yes	yes	Dist	none
L.OnCd.MetLC.Loc	yes	yes	Loc	LC
L.OnOn.MetLC.Loc	yes	yes	Loc	CL_2
L.OnCd.Loc	yes	no	Loc	<LC>
L.OnOn.Dist	yes	no	Dist	<LC>
L.MetLC.Loc	no	yes	Loc	<CL_2>
L.MetLC.Dist	no	yes	Dist	<CL_2>
L.NoMet	no	no	–	both

3.5 Grammars of LDM typology

The collection of rankings that generate each language of the typology can be represented with the help of Skeletal Bases (SKB) and Hasse diagrams. Let’s first take a look at the four language types that correspond to attested LDM languages, which sparked the interest in the present typological analysis.

(41) Optima of OnOn languages and L.NoMet

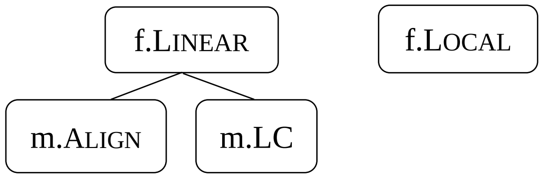
	cv.cLv.cv	cvL.cv.cv	cv.cv.cLv	cv.cvL.cv	
L.OnOn.MetLC.Dist	cLv.cv.cv	cLv.cv.cv	cLv.cv.cv	cLv.cv.cv	*Campidanian,…*
L.OnOn.MetLC.Loc	cLv.cv.cv	cLv.cv.cv	cv.cLv.cv	cv.cLv.cv	*Alguerese,…*
L.OnOn.Dist	cLv.cv.cv	cvL.cv.cv	cLv.cv.cv	cv.cvL.cv	*IG, Tertenian,…*
L.NoMet	cv.cLv.cv	cvL.cv.cv	cv.cv.cLv	cv.cvL.cv	*Latin, MedG*

The collections of sets of rankings yielding the above languages are given below:

(42) SKB L.NoMet

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
	L	W	
L		W	

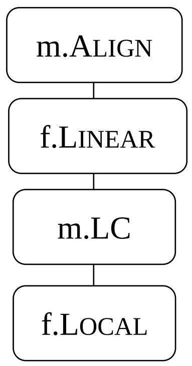
(43) Hasse L.NoMet



(44) SKB L.OnOn.Dist

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
W		L	
	L	W	
	W		L

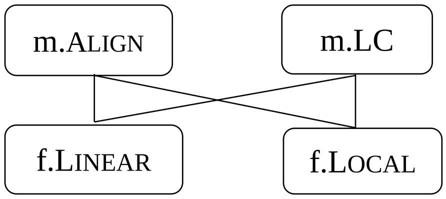
(45) Hasse L.OnOn.Dist



(46) SKB L.OnOn.MetLC.Dist

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
	W	L	L
W		L	L

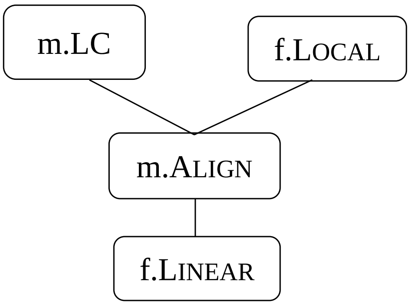
(47) Hasse L.OnOn.MetLC.Dist



(48) SKB L.OnOn.MetLC.Loc

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
L			W
L	W		
W		L	

(49) Hasse L.OnOn.MetLC.Loc



The remaining four predicted languages include three types that are not reported, at least in Romance, i.e. L.OnCd.Loc, L.OnCd.MetLC.Loc, L.MetLC.Dist, and one, i.e. L.MetLC.Loc, that corresponds to a number of languages, among which dialectal Spanish (see chapter 3). The optima and the grammars are presented below:

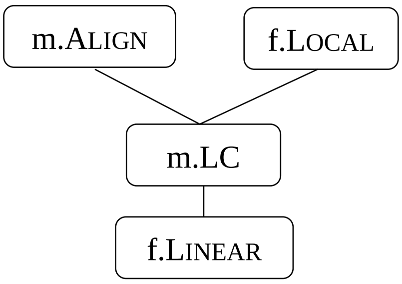
(50) Optima of OnCd languages and languages moving only codas

	cv.cLv.cv	cvL.cv.cv	cv.cv.cLv	cv.cvL.cv	
L.OnCd.MetLC.Loc	cLv.cv.cv	cLv.cv.cv	cvL.cv.cv ~ cv.cvL.cv	cv.cvL.cv	–
L.OnCd.Loc	cLv.cv.cv	cvL.cv.cv	cvL.cv.cv ~ cv.cvL.cv	cv.cvL.cv	*Dialectal Spanish*
L.MetLC.Dist	cv.cLv.cv	cLv.cv.cv	cv.cv.cLv	cLv.cv.cv	–
L.MetLC.Loc	cv.cLv.cv	cLv.cv.cv	cv.cv.cLv	cv.cLv.cv	–

(51) L.OnOn.MetLC.Loc

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
	L		W
W	L		
	W	L	

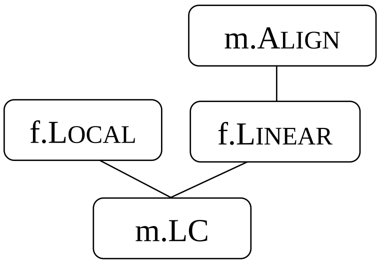
(52) Hasse L.OnOn.MetLC.Loc



(53) L.OnCd.Loc

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
	L		W
W		L	
	L	W	

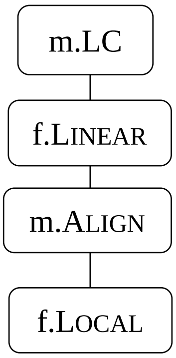
(54) Hasse L.OnCd.Loc



(55) L.MetLC.Dist

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
	W	L	
L		W	
W			L

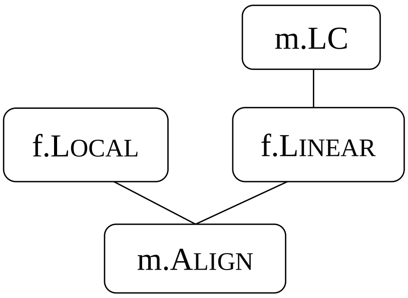
(56) L.MetLC.Dist



(57) SKB L.MetLC.Loc

m.ALIGN	m.LC	f.LINEAR	f.LOCAL
L			W
	W	L	
L		W	

(58) Hasse L.MetLC.Loc



3.6 Property Analysis of LDM typology

Based on the grammars, we can extract the intensional properties of the LDM typological system. Through an inspection of the grammars presented in the previous section, we notice that all cases in which metathesis affects non-initial CL regardless of the locality restrictions, i.e. L.OnOn.MetLC.Dist, L.OnOn.MetLC.Loc, L.OnCd.MetLC.Loc, L.OnOn.Dist, L.OnCd.Loc have the ranking m.ALIGN >> f.LINEAR. The opposite ranking is found in all grammars in which non-initial CL stay put (L.MetLC.Dist, L.MetLC.Loc, L.NoMet).

Furthermore, the ranking m.LC >> f.LINEAR holds in all grammars where metathesis from a pre-consonantal position takes place, i.e. L.OnOn.MetLC.Dist, L.OnOn.MetLC.Loc, L.OnCd.MetLC.Loc, L.MetLC.Dist, L.MetLC.Loc. f.LINEAR outranks m.LC in the remaining languages of the typology, L.OnOn.Dist, L.OnCd.Loc, and L.NoMet, i.e. those in which metathesis does not target LC.

When metathesis applies, the next question is whether locality restrictions are at play. In the languages where metathesis is local (L.OnOn.MetLC.Loc, L.OnCd.MetLC.Loc, L.OnCd.Loc), LOCAL outranks at least one of the m.constraints m.ALIGN and m.LC, i.e. the subordinate member of the class M (59). Reversely, M.sub dominates f.LOCAL in all languages where all metathesized L go all the way to the first onset, i.e. L.OnOn.MetLC.Dist and L.OnOn.Dist.

(59) Class M {m.ALIGN, m.LC}

Finally, languages in which the only marked structure that makes it to the surface is LC (L.OnCd.MetLC.Loc, L.OnO.Dist, L.OnCd.Loc) share the ranking m.ALIGN >> m.LC, whereas languages where only CL_2 survives (L.OnOn.MetLC.Loc, L.MetLC.Dist, L.MetLC.Loc) have the ranking m.LC >> m.ALIGN.

The above ranking conditions constitute the properties of the typological system and are summarized in (60):

(60) Properties of LDM typology

a. **METCL.yes/no**

m.ALIGN < > f.LINEAR	metathesis / no metathesis from CL
m.ALIGN >> f.LINEAR	metathesis from CL
f.LINEAR >> m.ALIGN	no metathesis from CL

b. **METLC.yes/no**

m.LC < > f.LINEAR	metathesis / no metathesis from LC
m.LC >> f.LINEAR	metathesis from LC
f.LINEAR >> m.LC	no metathesis from LC

c. **DISTANCE.Loc/Dist**

f.LOCAL < > M.sub	local / distal metathesis
f.LOCAL >> M.sub	local metathesis
M.sub >> f.LOCAL	distal metathesis

d. **M.LC/CL_2**

m.ALIGN < > m.LC	only LC/CL_2 survives albeit marked
m.ALIGN >> m.LC	only LC survives albeit marked
m.LC >> m.ALIGN	only CL_2 survives albeit marked

The property values each language in the typology possesses are given in (61) (value *a* in salmon pink, value *b* in light blue).

(61) Property analysis of LDM

	METCL yes/no	**METLC** yes/no	**DISTANCE** Loc/Dist	**M** LC/CL_2
L.OnOn.MetLC.Dist	*yes*	*yes*	*Dist*	*moot*
L.OnCd.MetCL.Loc	*yes*	*yes*	*Loc*	*LC*
L.OnOn.MetLC.Loc	*yes*	*yes*	*Loc*	*CL_2*
L.OnCd.Loc	*yes*	*no*	*Loc*	*LC*
L.OnOn.Dist	*yes*	*no*	*Dist*	*LC*
L.MetLC.Loc	*no*	*yes*	*Loc*	*CL_2*
L.MetLC.Dist	*no*	*yes*	*Dist*	*CL_2*
L.NoMet	*no*	*no*	*moot*	*moot*

Properties METCL.yes/no and METLC.yes/no are active in all grammars and act as metathesis triggers/blockers. METCL.yes/no classifies the grammars of the typology into those exhibiting metathesis from CL (METCL.yes) and those that do not (METCL./no). Similarly, METLC.yes/no separates the grammars allowing metathesis from LC (METLC.yes) and those blocking it (METLC.no).

The property DIST.Loc/Dist has narrow scope, as a prerequisite for it to be active is that the grammar has either METCL.yes or METLC.yes. If f.LINEAR dominates both m.ALIGN (METCL.no) and m.LC (METLC.no), then the position of f.LOCAL on the hierarchy, and in particular with respect to M.dom is not important. Simply put, if all metathesis processes are blocked, it is redundant to consider whether local or non-local movement would be preferred. Hence, DISTANCE.Loc/Dist is moot with respect to grammar L.NoMet (METCL.no and METLC.no).

Finally, the property M.LC/CL_2 does not have scope over the combinations (a) METCL.no, METLC.no and (b) METCL.yes, METLC.yes, DIST.Dist. These values are found in the grammars via which metathesis either fails to apply (L.NoMet) or eliminates both marked structures CL_2 and LC (L.OnOn.MetLC.Dist). The remaining grammars of the typology have some value for M.LC/CL_2. Interestingly, though, these values may be entailed by the values of other properties. Specifically, in grammars having simultaneously METCL.yes and METLC.no, i.e. m.ALIGN >> f.LINEAR and f.LINEAR >> m.LC (L.OnOn.Dist, L.OnCd.Loc), as well as in grammars having METCL.no and METLC.yes, i.e. m.LC >> f.LINEAR and f.LINEAR >>

m.ALIGN (L.MetLC.Dist and L.MetLC.Loc), the rankings m.ALIGN >> m.LC and m.LC >> m.ALIGN, respectively, are obtained by transitivity.

(62) Entailments

a.	METCL.yes *and* METLC.no m.ALIGN >> f.LINEAR >> m.LC	=>	M.LC m.ALIGN >> m.LC
b.	METCL.no *and* METLC.yes m.LC >> f.LINEAR >> m.ALIGN	=>	M.CL_2 m.LC >> m.ALIGN

The distinction m.CL_2 vs. m.LC is indispensable in grammars L.OnCd.MetCL.Loc and L.OnOn.MetLC.Loc. These grammars share all other property values, i.e. METCL.yes, METLC.yes, and DIST.Loc. The ranking between the m.constraints becomes crucial, because in each case LOCAL must dominate M.sub, which is not determined otherwise.

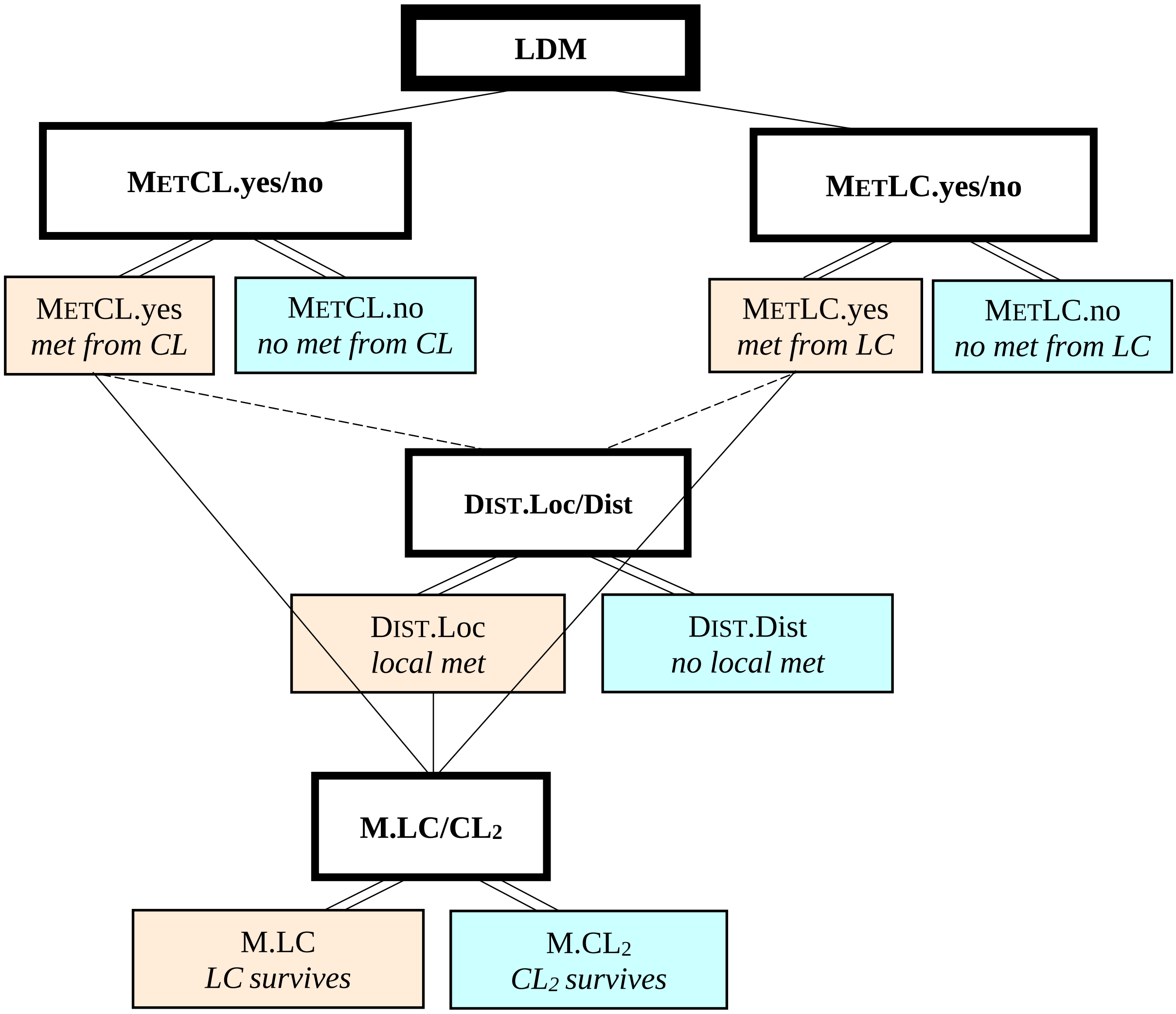
Removing the entailed values from the property analysis shapes the picture as follows:

(63) Property analysis of LDM; entailed values are removed

	METCL yes/no	**METLC yes/no**	**DISTANCE Loc/Dist**	**M LC/CL_2**
L.OnOn.MetLC.Dist	*yes*	*yes*	*Dist*	*moot*
L.OnCd.MetLC.Loc	*yes*	*yes*	*Loc*	*LC*
L.OnOn.MetLC.Loc	*yes*	*yes*	*Loc*	*CL_2*
L.OnCd.Loc	*yes*	*no*	*Loc*	*<LC>*
L.OnOn.Dist	*yes*	*no*	*Dist*	*<LC>*
L.MetLC.Loc	*no*	*yes*	*Loc*	*<CL_2>*
L.MetLC.Dist	*no*	*yes*	*Dist*	*<CL_2>*
L.NoMet	*no*	*no*	*moot*	*moot*

The scope of the above properties is illustrated by means of the property treeoid in (64). The two properties determining metathesis, i.e. METCL.yes/no and METLC.yes/no, have wide scope and thus constitute branches that are not c-commanded by any value. DISTANCE.Loc/Dist has disjunctive scope over *either* MetCL.yes *or* MetLC.yes (i.e. at least one property regulating metathesis must take the value *yes*). This disjunction is represented by dotted lines from the relevant values to the property (Bennett & DelBusso 2018). Furthermore, if the values METCL.yes, METLC.yes, and DISTANCE.Loc are chosen at the same time, then M.LC/CL$_2$ must be decided. In other words, M.LC/CL$_2$ has conjunctive scope (Danis 2014) over and thus should branch under METCL.yes *and* METLC.yes, *and* DISTANCE.Loc.

(64) Property treeoid of LDM typology; entailed values are removed

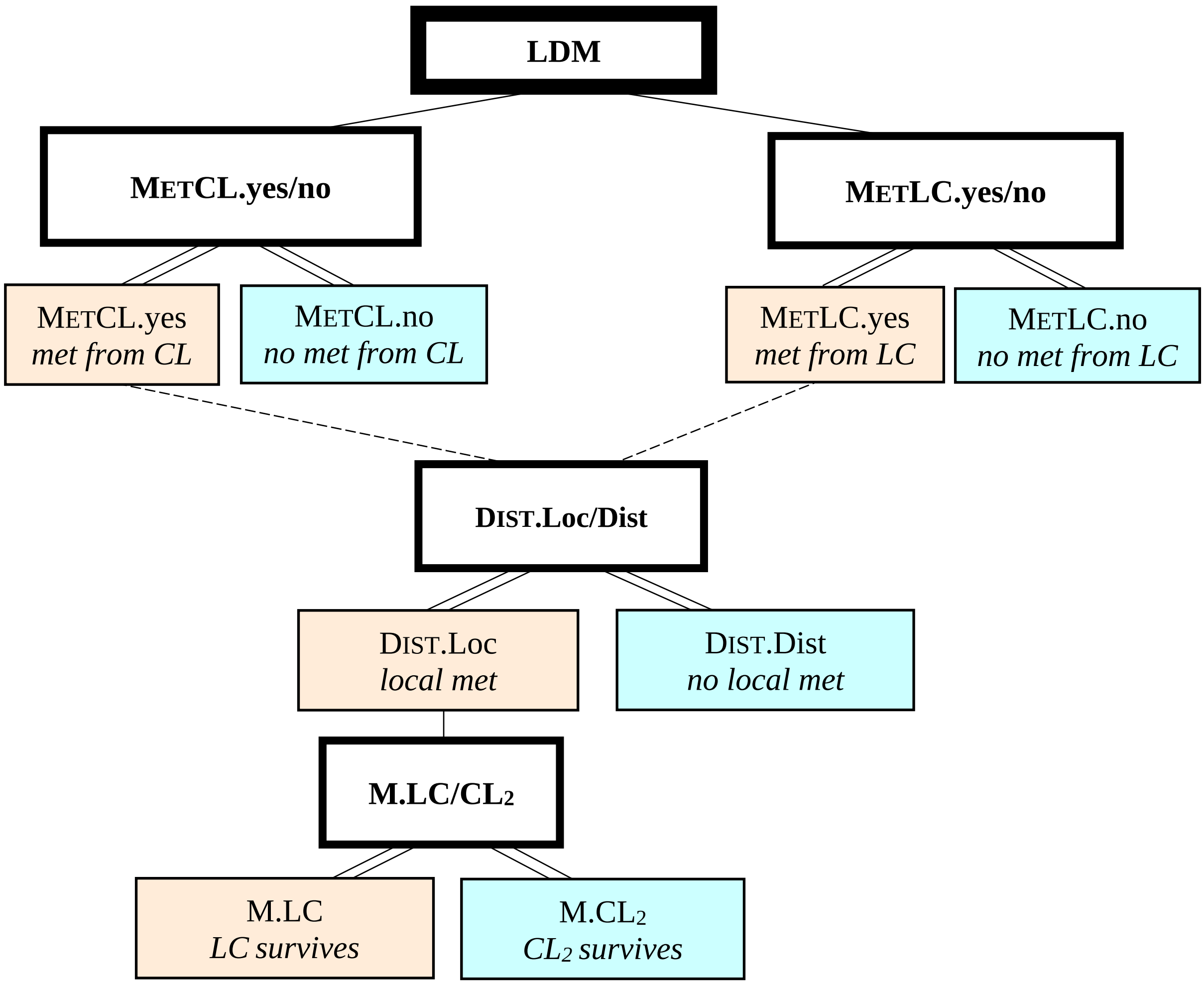


Alternatively, a formally cleaner picture is obtained if we retain the entailed values of M.LC/CL$_2$ for the grammars that take DISTANCE.Loc, i.e. L.OnCd.Loc and L.MetLC.Loc (65, in purple). Therefore, the value of M.LC/CL$_2$ is no longer choosable under the triple conjunction METCL.yes & METLC.yes & DISTANCE.Loc; instead, now M.LC/CL$_2$ falls neatly under DISTANCE.Loc (66).

(65) Property analysis of LDM; entailed values under DISTANCE.Loc are retained

	MetCL yes/no	**MetLC** yes/no	**Distance** Loc/Dist	**M** LC/CL_2
L.OnOn.MetLC.Dist	*yes*	*yes*	*Dist*	*moot*
L.OnCd.MetLC.Loc	*yes*	*yes*	*Loc*	*LC*
L.OnOn.MetLC.Loc	*yes*	*yes*	*Loc*	*CL_2*
L.OnCd.Loc	*yes*	*no*	*Loc*	*<LC>*
L.OnOn.Dist	*yes*	*no*	*Dist*	*<LC>*
L.MetLC.Loc	*no*	*yes*	*Loc*	*<CL_2>*
L.MetLC.Dist	*no*	*yes*	*Dist*	*<CL_2>*
L.NoMet	*no*	*no*	*moot*	*moot*

(66) Property treeoid of LDM typology; entailed values under DISTANCE.Loc are retained



4. Language change

Based on the hypotheses of Property Theory, diachronic change can be explained by means of minimal switches in the property values (Alber 2015; Alber & Meneguzzo 2016; DelBusso 2018; Apostolopoulou 2021). In other words, historically adjacent grammars differ with respect to just one property value. According to my proposal (cf. Alber 2015), which is outlined in chapter 4, section 1.2, switching from a value to mootness and vice versa ensues from the reversion of a different property and does not count for minimality.

In the LDM typology, the property DIST.Loc/Dist comes into play on condition that at least one of the wide-scope properties MetCL.yes/no and MetLC.yes/no are set to value *yes* so that metathesis from some environment is allowed. Hence, DIST.Loc/Dist is moot with respect to L.NoMet, where the values METCL.no and METLC.no hold, ensuring that metathesis is blocked altogether. In the diachronic dimension, speakers of a L.NoMet language, such as Latin or MedG, acquire a value for DIST.Loc/Dist once at least one of the above property values is reset to *yes* via minimal change.

4.1 Diachronic changes in LDM languages

Let's first examine the change from L.NoMet to L.OnOn.Dist, e.g. from Latin to Tertenian Sardinian or Gascon, or from MedG to IG. The most recent of the two historical stages continued allowing LC, but ceased to admit medial CL. Therefore, the crucial switch from METCL.no to METCL.yes that signalled the change to L.OnOn.Dist. As medial CL were no longer tolerated, LDM stepped in to amend them by moving L leftwards. In turn, the previously moot property DIST.yes/no got the value DIST.no, thus allowing the L to move as far as required to be perfectly aligned with the left edge of the root. M.LC (m.ALIGN >> m.LC) is implied by METCL.yes (m.ALIGN >> f.LINEAR) and METLC.no (f.LINEAR >> m.LC). Provided that minimality is not compromised by changes from mootness to value, the property analysis predicts that a direct change from L.NoMet to L.OnOn.Dist is possible.

However, the property analysis predicts that metathesis cannot target both onsets and codas simultaneously, as this involves two resets: both METCL.no and METLC.no must switch to value *yes*. Thus, the passage from L.NoMet to L.OnOn.MetLC.Dist cannot represent a minimal diachronic step. However, we can put forth that the minimality can be retained if we assume that an intermediate stage corresponding to L.OnOn.Dist occurred between L.NoMet and L.OnOn.MetLC.Dist. We notice that L.OnOn.Dist and L.OnOn.MetLC.Dist have the value Dist.Dist in common and M.LC/CL_2 is moot in L.OnOn.MetLC.Dist. Therefore, it only takes a switch from MetLC.no to MetLC.yes so that a new stage arises. This assumption finds empirical support in the diachrony of Sardinian. Presumably, certain varieties preserved codas, e.g. Tertenian, while others took a further step and moved them to the first onset, e.g. Campidanian. The latter metathesis type is arguably the most recent to have targeted Sardinian (Lai 2013; see also Alber 2001; Lai 2015 for similar synchronic metathesis in Campidanian). The same holds for S. Italo-Romance dialects.

(67) L.NoMet > L.OnOn.Dist > L.OnOn.MetLC.Dist

	MetCL **yes/no**	**MetLC** **yes/no**	**Distance** **Loc/Dist**	**M** **LC/CL_2**
L.NoMet *Latin* *MedG*	***no***	*no*	*moot*	*moot*
L.OnOn.Dist *Tertenian* *Gascon* *S. Italo-Romance (a)* *IG*	***yes***	***no***	*Dist*	*<LC>*
L.OnOn.MetLC.Dist *Campidanian* *S. Italo-Romance (b)*	*yes*	***yes***	*Dist*	*moot*

Along the same lines, a liaison between L.NoMet and L.OnOn.MetLC.Loc, e.g. Latin to Judeo-Spanish, could be assumed so that diachronic change can proceed in a stepwise manner. An option could be a language displaying metathesis only from a coda to the onset of the same syllable – in other words, a grammar with the property values MetCL.no, MetLC.yes, Dist.Loc, M.CL_2. This pattern is indeed reported for dialectal Spanish, as we saw in chapter 3 (Lipski 1990; Russell-Webb & Bradley 2009) (relevant data are repeated here for convenience), and it is included in the typology, i.e. language L.MetLC.Loc.

(68) Dialectal Spanish (L.MetLC.Loc)

a.	abracar	<	abarcar	‘to cover, take on’
b.	pedrenal	<	pedernal	‘flint’

L.OnOn.MetLC.Loc varies minimally with both L.NoMet and L.MetLC.Loc. Thus, the change from L.NoMet to L.MetLC.Loc is achieved via resetting MetLC.no to MetLC.yes, which called for the acquisition of Dist.Loc and entailed M.LC/CL$_2$. Later, MetCL.no switched to MetCL.yes, thus giving rise to L.OnOn.MetLC.Loc. The value M.CL$_2$ is carried from the previous stage, yet it becomes crucial in the new stage, since the ranking *LC >> Align can no longer be entailed.

(69) L.NoMet > L.MetLC.Loc > L.OnOn.MetLC.Loc

	MetCL yes/no	**MetLC yes/no**	**Distance Loc/Dist**	**M LC/CL$_2$**
L.NoMet *Old Spanish*	*no*	***no***	*moot*	*moot*
L.MetLC.Loc *Dialectal Spanish*	***no***	***yes***	*Loc*	*<CL$_2$>*
L.OnOn.MetLC.Loc *Judeo-Spanish*	***yes***	*yes*	*Loc*	*CL$_2$*

Hypothetically, alternative evolution chains could be posited. For instance, L.MetLC.Loc and L.OnOn.MetLC.Loc could serve as intermediate stages between L.NoMet and L.OnOn.MetLC.Dist (Table 68). In this scenario, codas first move locally to an onset (L.NoMet > L.MetLC.Loc), onsets follow (L.MetLC.Loc > L.OnOn.MetLC.Loc), and, as last step, the locality restrictions are lifted (L.OnOn.MetLC.Loc > L.OnOn.MetLC.Dist).[9]

[9] The impression that locality restrictions are lifted could also result via Lexicon Optimization. It is possible that the innovative forms of a certain stage replace the previous forms in the lexicon and be transmitted to the next generation as such. Thus, L may continue moving leftwards in a stepwise fashion, until it reaches the first onset.

(70) L.NoMet > L.MetLC.Loc > L.OnOn.MetLC.Loc > L.OnOn.MetLC.Dist

	METCL **yes/no**	**METLC** **yes/no**	**DISTANCE** **Loc/Dist**	**M** **LC/CL_2**
L.NoMet *Latin*	*no*	***no***	*moot*	*moot*
L.MetLC.Loc *(undocumented in Sardinian)*	***no***	***yes***	*Loc*	*<CL_2>*
L.OnOn.MetLC.Loc *(undocumented in Sardinian)*	***yes***	*yes*	***Loc***	*CL_2*
L.OnOn.MetLC.Dist *Campidanian*	*yes*	*yes*	***Dist***	*moot*

The unattested languages predicted by the factorial typology could also have constituted possible linking stages between L.NoMet and the attested LDM languages. For instance, L.OnOn.MetLC.Dist, where all Ls travel to the leftmost onset, could have been predated by the unattested language type identified as L.MetLC.Dist, where only LC is affected (Table 71). Unlike the changes described in Table (67) above, where METCL.no is reset to METCL.yes first, and the switch from METLC.no to METLC.yes follows, here changes happen in the reversed order:

(71) L.NoMet > L.MetLC.Dist > L.OnOn.MetLC.Dist

	METCL **yes/no**	**METLC** **yes/no**	**DISTANCE** **Loc/Dist**	**M** **LC/CL_2**
L.NoMet *Latin*	*no*	***no***	*moot*	*moot*
L.MetLC.Dist *undocumented*	***no***	***yes***	*Dist*	*<CL_2>*
L.OnOn.MetLC.Dist *Campidanian*	***yes***	*yes*	*Dist*	*moot*

The remaining two unattested types L.OnCd.Loc and L.OnCd.MetLC.Loc could potentially participate in a chain leading to L.OnOn.MetLC.Loc (Alguerese, Judeo-Spanish, N. Italo-Romance) (72). First, the change from MetCL.no to MetCL.yes (L.NoMet > L.OnCd.Loc) paves the way for LDM from CL. At the same time, the grammar receives the property value Dist.Loc (and, via entailment, M.LC). The value change from MetLC.no to MetLC.yes that defines the next step, i.e. L.OnCd.MetLC.Loc > L.OnCd.Loc, allows metathesis from LC to rise. However, given that Dist.Loc and M.LC retain their values, metathesis affects only the first coda, as there lacks a licit hosting site for the second one. In this stage M.LC is not simply entailed by other rankings in L.OnCd.Loc and its resetting to M.CL_2 is what demarcates the new stage L.OnOn.MetLC.Loc. As a result, L in the third onset and the second coda gets permission to move to the second onset.

(72) L.NoMet **>** L.OnCd.MetLC.Loc > L.OnCd.Loc > L.OnOn.MetLC.Loc

	MetCL **yes/no**	**MetLC** **yes/no**	**Distance** **Loc/Dist**	**M** **LC/CL_2**
L.NoMet *Latin*	***no***	*no*	*moot*	*moot*
L.OnCd.MetLC.Loc *undocumented*	***yes***	***no***	*Loc*	*<LC>*
L.OnCd.Loc *undocumented*	*yes*	***yes***	*Loc*	***LC***
L.OnOn.MetLC.Loc *Alguerese* *Judeo-Spanish* *N. Italo-Romance*	*yes*	*yes*	*Loc*	***CL_2***

Even though the hypothetical stages represented by L.OnCd.Loc and L.OnCd.MetLC.Loc are undocumented or represented by isolated examples that by no means support a strong claim about their existence, the assumed path is plausible. The changes advance in a minimal fashion and the empirical picture is reasonable: at first only some Ls move, in particular those that stand close to the left edge but are not perfectly aligned with it; then more follow, always with forward directionality. Further research could perhaps unearth evidence pointing at the existence of the currently undocumented languages as transient patterns that occurred between robustly attested languages.

Assuming that the selected outputs of each stage serve as inputs for the next one, in the chains described above language gradually becomes less faithful to the original pattern. To the contrary, hypothetical evolutionary paths involving progressive changes from less to more faithful languages are invisible. In theory, properties are free to shift to the opposite value, thus reversing the directionality of change. However, as mentioned above, each stage may lexicalize the innovative outputs of the previous stage. In this case, the synchronic forms are opaque with respect to their predecessors, which are no longer recoverable, unless morphophonological alternations preserve the visibility of the metathetic processes (Alber 2015). For example, it is possible that, once the transition from L.OnOn.Dist to L.OnOn.MetLC.Dist was complete, inputs with medial CL and with LC probably ceased to exist. By this logic, it is hard to detect whether and when grammar becomes faithful again, given that the inputs which would be able to serve as a reference point have already been eliminated. Nevertheless, backward directionality of change is not impossible, as new material can be provided by loanwords containing structures that could constitute new targets of metathesis.

4.2 The convergence with Romance

The activation of LDM is one of the major points of divergence between MedG and IG. MedG and all modern Greek dialects, with the unclear exception of Heptanesian, fall in the type L.NoMet. The grammars of IG, on the one hand, and of most versions of Greek outside Italy, on the other hand, vary minimally with respect to the value of METCL.yes/no. MedG and its other descendants have METCL.no and IG has METCL.yes, crucially grouping together with languages of the Romance family. The table below exemplifies minimal variation:

(73) MedG & Greek outside Italy vs. IG & Romance

	METCL yes/no	METLC yes/no	DISTANCE Loc/Dist	M LC/CL_2
L.NoMet *MedG* ——— *Standard, Cypriot,…*	***no***	*no*	*moot*	*moot*
L.OnOn.(MetLC).Dist *IG (+Heptanese)* ——— *Romance*	***yes***	*(some value)*	*(some value)*	*(some value)*

Moreover, IG is closer to S. Italo-Romance than N. Italo-Romance and Ibero-Romance, based on the value of DIST.Loc/Dist:

(74) MedG & Greek outside Italy vs. IG & Romance

	METCL yes/no	METLC yes/no	DISTANCE Loc/Dist	M LC/CL_2
L.OnOn.(MetLC).Dist *IG (+Heptanese)* ——— *S. Italo-Romance*	*yes*	*(some value)*	***Dist***	*(some value)*
L.OnOn.MetLC.Loc *Alguerese Catalan* ——— *Judeo-Spanish* ——— *N. Italo-Romance*	*yes*	*yes*	***Loc***	*CL_2*

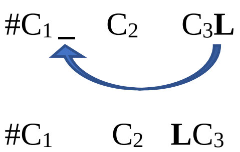
These findings dictate that contact has played a critical role not only in the deviation of IG from Greek, i.e. the change from a non-metathetic to an LDM language, but also the exact position IG occupied in the LDM universe. IG namely resembles the S. Italo-Romance dialects, which have surrounded it for centuries, rather than N. Italo-Romance and, even more, Ibero-Romance, with which contact is likely to have been limited or inexistent.

Take-home message

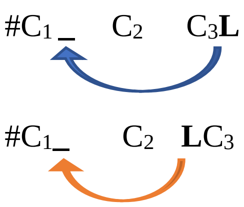
- This chapter offers a property analysis (Alber & Prince 2015, in prep.) of the typology of long-distance metathesis of liquids (LDM).
  - In the diachrony of a number of Romance languages and of IG, post-consonantal liquids (i.e. in a CL configuration) are displaced to the left, into a novel post-consonantal position. This movement may be accompanied by leftward metathesis of pre-consonantal liquids (i.e. in a LC configuration). Metathesis may be distal, i.e. the liquid lands in the first onset, or local, i.e. the liquid skips just one vowel (V). The three cross-linguistically attested patterns are summarized in the figures below:

    Figure 1

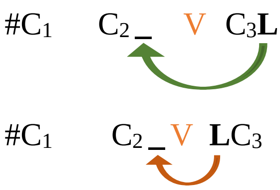
    a. LDM from medial CL to the first syllable; no metathesis from LC

    b. LDM from medial CL and metathesis from LC to the first syllable

    c. LDM from medial CL and LC; L skips over one V

  - The main premise is that prominent positions such as the leftmost onset of a word attract segmental material from medial positions. Liquids are exceptionally prone to metathesis (Ultan 1971). This hypothesis finds support in research exploring phonetic and perceptual factors underlying LDM.
  - Along these lines, it was maintained that the grammar of a language may be reconstructed so that certain marked structures, i.e. non-initial complex onsets (henceforth $CL_{2,3}$) or codas (henceforth LC), are avoided via local or distal metathesis.

- The LDM typology was generated on the basis of:
  - (a) LDM.Gen: input and output set consisted of input and output forms containing pre- and post-consonantal L in all possible positions.
  - (b) LDM.Con including two m.constraints, i.e. m.Align((Complex Onset, Left edge-root)) and m.LC, and two f.constraints in stringency relation, i.e. f.Linear(ity) and f.Local(ity).
  - The proposed m.Align is violated gradiently, i.e. it returns a violation for every syllable separating a complex onset from the first syllable.
  - The proposed f.Local is violated when L moves outside of its local domain, i.e. up to one nucleus away. The more stringent f.Linear is violated when L moves at all.
  - The two m.constraints, m.Align and m.LC form class M, which becomes relevant in the property analysis.
  - The crucial distinctions among grammars that were accounted for were:

    (a) Metathesis from onset vs. no metathesis from onset

    Property **MetCL.yes/no**: m.Align < > f.Linear

    (b) Metathesis from coda vs. no metathesis from coda

    Property **MetLC.yes/no**: m.LC < > f.Linear

    (c) Local / distal metathesis

    Property **Distance.Loc/Dist**: f.Local < > M.sub

    (d) Permitted LC only vs. permitted CL_2 only

    M.LC/CL_2: m.Align < > m.LC
  - The conjunction of MetCL.yes *and* MetLC.no entails M.LC and the conjunction of MetCL.no *and* MetLC.yes entails M.CL_2. Entailed values were removed from the property analysis.
  - Properties MetCL.yes/no and MetLC.yes/no have wide scope. Property Distance.Loc/Dist has disjunctive scope under *either* MetCL.yes *or* MetLC.yes. Property M.LC/CL_2 has conjunctive scope under MetCL.yes *and* MetLC.yes *and* Distance.Loc.
  - Eight grammars were distinguished. The property values defining each grammar were:

L.OnOn.MetLC.Dist	distal metathesis from both $CL_{2,3}$ and LC MetCL.yes, MetLC.yes, Distance.Dist
L.OnCd.MetLC.Loc	local metathesis from both $CL_{2,3}$ and LC; LC allowed MetCL.yes, MetLC.yes, Distance.Loc, M.LC

L.OnOn.MetLC.Loc	local metathesis from both $CL_{2,3}$ and LC; CL_2 allowed METCL.yes, METLC.yes, DISTANCE.Loc, M.CL_2
L.OnCd.Loc	local metathesis from $CL_{2,3}$ METCL.yes, METLC.no, DISTANCE.Loc
L.OnOn.Dist	distal metathesis from $CL_{2,3}$ METCL.yes, METLC.no, DISTANCE.Dist
L.MetLC.Loc	local metathesis from LC METCL.no, METLC.yes, DISTANCE.Loc
L.MetLC.Dist	distal metathesis from LC METCL.no, METLC.yes, DISTANCE.Dist
L.NoMet	no metathesis METCL.no, METLC.no

- The historical path throughout the several stages of IG as well as Romance languages displaying metathesis was reconstructed in terms of stepwise minimal re-sets in the property values of the LDM typology.
  - It was shown that metathesis can start independently from onset (METCL.no → METCL.yes) or from coda (METLC.no → METLC.yes). The value of property DISTANCE (which is moot if both METCL.no and METLC.no hold) is then decided; however, this does not constitute an additional change.
  - So far unattested languages were taken to constitute possible intermediate stages between attested languages.

- The role of contact in the historical changes IG grammar has undergone was highlighted. IG was shown to converge with the Italo-Romance grammatical system with respect to where a complex onset may be positioned in the word, rather than retaining characteristics of the Greek dialectal group.

CHAPTER 6

OT analysis of IG clusters

Chapter 4 addressed the changes IG codas underwent in terms of Place of Articulation (PoA) and Manner of Articulation (MoA) features from an abstract, context-free point of view. Diachronic change resulted in a progressive decrease of the markedness degree of the coda, through unmarked values for PoA in combination with MoA specification implying higher sonority. Similarly, chapter 5 offered a bird's eye view on the Long-Distance Metathesis (LDM) phenomena without taking into consideration language-specific idiosyncrasies that may motivate deviations from the main pattern.

This chapter delves into the same phenomena within specific phonological contexts rather than from a typological perspective. Depending on the phonological environment, certain clusters in certain varieties deviate from the general pattern determined on the basis of the type the grammar belongs to. The most important points of divergence are summarized in Table (1).[1]

(1) Broad patterns and peculiarities

<table>
<tr><th></th><th>general pattern</th><th>peculiarities</th></tr>
<tr><td rowspan="2">MedG</td><td>all PoA in the coda</td><td>[lC] (note that /l/ is also [dor]) are avoided via transformation to [rC]</td></tr>
<tr><td>- stops in the coda are avoided via spirantization
- fricatives allowed</td><td>- fricatives avoided via despirantization before /s/ (assuming [O.s])
- /θ/ is deleted before /s/ and stridentized before /t/</td></tr>
<tr><td rowspan="2">MedG
&
IG</td><td>labial-labial is avoided</td><td>[mO$_{[lab]}$] is allowed</td></tr>
<tr><td>cooccurring continuants are avoided via dissimilation or [t] intrusion</td><td>- /sf/ and /rf/ are not dissimilated (but /sf/ → [sp] in CIG)
- cooccurring continuants ([Cs]) emerge in Pre-SIG, Early SIG, Martano SIG</td></tr>
</table>

[1] Recall that 'C' denotes consonants; 'O' denotes non-strident obstruents; 'S' denotes sibilants; 'N' denotes nasals; 'L' denotes liquids. Note also that the abbreviations *k* '[dorsal, peripheral]', *p* '[per]', *t* '[P(lace)N(ode)]' / '[–son –cont –str]', *θ* '[–son +cont –str], and *s* '[+str] or [+son]' used in chapter 4 are not employed in this chapter.

MedG & *IG*	heterosyllabic clusters ([O.O], [s.C]; also [O.N] in SIG) agree with respect to [±voice], the reference point being the onset	voiceless post-nasal O emerge in SIG
IG	LDM from medial OL to first syllable (onset) of the root	neither LDM nor alternative movement - if the first syllable starts with (a) vowel, (b) sonorant, (c) coronal - if there is another L in the root - if the L goes outside the root
	dorsals and labials are gradually eliminated in the coda via PoA shift or metathesis	rare alternatives are found, especially in On (V insertion, liquidization of /n/)
	shift towards more marked values is forbidden	- /vɣ/ may shift to [gg] - /n/ shifts to labial or velar before the respective onsets - coronal O before /m/ turn to [m] (instead of [z]) in Galliciano CIG
	shifting O remain O	PoA shift to coronals results in [r] in SIG+
	coronals don’t undergo PoA shifts	/n/ always agrees with respect to PoA with the following onset
	if coda is marked with respect to PoA, change targets the coda	in /ln/, it is the onset (/n/) that changes
	stridents do not change MoA in the coda	/sk/ is palatalized before front vowels
	/rC/ clusters are preserved	/rn/ may change to [rr]
	/nC$_{[-\text{cont}]}$/ clusters are preserved	/n/ may be absorbed by following stop in SIG
	sonority may rise in syllable contact ([O.N], [z.m])	/sm/ is realized as [m.m] in Galliciano CIG

Gallic. *&* *Rogh.* *CIG*	marked PoA in the coda is avoided via metathesis	- metathesis is visible only in OS (plus, /sk/ is palatalized); codas in all other clusters shift - derived OS may also shift
Bova *CIG,* *Rogh.* *CIG*	dorsal and labial O become sibilants (Bova) or non-strident continuant coronals (Roghudi) before a coronal onset	voiced /Od/ turn to a geminate [dd]; [zd] and [ðd] are phonotactically impossible

Recall that the representations I assume for consonants in IG are the following (see chapters 2 and 4):

- Dorsals are [per(ipheral), dor(sal)]; Labials are [per]; Coronals are bare [P(lace)N(ode)]
- /l/ has [dor] specification
- Plosives are [–son(orant], –cont(inuant), –str(ident)]; non-strident fricatives are referred to as fricatives and are [–son, +cont, –str]; sibilants are [+str]; sonorants are [+son]
- Affricates are [–cont, +str]
- /r/ is [+cont]; the continuancy of other sonorants is not crucial
- (Surface) geminates correspond to two different roots at the underlying level. The underlying consonants may be identical or different.

The analysis is framed within OT. The main goal is to establish more detailed rankings holding in each variety and to identify the ranking conditions under which each of the several possible outputs of certain input clusters arises. Free variation is understood in the spirit of Anttila's (1997) model. Alternative approaches along the lines of equal ranking (Crowhurst 2001; Crowhurst and Michael 2005; Topintzi 2005) are not discussed here.

Section 1 outlines the sonority requirements that distinguish tautosyllabic from heterosyllabic clusters and introduces an expanded set of constraints I call IG.Con for brevity. In turn, sections 2–8 discuss types of consonant clusters by taking into consideration all attested contexts. More specifically, section 2 investigates obstruent–liquid (OL) clusters with special emphasis on LDM and, crucially, its underapplication in particular environments. Section 3 analyzes the manifestation of obstruent–sibilant (OS) clusters in each IG variety. Section 4 examines the less variable SO clusters. Section 5 proceeds with the non-strident obstruent clusters (OO), which evolve differently depending on the variety. The variation emerging in consonant–nasal (CN) clusters is analyzed in section 6. Then, nasal–obstruent (section 7) and liquid–obstruent (section 8) sequences are accounted for. Finally, sections 9 and 10 deal with codas (or rather non-onsets) in the periphery of words. Specifically, word-initial heterosyllabic clusters are examined in section 9, and section 10 is devoted to the analysis of word-final codas, which have ceased to emerge, yet their traces can still be visible in certain sandhi contexts.

1. Heterosyllabic vs. tautosyllabic clusters and IG.CON

Similarly to most languages, IG's least sonorous consonantal segments are the plosives, followed by non-strident fricatives. Sibilants outperform all other obstruents with respect to sonority, yet they still stand below sonorants in the hierarchy. Within the latter category, liquids occupy the highest step, above nasals. The proposed sonority hierarchy is summarized below (repeated from chapter 2):

(2) Sonority Hierarchy in IG

0	0.5	1	2	3
O[–cont]	O[+cont]	S	N	L

The Minimum Sonority Distance (MSD; Vennemann 1972; Steriade 1982; Selkirk 1984; Zec 1995, 2007; Parker 2002, 2011; cf. Clements 1990) for a biconsonantal cluster to form a complex onset in IG is +2.5. This requirement is fulfilled exclusively by OL clusters. All clusters that do not reach the MSD are syllabified as coda–onset, even at the cost of principles of Syllable Contact (SylCont; Hooper 1976; Murray & Vennemann 1983; Davis 1998; Vennemann 1988; Clements 1990; Gouskova 2001, 2004). The profile of the attested IG clusters is presented below:

(3) Sonority Distance of clusters in IG

a.	$LO_{[-cont]}$	–3	*good SylCont (sonority either falls or remains flat)*
b.	$LO_{[+cont]}$	–2.5	
c.	LS	–2	
d.	$NO_{[-cont]}$	–2	
e.	$NO_{[+cont]}$	–1.5	
f.	LN	–1	
g.	$SO_{[-cont]}$	–1	
h.	$SO_{[+cont]}$	–0.5	
i.	$O_{[+cont]}O_{[-cont]}$	–0.5	
j.	$C_{\alpha}C_{\alpha}$	0	
k.	$O_{[+cont]}S$	+0.5	*poor SylCont (sonority rises)*
l.	$O_{[-cont]}S$	+1	
m.	SN	+1	
n.	$O_{[+cont]}N$	+1.5	
o.	$O_{[-cont]}N$	+2	
p.	$O_{[+cont]}L$	+2.5	*MSD met (sonority rises steeply)*
q.	$O_{[-cont]}L$	+3	

(4) Summary of SD of clusters in IG

a.	OL	2.5 to 3	tautosyllabic
b.	CN	–1 to +2	heterosyllabic
c.	CS	0.5 to 1	
d.	CO	–0.5 to –3	
e.	$C_{\alpha}C_{\alpha}$	0	

MSD and SylCont have been formalized as OT constraints in stringency relation (5) (see Krämer 2000; Gouskova 2001, 2004; Alber & Meneguzzo 2016, a.o.).

(5) a. MSD(x) — Assign a violation for every cluster of sonority distance lower than *x* that is parsed into a complex onset

i. MSD(+3.5) — - *violated by all tautosyllabic onset clusters (.OL, .ON, .SN, .OS, .$C_{\alpha}C_{\alpha}$, .SC, .NC, .LC)*

ii. MSD(+2.5) - *violated by .ON, .SN, .OS, .*$C_\alpha C_\alpha$*, .SC, .NC, .LC*
- *satisfied by .OL*

iii. MSD(+1.5) - *violated by .SN, .OS, .*$C_\alpha C_\alpha$*, .SC, .NC, .LC*
- *satisfied by .OL, .ON*

… …

iv. MSD(–3) - *satisfied by all tautosyllabic onset clusters*
(.OL, .ON, .SN, .OS, .$C_\alpha C_\alpha$*, .SC, .NC, .LC)*

b. SYLCONT(y) Assign a violation for every syllable border across which sonority distance is higher than *y*

i. SYLCONT(+3) - *satisfied by all heterosyllabic clusters*
(O.L, O.N, S.N, O.S, $C_\alpha.C_\alpha$*, S.C, N.C, L.C)*

ii. SYLCONT(+2) - *violated by O.L*
- *satisfied by O.N, S.N, O.S,* $C_\alpha.C_\alpha$*, S.C, N.C, L.C*

iii. SYLCONT(+1) - *violated by O.L, ON*
- *satisfied by S.N, O.S,* $C_\alpha.C_\alpha$*, S.C, N.C, L.C*

… …

iii. SYLCONT(–3.5) - *satisfied by all heterosyllabic clusters*
(O.L, O.N, S.N, O.S, $C_\alpha.C_\alpha$*, S.C, N.C, L.C)*

In order for all but /OL/ clusters to be parsed as coda–onset, the ranking SYLCONT(+2) >> MSD(+2.5), MSD(+3), MSD(+3.5) >> SYLCONT(+1.5), SYLCONT(*z*) (where *z* < 1.5) must hold (summarized in 6). Specifically, the MSD constraints disallowing complex onsets of SD ≤ +2.5 (henceforth collectively MSD(≤+2.5)) must be outranked by SYLCONT(2), so that /OL/ → [.OL] wins over /OL/ → [O.L] in all cases, i.e. $O_{[+cont]}$L (SD = +2.5) and $O_{[-cont]}$L (SD = +3). At the same time, MSD(≤2.5) must dominate all SYLCONT constraints penalizing SD ≤ +1.5 across syllable boundaries (henceforth collectively SYLCONT(≤+1.5)) so that any cluster displaying SD ≤ +2, i.e. /SL/ and below, is syllabified as coda–onset. The exact ranking of the remaining constraints, i.e. MSD(≤+2) and SYLCONT(≥+2), is not crucial.

(6) Ranking of MSD and SYLCONT constraints in IG
SYLCONT(2) >> MSD(≥+2.5) >> SYLCONT(≤+1.5)

Tableau (7) offers an overview of the syllabification of phonotactically possible clusters in IG. Violation marks in parentheses indicate violations of a subset of the constraints incurred by a subset of the clusters at hand.[2]

(7) Syllabification of biconsonantal clusters in IG

Input	*Output*	SYLCONT(+2)	MSD(≥+2.5)	SYLCONT(≤+1.5)
OL	a. .OL ☜		(*)	
	b. O.L	*!		*
CN	a. .CN		*!	
	b. C.N ☜			(*)
CS	a. .Cs		*!	
	b. C.s ☜			(*)
CO	a. .CO		*!	
	b. C.O ☜			(*)
$C_\alpha C_\alpha$	a. .$C_\alpha C_\alpha$		*!	
	b. $C_\alpha.C_\alpha$ ☜			(*)

The OT analysis looking at each phonological environment separately relies on the constraint sets employed for the context-free typological analyses, which include positional markedness constraints militating against the emergence of medial complex onsets and the presence of certain (combinations of) features in the coda, i.e. [dor], [per], [–cont], and [–son, –str], as well as faithfulness constraints preventing the deletion or insertion of PoA and MoA features or changes in linear order.

The constraints determining LDM of liquids, introduced in chapter 5, are repeated below (for further details on each constraint see chapter 5, section 3.2):

(8)	a.	ALIGN(Complex Onset, Left Edge-root) (henceforth ALIGN(CL, left))	Assign a violation for each syllable that separates a complex onset from the left edge of the root

[2] For instance, MSD(≥+2.5) covers the range of three constraints, i.e. MSD(+2.5), MSD(+3), MSD(+3.5). MSD(+2.5) is satisfied by all [.OL] clusters, MSD(+3) is violated by $O_{[+cont]}L$ (SD = +2.5), and MSD(+3.5) is violated by all [.OL]. In other words, *some* of the constraints that co-build MSD(≥+2.5) are violated by *some* of the candidates subsumed under [.OL].

	b.	LINEARITY	Assign a violation if the precedence relations in the input have not been preserved in the output
	c.	*LC	Assign a violation for every liquid that is syllabified in a pre-consonantal coda position
	d.	LOCALITY	Assign a violation if a segment in the output is realized outside its local domain in the input, i.e. farther than one nucleus away from its original position

The constraints relevant to PoA and MoA changes in the coda (introduced in chapter 4; for further details see chapter 4, sections 2.4.2 and 3.2.2) are presented in (9).

(9)	a.	*{[dor].[¬dor]}	Assign a violation for each consonant in the coda that is specified as [dor] and occurs before an onset not specified as [dor]
	b.	*{[dor].[¬dor], [per].[¬per]}	Assign a violation mark for each consonant in the coda that is either specified as [dor] and occurs before an onset not specified as [dor] or specified as [per] and occurs before an onset not specified as [per]
	c.	*[–cont].CODA (henceforth *STOP.CODA)	Assign a violation mark for every segment in a syllable coda that is specified as [–cont] (i.e. *stop*)

d.	*[–son, –str].CODA (henceforth *STOPFRIC.CODA)	Assign a violation mark for every segment in a syllable coda that is specified as [–str, –son] (i.e. *non-strident fricative*; henceforth *fricative*)
c.	MAX[place]	Assign a violation mark for every place feature ([per], [dor]) in the input that has no correspondent in the output
d.	DEP[place]	Assign a violation mark for every place feature ([per], [dor]) in the output that has no correspondent in the input

In the MoA typology I employed IDENT[±cont(inuant)] and a conflated IDENT constraint subsuming IDENT[±str(ident)] (Kenstowicz & Banskira 1999; Hall 2006) and IDENT[±son(orant)] (Kirchner 2000). Since this chapter is devoted to the examination of changes affecting codas in particular phonological contexts, the above constraints participate individually. Moreover, IDENT[±nas(al)] (McCarthy & Prince 1995; Kawahara 2006) and FAITH-LIQUID (Kang 2003) are added to the IG.CON.

(10)	a.	IDENT[±cont]	Assign a violation mark for each output segment that does not have the same specification for [±continuant] as the input correspondent
	b.	IDENT[±str]	Assign a violation mark for each output segment that does not have the same specification for [±strident] as the input correspondent
	c.	IDENT[±son]	Assign a violation mark for each output segment that does not have the same specification for [±sonorant] as the input correspondent

d. IDENT[±nas] — Assign a violation mark for each output segment that does not have the same specification for [±nasal] as the input correspondent

e. FAITH-LIQUID — Assign a violation mark for every underlying liquid that does not surface as a liquid in the output

Apart from the processes related to PoA and MoA features, IG codas have undergone changes in the feature [±voice]. In particular, heterosyllabic obstruent–obstruent and, after a certain point in SIG, obstruent–nasal clusters share a single value of voicing. Regressive assimilation amends codas that do not agree in voicing with the following onset. To capture this, I employ AGREE[voice] (Lombardi 1999) and IDENT[±voice] (Hale & Reiss 1998; Lombardi 1999; Kawahara 2006). Moreover, I attribute the directionality of assimilation to the positional faithfulness constraint IDENT-ONSET[±voice] (Lombardi 1999; Krämer 2000; Coetzee & Pater 2008).

(11) a. AGREE[voice] — Assign a violation mark for every obstruent cluster the members of which do not agree in the value of [±voice]

b. IDENT[±voice] — Assign a violation mark for each output segment that does not have the same specification for [±voice] as the input correspondent

c. IDENT-ONSET[±voice] — Segments in the onset have the same voice specification in input and output. Assign one violation mark for each segment in the onset which has a voice specification not identical to its input correspondent

Given the abundance of surface geminates in IG, the constraint *GEMINATE (Crosswhite 1998) must be low-ranked; however it occasionally plays a role in the selection of the optimum. A less stringent version of this constraint, which is assumed to be undominated in IG, is *VOICEDFRICATIVEGEMINATE.

(12)	a.	*GEMINATE	Assign a violation for every geminate (i.e. pair of adjacent identical consonants or long consonant)
	b.	*VOICEDFRICATIVEGEMINATE	Assign one violation mark for every voiced fricative geminate

An additional markedness constraint motivated by the observation that, since the MedG era, cooccurring continuants tend to be avoided, is OCP[+continuant]. One of the available avoidance strategies is the epenthesis of an intrusive stop, which violates DEP-C (McCarthy & Prince 1995). Other types of illicit clusters are repaired via vowel epenthesis, which is penalized by DEP-V (Orgun 2001), consonant deletion, which violates MAX-C, or coalescence of the two cluster members into one contour segment, which incurs a violation of UNIFORMITY (McCarthy & Prince 1995).

(13)	a.	OCP[+cont]	Assign a violation mark for every pair of adjacent segments specified as [+continuant]
	b.	DEP-C	Assign a violation mark for every consonant in the output that has no correspondent in the input
	c.	DEP-V	Assign a violation mark for every vowel in the output that has no correspondent in the input
	d.	MAX-C	Assign a violation mark for every consonant in the input that has no correspondent in the output
	e.	UNIFORMITY	Assign a violation mark for every element in the output that has multiple correspondents in the input (no coalescence)

More constraints pertaining to the analysis of particular clusters are introduced in due time throughout the chapter.

2. OL clusters and long-distance metathesis

The macroscopic typological analysis in chapter 5 showed that IG lines up with those languages that display (diachronically) unbounded LDM affecting medial post-consonantal liquids. The LDM pattern of IG arises by virtue of the constraint hierarchy ALIGN(CL, left) >> LINEARITY >> *LC >> LOCALITY. The ranking ALIGN(CL, left) >> LINEARITY acts as trigger of LDM from medial complex onsets. LINEARITY >> *LC ensures that pre-consonantal liquids stay put. LOCALITY is dominated by both markedness constraints, thus any limitations with respect to the distance a migrating liquid is allowed to travel are lifted. Thus, given an input containing a CL onset in the third syllable, e.g. /kapistri/ (Tableau 14), /r/ obligatorily moves all the way to the first syllable. i.e. [krapisti] (candidate d), at the expense of locality restrictions. By contrast, LDM that yields a non-initial complex onset, i.e. [kapristi] (candidate c), despite improving the markedness of the output while at the same time respecting locality restrictions, is equally bad as the faithful realization [kapistri] (candidate a), since both incur fatal violations of ALIGN(CL, left).[3] Moreover, the output exhibiting metathesis to a coda position ([karpisti], candidate c) fatally violates *LC. Note that stress is omitted in all tableaux to follow, as it is not pertinent to the analysis.

(14) LDM in IG

Input	*Output*	ALIGN(CL, left)	LINEARITY	*LC	LOCALITY
kapist**r**i	a. ka.pis.t**r**i	*!*			
	b. ka**r**.pis.ti		*	*!	
	c. ka.p**r**is.ti	*!	*		
	d. k**r**a.pis.ti ☜		*		*

Etymological codas, on the other hand (Tableau 15), do not need to move to an onset, as *LC is ranked below LINEARITY. Therefore, any output in which the linear order has been disrupted from the input to the output (candidate b) is eliminated. Hence, the faithful output [karpo]

[3] Note that from a language-specific point of view the assumption that ALIGN(OL, left) is violated gradiently seems redundant. The constraint in fact could be violated in a boolean manner or even be replaced by a COINCIDE or a LICENSE constraint. However, the typological analysis in chapter 5 showed that the typological distinction between IG and other LDM languages requires a gradiently violated ALIGN(OL, left).

(candidate a) wins, since, contrary to the case of derived codas, the violation of *LC is not fatal.

(15) Realization of etymological LC

Input	*Output*	ALIGN(CL, left)	LINEARITY	*LC
ka**r**po	a. ka**r**po ☜			*
	b. k**r**apo		*!	

A comprehensive analysis of LDM in IG should take into account the following considerations:

(a) the unsuitability of the root-initial syllable as a host for a migrating liquid in case it starts with a vowel, a sonorant (/m/, /n/, /l/), or a coronal obstruent (/t/, /d/, /s/, /t͡ʃ/, /t͡s/);

(b) the absence of movement to an alternative landing site (non-initial complex onset, coda) when LDM to the root-initial syllable is blocked by the factors outlined in (a).

Let's begin with (a) and, in particular, with the underapplication of LDM in roots starting with vowels, i.e. *exendra*, **rexenda* 'grass snake', despite the grammaticality of the outcome; recall that etymological root-initial liquids are attested in IG, e.g. ***r**ema* 'sea', ***l**adi* 'oil'. An obvious conclusion would be that there is a bias against innovative initial liquids. Another asymmetry calling for an explanation concerns certain $C_{[cor]}$L clusters.[4] Although configurations such as /tr/ and /dr/ are found in words bequeathed from MedG, e.g. *t**r**ipi* 'hole', *d**r**ako* 'dragon', the formation of new clusters is banished, i.e. *tav**r**i*, **t**r**avi*, *dak**r**i*, **d**r**aki*. In the same vein as earlier, we can posit that, although $C_{[cor]}$L onsets are allowed in IG, they cannot be derived. In order to explain these asymmetries, I employ $*_{PW[}$L (Bolognesi 1998) and OCP[cor] (Anttila 2008; Pater & Coetzee 2005), which is taken to operate exclusively within onsets.

(16)	a.	$*_{PW[}$L	Assign a violation for every word-initial liquid
	b.	OCP[cor]-ONSET	Assign a violation for every pair of adjacent coronal segments in a complex onset

[4] The feature [cor] is used in this section for clarity of presentation; recall that coronals were taken to be specified as [P(lace)N(ode)] (chapter 4 section 2.3).

Moreover, in spite of the occurrence of pre-consonantal rhotics, e.g. *xó**r**to*, *ka**r**pó* (for the laterals see section 8) and non-initial CL onsets, e.g. *sá**g**ripa, máv**r**o, múx**l**a, nef**r**ó*, these environments are not fitting as alternative docking sites; in other words, they are not derivable, e.g. *exend**r**a*, **e**r**xenda*, **ex**r**enda* (what Coffman 2013 called the "all-or-nothing-ness" of LDM). The restriction in the availability of a phonological context as a landing site for a migrating liquid is here formalized by means of OT constraints exploiting the function of *local conjunction* (Smolensky 1995; Lubowicz 2003). In a nutshell, when two constraints *A* and *B* are locally conjoined within a certain domain, then their conjunction *A&B* is violated by a candidate *x* iff both conjuncts are violated by *x*. The local conjunction must dominate both conjuncts in order to be active in a language, i.e., schematically, A&B >> {A, B}.dom. For the purposes of the present analysis, LINEARITY and the markedness constraint targeting each non-derivable structure are locally conjoined within the domain of the root. The local conjunctions are defined in (17). Each of them is ranked above both its conjuncts.

(17)	a.	LINEARITY&ALIGN(CL, left)	Assign a violation for every candidate in which the disruption of the linear order from the input to the output results in a complex onset that is not aligned with the left edge of the root
	b.	LINEARITY&*LC	Assign a violation for every candidate in which the disruption of the linear order from the input to the output results in a liquid syllabified in a pre-consonantal coda

Let's first examine the example illustrated in (18), where LDM from the third CL to the first, onsetless syllable fails to apply. In the absence of a suitable target environment in the root-initial syllable, the grammar can employ different strategies in order to avoid the non-initial CL. One option would be the leftward displacement of the rhotic to the second syllable (candidate c), so that one violation mark returned by ALIGN(CL, left) is spared. Alternatively, the liquid can form a simplex onset (candidate b) or move to a coda position (candidate d). All three outputs win over the faithful output (a) with respect to ALIGN(CL, left), yet they are not selected. What eliminates them from the race is LINEARITY&ALIGN(CL, left), $*_{PW[}$L, and

Linearity&*LC, respectively, which all rank higher than Align(CL, left) (there is no evidence that the ranking among the local conjunctions is crucial to the IG grammar, hence the broken lines). Moreover, the deletion of /r/ (candidate e) returns a fatal violation of Max-C.

(18) Underapplication of LDM in roots beginning with a vowel

Input	*Output*	Linear& Align(CL, left)	Linear&*LC	Max-C	$*_{PW[}L$	Align(CL, left)	Linear	*LC
exend**r**a	a. e.xen.d**r**a ☜					**		
	b. **r**e.xen.da				*!		*	
	c. e.x**r**en.da	*!				*	*	
	d. e**r**.xen.da		*!				*	*
	e. e.xen.dØa			*!				

Along the same lines, as illustrated in Tableau (19), the creation of innovative $C_{[cor]}L$ clusters is disallowed owing to the fact that the relevant output (candidate b), even though satisfying Align(CL, left), is fatally penalized by the high-ranked OCP[cor]-Onset. Candidate c loses due to the fatal violation it yields with respect to Linearity&*LC. Thus, the grammar favors the faithful (a), despite its containing a medial CL onset.

(19) Underapplication of LDM in roots beginning with a coronal

Input	*Output*	Linear &Align	Linear &*LC	Max-C	OCP [cor]	Align	Lin	*LC
ðak**r**i	a. ðak**r**i ☜					*		
	b. ð**r**aki				*!		*	
	c. ða**r**ki	*!					*	*

The faithful realization of etymological $_{PW[}L$ (20, candidate a) and $C_{[cor]}L$ clusters (21, candidate a) does not entail a fatal violation of $*_{PW[}L$ and OCP[cor]-Onset, respectively, as Max-C rules out the alternative repair strategy of deletion (20 and 21, candidates b).

(20) Realization of etymological #L

Input	*Output*	LINEAR &ALIGN	LINEAR &*LC	MAX-C	*$_{PW[}$L	ALIGN	LIN
rema	a. **r**ema ☜				*		
	b. Øema			*!			

(21) Realization of etymological C[cor]L onsets

Input	*Output*	LINEAR &ALIGN	LINEAR &*LC	MAX-C	OCP[cor]-ONS	ALIGN	LIN
ð**r**ako	a. ð**r**ako ☜				*		*
	b. ðØako			*!			
	c. ða**r**ko		*!				*
	d. ðak**r**o	*!				*	*

LDM is blocked in roots beginning with a sonorant, e.g. /m/ (22) (for the coronal /n/ see also 19 above). An undominated phonotactic constraint militating against NL clusters disqualifies candidates (b–c), i.e. both the tautosyllabic [.mr] (which would also violate MSD(+2.5), due to the shallow sonority slope between the two sonorants) and the heterosyllabic [m.r] (note that consonants are not possible nuclei). Candidate (d), which contains an innovative coda, is ruled out by the local conjunction LINEARITY&*LC. Therefore, the faithful candidate (a) wins.

(22) Underapplication of LDM in roots beginning with a sonorant

Input	*Output*	*NL	LINEAR&*LC	ALIGN(CL, left)	LINEAR	*LC
mavro	a. ma.v**r**o ☜			*		
	b. m**r**a.vo	*!			*	
	c. m.**r**a.vo				*	
	d. ma**r**.vo		*!		*	*

Let us now turn to the most understudied case, that is the immunity of intervocalic /tr/ to LDM, and, in addition, the cross-dialectal difference arising with respect to post-sibilant /tr/. Interestingly enough, /tr/ is classified among the clusters that may be affected by retroflexion in all dialects of the Extreme South, among which IG, and it is shown to sound more closely to [t^{ʂ}] and behave like an affricate (Romano 1999; Loporcaro 2001; Celata 2006; Romano &

Gambino 2010). In this vein, I postulate that under the influence of Romance, the IG /tr/ has become a complex segment, i.e. an inseparable unit, henceforth represented as *t͡r*, and, as such, it is not subject to the restrictions imposed on branching onsets (van de Weijer 1996). Therefore, these sequences do not violate ALIGN(CL, left), which means that LDM is not triggered. As illustrated in Tableau (24), an alternative syllabification of /t͡r/ as complex onset (candidate b) or displacement of /r/ (candidate c) incur a violation of ALIGN(CL, left) or LINEARITY, respectively. In addition, the high-ranked INTEGRITY (23; McCarthy & Prince 1995) is violated when /t͡r/ is not realized as one segment (candidates b–c).

(23) INTEGRITY — Assign a violation mark for each element of the input that has multiple correspondents in the output (no breaking)

(24) Non-splittable /t͡r/

Input	*Output*	INTEGRITY	ALIGN (CL, left)	LINEARITY
pet͡ra	a. pe.t͡ra ☜			
	b. pe.t**r**a	*!	*	
	c. p**r**e.ta	*!		

A puzzling issue, though, centres around medial /str/ sequences, which appear to be dealt with differently in the two IG dialects: in SIG, /tr/ does not split, whereas in CIG /r/ typically moves to the first onset. A possible solution to explain this difference could be to postulate that, retroflexion and, in turn, affrication of /tr/ was delayed in the context of /s/ in CIG, thus [.tr] continued violating ALIGN(CL, left). Hence, /r/ migrated to the initial syllable (25, candidate a) instead of staying put in a non-initial complex onset (candidate b) if ALIGN(CL, left) outranks LINEARITY. Fusing the two segments into one affricate [t͡r] (candidate c) violates UNIFORMITY (candidate c).

(25) Splittable /tr/ after a sibilant in CIG

Input	*Output*	UNIFORMITY	ALIGN (CL, left)	LINEARITY
past**r**iko	a. p**r**as.ti.ko ☜			*
	b. pas.t**r**i.ko		*!	
	c. pas.t͡ri.ko	*!		

On the other hand, in SIG, retroflexion of /tr/ took place early on in all phonological environments, including the sequences following /s/. As a result, /t͡r/ behaved like a non-splittable entity (26, candidate b) and not as a complex onset in all cases during the period when LDM was active. Re-splitting it (candidates a, c) is not viable, as INTEGRITY is violated.

(26) Non-splittable /t͡r/ after a sibilant in SIG

Input	*Output*	INTEGRITY	ALIGN(CL, left)	LINEARITY
pas͡tr iko	a. p**r**as.ti.ko	*!		*
	b. pas.t͡ri.ko ☜			
	c. pas.t**r**i.ko	*!	*	

Finally, I attribute the fact that /r/ does not skip over another liquid to an OCP effect involving non-adjacent elements (Boersma 1998; Rose 2000; Frisch et al. 2004; Asherov & Bat-El 2019). I assume that two liquids are not admissible in the same root, which is here formalized as OCP(LIQUID). In IG, the constraint is also locally conjoined with LINEARITY, i.e. LINEARITY&OCP(LIQUID).

(27)	a.	OCP(LIQUID)	Assign a violation for every output containing more than one liquid
	b.	LINEARITY&OCP(LIQUID)	Assign a violation for every candidate in which the linear order from the input to the output is disrupted and which contains more than one liquid

The conjunction is ranked above ALIGN(CL, left) (28). Therefore, roots containing two liquids eventually do appear in the language, but, crucially, the liquids always emerge in their etymological position, e.g. /xa**r**ad**r**a/ → [xa**r**ad**r**a] (candidate b). Moving an /r/ that is part of a medial complex onset to the first syllable (candidate a) in order for alignment to be improved is blocked due to the fatal violation of LINEARITY&OCP(LIQUID). Deleting one liquid, e.g. [xarada] (candidate a), is not viable either, as it incurs a fatal violation of MAX-C.

(28) Underapplication of LDM in roots containing two liquids

Input	*Output*	LINEAR &OCP(LIQ)	MAX-C	OCP (LIQ)	ALIGN (CL, left)	LINEAR
xa**r**ad**r**a	a. xa**r**adØa		*!			
	b. xa**r**ad**r**a ☜			*	*	
	c. x**r**a**r**ada	*!		*		*

3. OS clusters

The /Os/ environment, together with /Ot/, /Od/ and, partially, /On/, is of particular interest, as its manifestations vary greatly across the several historical and geographical varieties of IG. The attested forms corresponding to underlying OS clusters are presented in Table (29):[5]

[5] Recall that "SIG⁺" and "SIG⁺" refer to systems of SIG that generate less systematic variants alternating freely with the typical ones; "Roghudi/Galliciano CIG⁺" refers to the presumably most recent version of Roghudi and Galliciano CIG, where verbal forms display [ss] aside from [ʃʃ] and [sp] at morphological boundaries (see chapter 2, sections 3.4–3.5).

(29) Attested variants of OS in IG

IG varieties	/ks, xs, ɣs/	/ps, fs, vs/	/θs/
MedG	ks	ps	s
pre-SIG	xs	fs	s
Early SIG, Martano SIG	fs	fs	s
Early Sternatia SIG	fts	fts	s
Calimera/Sternatia SIG	t͡s	t͡s	s
Calimera SIG+	ss	ss	s
SIG+	rs	rs	s
SIG++	rts	rts	s
Bova CIG	t͡s	t͡s	s
Roghudi/Galliciano CIG	sk > ʃʃ	sp	s
Roghudi/Galliciano CIG+	ss	ss	s

In (Late) MedG,[6] marked PoA features such as [dor] and [per] are allowed due to the ranking MAX[pl], LINEARITY >> *{[dor].[¬dor]}, *{[dor].[¬dor], [per].[¬per]}.

(30) Absence of PoA changes in OS (MedG)

Input	*Output*	MAX[pl]	LINEAR	*{[dor].[¬dor]}	*{[dor].[¬dor], [per].[¬per]}
/ks/	a. ks ☜			*	*
	b. ps	*!*			*
	c. t͡s	*!*			
	d. sk		*!		
/ps/	a. ks			*!	*
	b. ps ☜				*
	c. t͡s	*!			
	d. sp		*!		

[6] The reader is reminded that "(Late) MedG" refers to the regional version of Greek spoken in the South-Italian territory, which eventually deviated from the common core and gave birth to the IG branch.

In general, MedG has the ranking *STOP.CODA >> IDENT[cont], which translates into stops spirantizing in the coda. Crucially, though, MedG is averse to adjacent continuants. In principle, MoA altering processes aim at creating $C_{[+cont]}C_{[–cont]}$ sequences (see section 5), which fare better with respect to syllable contact. However, MedG does not have a [–cont, +str] counterpart of /s/. Thus, dorsal and labial stops surface intact and fricatives despirantize before /s/, in order for cooccurring continuants to be avoided. The ranking leaving room for this process to take place is OCP[+cont] >> *STOP.CODA.

The avoidance of adjacent continuants (Tableau 31, candidates b) is accomplished via a change in the value of [±cont] (candidates a) and not, for instance, the insertion of an intrusive consonant (candidates c) (cf. Early Sternatia below), because DEP-C outranks IDENT[cont]. Moreover, the constraints blocking PoA shifts to a non-fricative coronal and metathesis, i.e. MAX[pl] and LINEARITY, or IDENT[str] and UNIFORMITY, are placed above *STOP.CODA so that the coda stop is preferable to alternatives such as [ss] (involving at least a PoA shift to coronal and stridentization), [t͡s] (involving at least a PoA shift to coronal and coalescence of the two segments into one), and [sk] or [sp] (involving at least transposition) (see candidates d). The faithfulness constraints that militate against the above changes are collectively represented as {FAITH} in (31).

(31) Realization of OS as stop–sibilant (MedG)

Input	*Output*	OCP [+cont]	DEP-C	{FAITH}	*STOP .CODA	IDENT [cont]
/ks, ps/	a. ks, ps ☜				*	
	b. xs, fs	*!				*
	c. xts, fts		*!			*
	d. ss t͡s sk, sp			*!		(*)
/xs, fs/	a. ks, ps ☜				*	*
	b. xs, fs	*!				
	c. xts, fts		*!			
	d. ss t͡s sk, sp			*!		(*)

MedG did not exhibit any root-internal instances of coronal–sibilant, i.e. [ts] and [θs]. At morpheme boundaries and specifically in verbal inflection, it is possible (although, to my knowledge, significantly rare) that a root-final /θ/ meets the perfective suffix /s/, e.g. /aleθ-s-a/ grind-PFV-1SG. In the same environment, dorsals and labials do emerge, although their MoA feature may change to [–cont] in order for OCP[+cont] to be satisfied. However, instead of despirantizing, /θ/ is deleted and what makes it to the surface in both MedG and all IG dialects is an intervocalic singleton [s], i.e. [álesa] 'I ground'. I assume that the deletion of more marked consonants, i.e. dorsals and labials, is more costly to the grammar. Thus I posit the ranking MAX-C$_{[per]}$, OCP[+cont] >> IDENT[cont] >> MAX-C$_{[PN]}$, according to which OCP-violating /C$_{[per]}$s/ clusters undergo MoA dissimilation, because deletion is out of question due to the fatal violation of MAX-C$_{[PN]}$. On the contrary, /θs/ loses its first member, since the violation of MAX-C$_{[PN]}$ is not fatal. The same pattern is observed in all IG varieties and is thus not addressed anew.

(32) MoA dissimilation vs. deletion in OS

Input	*Output*	MAX-C$_{[per]}$	OCP[+cont]	IDENT[cont]	MAX-C$_{[PN]}$
/xs/	a. xs		*!		
	b. ks ☜			*	
	c. Øs	*!			
/θs/	a. θs		*!		
	b. t͡s			*!	
	c. Øs ☜				*

The hierarchy AGREE[voice] >> IDENT[voice], IDENT-ONS[voice], which motivates regressive voice assimilation in clusters not sharing a single voicing value, holds since MedG. Since all attested OS clusters end in a voiceless sibilant, regardless of whether the first member is voiceless or voiced, the outcome is always a voiceless cluster. The same rule applies to IG dialects, thus the discussion is not repeated below (but note the CIG dialects exhibiting metathesis).

(33) Regressive voice assimilation in OS

Input	*Output*	AGREE[voice]	IDENT[voice]	IDENT-ONS[voice]
xs	a. ks ☜			
	b. gs	*!	*	
	c. gz		*!	*
ɣs	a. ks ☜		*	
	b. gs	*!		
	c. gz		*	*!

When SIG started acquiring an autonomous status as a dialect, at the stage dubbed *Pre-SIG,* restrictions on PoA remained the same as in Late MedG. What marked the dawn of the new stage was the update of the hierarchy controlling the MoA features of the surface clusters. In Pre-SIG, stops were entirely eliminated from the coda position, at the expense of violations of OCP[+cont]. In other words, all underlying OS clusters were realized as fricative–sibilant, via the ranking *STOP.CODA, DEP-C >> OCP[+cont] >> IDENT[cont].[7] Essentially, the constraints *STOP.CODA and OCP[+cont] swapped places in the hierarchy.

(34) Elimination of plosives in the coda in Pre-SIG

Input	*Output*	*STOP.CODA	DEP-C	OCP[+cont]	IDENT[cont]
ks, ps	a. ks, ps	*!			
	b. xts, fts		*!		*
	c. xs, fs ☜			*	*
xs, fs	a. ks, ps	*!			*
	b. xts, fts		*!		
	c. xs, fs ☜			*	

The ban of stops in the coda and the emergence of cooccurring fricatives continued being active in Early SIG and is retained in current Martano SIG. However, these varieties are averse to marked PoA features, in particular [dor], in the coda, and, consequently, displayed a first PoA shift that neutralized dorsals and labials. The ranking defining a language where only dorsals

[7] For the necessity of an established ranking between OCP[+cont] and IDENT[cont] see section 5.

shift is *{[dor].[¬dor]}, LINEARITY >> MAX[pl] >> *{[dor].[¬dor], [per].[¬per]} (see chapter 4).

(35) PoA shift *dor* > *lab* in OS (Early SIG and Martano SIG)

Input	*Output*	*{[dor].[¬dor]}	LINEAR	MAX[pl]	*{[dor].[¬dor], [per].[¬per]}
xs	a. xs	*!		*	*
	b. fs ☜			*	*
	c. θs			**!	
	d. sx		*!		
fs	a. xs	*!			
	b. fs ☜				*
	c. θs			*!	
	d. sf		*!		

Early Sternatia diverges from Early SIG and Martano as for the dispreference of adjacent continuants. Since stops do not constitute a viable alternative, fricative–sibilant clusters were split by consonant intrusion enabled by the demotion of DEP-C below IDENT[cont] and OCP[cont].

(36) [t] insertion in OS (Early Sternatia SIG)

Input	*Output*	*STOP.CODA	IDENT[cont]	OCP[cont]	DEP-C
ps	a. ps	*!			
	b. fs		*!	*	
	c. fts ☜				*
fs	a. ps	*!			
	b. fs			*!	
	c. fts ☜				*

More recently, a second PoA shift was observed that converted both dorsals and labials into coronals, via the ranking *{[dor].[¬dor], [per].[¬per]}, *{[dor].[¬dor]}, LINEARITY >> MAX[pl].

(37) PoA shift *dor, lab* > *cor* in OS (Current Sternatia SIG)

Input	*Output*	*{[dor].[¬dor], [per].[¬per]}	*{[dor].[¬dor]}	LINEARITY	MAX[pl]
ks, xs	a. ks, xs	*!	*		
	b. ps, fs	*!			*
	c. ts, θs ☜				**
	d. sk, sx			*!	
ps, fs	a. ks, xs	*!	*		
	b. ps, fs	*!			
	c. ts, θs ☜				*
	d. sp, sf			*!	

At the same time, a new ban, i.e. that of fricatives in the coda, was imposed via the promotion of *STOPFRIC.CODA above at least one faithfulness constraint associated with changes leading to non-fricative codas.[8] The selection among the available non-fricative coronal codas, i.e. another sibilant or a sonorant (rhotic), and the merged affricate [t͡s] was made by means of the ranking of *STOPFRIC.CODA, IDENT[str], and IDENT[son] above IDENT[cont] and UNIFORMITY. Thus, in today's Sternatia SIG, the optimal realization of all OS clusters is an affricate [t͡s], where the two components of the underlying sequence are fused into one segment.[9]

(38) Realization of OS as affricate (Current Sternatia SIG)

Input	*Output*	*STOPFRIC .CODA	IDENT [str]	IDENT [son]	IDENT [cont]	UNIFORM
ks	a. t͡s ☜					*
	b. θs	*!			*	
	c. ss		*!			
	d. rs			*!		

[8] The losing candidate containing coronal [θ] is included in the Tableau, even though a general prohibition of the particular sound holds in SIG.

[9] Given that all dorsal and labial obstruents are either stops or fricatives, the PoA shift could ostensibly have been enforced by means of *STOPFRIC.CODA >> MAX[pl] (cf. the *mn* > *nn* change, section 6).

xs	a. t͡s ☜				*	*
	b. θs	*!				
	c. ss		*!			
	d. rs			*!		

It is worth mentioning that the output [ns] is an impossible alternative. According to the present analysis, the conversion of an obstruent to any sonorant violates IDENT[son], but, if this sonorant is a nasal, IDENT[nas] is violated in addition. Crucially, there is no constraint favoring $/C_{[-son]}s/$ → [ns] over $/C_{[-son]}s/$ → [rs]. This means that $/C_{[-son]}s/$ → [ns] always loses to $/C_{[-son]}s/$ → [rs]. The CT in (39) summarizes the comparison:

(39) Ls vs. Ns

Inputs	*W*	*L*	IDENT[son]	IDENT[nas]
ks, xs, ps, fs	rs	ns	e	W

Although Calimera SIG largely followed the same path as Sternatia, it displays an additional pattern, i.e. the realization of OS as a geminate [ss]. For this pattern to be generated, UNIFORMITY is promoted above IDENT[str]. As long as IDENT[son] also dominates IDENT[str], the violation of the latter is not fatal.

(40) Realization of OS as a geminate [ss] (Calimera SIG^{+})

Input	*Output*	UNIFORM	IDENT[son]	IDENT[str]	IDENT[cont]	*GEMIN
ks	a. t͡s	*!				
	b. ss ☜			*		*
	c. rs		*!			
xs	a. t͡s	*!			*	
	b. ss ☜			*		*
	c. rs		*!			

The conversion of coda obstruents to a rhotic is a non-systematic pattern that exists in parallel to the typical realizations in each SIG-speaking community. In this case, it is IDENT[son] that can be non-fatally violated thanks to its demotion to the bottom of the hierarchy.

(41) Realization of OS as Ls (SIG+)

Input	*Output*	UNIFORM	IDENT[str]	*GEMIN	IDENT[cont]	IDENT[son]
ks	a. t͡s	*!				
	b. ss		*!	*		*
	c. rs ☜				*	*
xs	a. t͡s	*!			*	
	b. ss		*!	*		
	c. rs ☜					*

Recall that in MedG and IG /r/ patterns with continuant obstruents in the coda. For instance, /rC/ clusters undergo MoA dissimilation in order to satisfy OCP[+cont]. Depending on the ranking between DEP-C and OCP[+cont], either a sequence of continuants, i.e. [rs], emerges (Tableau 42) or an epenthetic consonant resolves the particular marked cluster, i.e. [rts] (Tableau 43).

(42) Realization of OS as Ls without [t] insertion (SIG+)

Input	*Output*	DEP-C	OCP[+cont]
/ks/	a. rs ☜		*
	b. rts	*!	

(43) Realization of OS as Ls with [t] insertion (SIG++)

Input	*Output*	OCP[+cont]	DEP-C
/ks/	a. rs	*!	
	b. rts ☜		*

Right from the beginning, Bova CIG abandoned dorsals and labials and turned them into coronals via a shift, due to the ranking *{[dor].[¬dor], [per].[¬per]}, *{[dor].[¬dor]}, LINEARITY >> MAX[pl]. As far as MoA is concerned, Bova CIG allows only sibilant and sonorant codas. OS clusters are repaired via coalescence, which gives rise to the affricate [t͡s].

The responsible ranking is STOPFRIC.CODA, IDENT[son] >> *GEMINATE >> IDENT[cont], UNIFORMITY >> IDENT[str].[10]

(44) Realization of OS as affricate (Bova CIG)

Input	*Output*	*STOPFRIC .CODA	IDENT [son]	*GEMIN	IDENT [cont]	UNIFORM	IDENT [str]
/ks/	a. t͡s ☜					*	
	b. θs	*!			*		
	c. ss			*!			*
	d. rs		*!				
/xs/	a. t͡s ☜				*	*	
	b. θs	*!					
	c. ss			*!			*
	d. rs		*!				

The final two IG varieties, Galliciano and Roghudi CIG, avoid dorsal and labial codas via metathesis, due to the ranking *{[dor].[¬dor], [per].[¬per]}, *{[dor].[¬dor]}, MAX[pl] >> LINEARITY. This repair process automatically ensures that the coda also hosts unmarked MoA features (i.e. it is not occupied by a stop or a fricative). The alternative system Galliciano/Roghudi CIG+, where [ss] is selected, would instead employ the ranking observed in Calimera SIG+, i.e. UNIFORMITY, IDENT[son] >> IDENT[str] >> IDENT[cont], *GEMINATE (see 40 above).

(45) Metathesis in OS (Galliciano & Roghudi CIG)

Input	*Output*	*{[dor].[¬dor], [per].[¬per]}	*{[dor].[¬dor]}	MAX[pl]	LINEARITY
/ks, xs/	a. ks, xs	*!	*		
	b. ps, fs	*!		*	
	c. ts, θs			*!*	
	d. sk, sx ☜				*

[10] The ranking of IDENT[str] below IDENT[cont] ensures that dorsal and labial voiceless obstruents turn into a sibilant in Bova (see section 5).

/ps, fs/	a. ks, xs	*!	*		
	b. ps, fs	*!			
	c. ts, θs			*!	
	d. sp, sf ☜				*

In CIG, MoA dissimilation unexceptionally targets clusters comprised of continuant obstruents, including [sx] and [sf] resulting from metathesis. This means that regardless of the input, at first glance, the possible outputs are [sk] and [sp]. However, [sk] was targeted by Assibilating Stop Palatalization (ASP) and transformed into [ʃʃ]. Initially, only transposed [sk] clusters preceding a front vowel were affected by ASP, just like etymological /sk/ sequences. However, as these constituted the vast majority, the process was extended to all metathesized [sk] sequences by means of analogy (Karanastassis 1984–1992), even across morphological boundaries (cf. etymological /sk/, which survived as [sk], i.e. with a velar stop, before back vowels and before front vowels that belong to an inflectional morpheme, see chapter 2). An OT analysis is offered in the next section.

The hierarchy AGREE[voice] >> IDENT[voice], IDENT-ONS[voice] holds for all IG dialects. According to this hierarchy, codas assimilate to the voicing value of the adjacent onset. In the two CIG varieties exhibiting metathesis, the transposed outputs corresponding to /Cs/ cluster still surface as voiceless, even if the underlying consonant preceding the sibilant is voiced. However, the posited hierarchy wrongly predicts that the [+voi] value of the consonant that ends up in onset position be preserved:

(46) Wrongly predicted voice assimilation in metathesized OS

Input	*Output*	AGREE[voice]	IDENT[voice]	IDENT-ONS[voice]
vs	a. sf ☹		*	*!
	b. zv 💣		*	

Notably, though, voiced consonants precede /s/ exclusively at derived contexts, in particular between a verbal stem ending in a voiced obstruent and the aspectual suffix /s/ ‘PFV’. Therefore, the voiced clusters could be ruled out by a high-ranking constraint FAITH-AFFIX that secures the faithful realization of an affix, at least as far as its voicing value is concerned:[11]

[11] Note also that the voiced [z] is associated with the imperfective aspect.

(47) Devoicing in OS

Input	*Output*	FAITH-AFFIX	AGREE[voice]	IDENT[voice]	IDENT-ONS[voice]
v-s	a. sv		*!		
	b. zv	*!		*	
	c. sf ☜			*	*

4. SO clusters

Typically, sibilant codas do not undergo PoA or MoA changes. The faithful realization of any /sO/ cluster satisfies the entire constraint system and thus bounds harmonically all other candidates (in salmon pink), since they incur at least one violation of faithfulness (here only IDENT[str] and LINEARITY are included), in addition to potential violations of markedness constraints (here only *{[dor].[¬dor], [per].[¬per]} and *STOPFRIC.CODA are included):

(48) /sC/

/sO/	IDENT[str]	LINEARITY	*{[dor].[¬dor], [per].[¬per]}	*STOPFRIC.CODA
kO, xO	1		1	1
pO, fO	1		1	1
tO, θO	1			1
sO				
rO	1			
nO	1			
Os		1	(1)	(1)

Under the ranking AGREE[voice] >> IDENT[voice], IDENT-ONS[voice], /s/ surfaces as [z] before a voiced consonant. The faithful realization of the cluster is eliminated by AGREE[voice] and, given that SO clusters are eventually parsed as coda–onset, devoicing the second member violates IDENT-ONS[voice]. Naturally, before voiceless consonants, the faithful realization [s] prevails, since no constraint is violated.

(49) Regressive voice assimilation in SO

Input	*Output*	AGREE[voice]	IDENT[voice]	IDENT-ONS[voice]
sv	a. sv	*!		
	b. zv ☜		*	
	c. sf		*	*!
sf	a. sf ☜			
	b. zf	*!	*	
	c. sv	*!	*	*

When the sibilant is followed by a fricative, MoA dissimilation applies due to OCP[+cont]. The clusters /sx/ (including the metathesized [sx] in Galliciano and Roghudi CIG), /sɣ/, and /sθ/, and /sð/ are targeted in both IG dialects, MedG, and many other Greek dialects (see chapter 3). Post-consonantal labial fricatives, i.e. /sf/ (including the transposed [sf]) and /sv/, although mostly dissimilated in CIG, proved exceptionally resistant against MoA dissimilation in SIG. A possible explanation to this paradox, at least for the linguistic enclaves in Apulia, is to attribute the preservation of [sf] and [zv] to exceptional faithfulness to labial fricatives, motivated by the existence of these particular sequences in Romance (cf. the absence of [sx], [zɣ], [sθ], and [zð]). Through this lens, a faithfulness constraint protecting these particular structures could be postulated, let it be FAITH-CC$_{[+cont, lab]}$ (50),[12] that outranks OCP[+cont] in MedG and SIG. The dorsals and the coronals, on the other hand, fall outside the scope of FAITH-CC$_{[+cont, lab]}$, therefore dissimilation applies as expected (Tableau 51; only voiceless clusters are presented for brevity).

(50) FAITH-CC$_{[+cont, lab]}$ Assign a violation for every unfaithfully realized post-consonantal continuant labial

(51) Underapplication of MoA dissimilation in SO$_{[+cont, lab]}$ (MedG, SIG)

Input	*Output*	FAITH-CC$_{[+cont, lab]}$	OCP[+cont]	IDENT[cont]
sf	a. sf ☜		*	
	b. sp	*!		*

[12] [lab] is used for ease, although the analysis takes labial segments to be specified as [per].

sx	a. sx		*!	
	b. sk ☜			*
sθ	a. sθ		*!	
	b. st ☜			*

In CIG, on the other hand, the effect of the special faithfulness constraint that protects post-sibilant labials has almost faded away, thus the violation of OCP[+cont] has become fatal for most speakers. Hence, variation emerges between [sf] ~ [sp] and [zv] ~ [zb], with the stop gaining ground especially in Bova:

(52) [sf] ~ [sp] (CIG)

Input	*Output*	(FAITH-CC$_{[+cont, lab]}$)	OCP[+cont]	IDENT[cont]
sf	a. sf (☜)		*(!)	
	b. sp (☜)	*(!)		*
sv	a. zv (☜)		*(!)	
	b. zb (☜)	(*!)		*

Stem-internal [sk], independently of whether it is etymological or resulted from metathesis, underwent further modifications, as the velar stop /k/ was subject to A(ssibilating) S(top) P(alatalization) before front vowels. Palatalization is enforced by the constraint PALATALIZATION{i,e} (see Rubach 2000a,b, 2003). The assibilation of the output is motivated by POSTERIORSTRIDENCY, which penalizes posterior non-strident coronals (Rubach 2007).

(53) a. PALATALIZATION {i,e} — Assign a violation for each dorsal segment that does not surface as a palatal preceding a front vowel /i, e/

b. POSTERIORSTRIDENCY — Assign a violation for each posterior non-strident coronal

In IG the outcome of palatalization is an assibilated segment within stems. On the contrary, between stems and inflectional morphemes, palatalization does not apply and /k/ surfaces as a velar [k]. The phenomenon is analyzed along the lines of Stratal OT (Kiparsky 2000, 2015;

Bermúdez-Otero 2010). At Stem Level, high-ranking PALATALIZATION{i,e} and POSTERIORSTRIDENCY eliminate the velar [k] and the non-strident palatal [c], respectively, thus /k/ surfaces as an assibilated palatal [tʃ] in the context of a front vowel.

(54) Stem-level ASP in IG

Input	*Output*	PALATAL{i,e}	POSTSTRID	IDENT[str]
ke	a. ke	*!		
	b. ce		*!	
	c. tʃe ☜			*

At Word Level, IDENT[str] swaps positions in the hierarchy with PALATALIZATION{i,e}. Therefore, the presence of a front vowel is not enough to trigger ASP, and /k/ is realized as a velar [k].

(55) Word-level underapplication of ASP in IG

Input	*Output*	IDENT[str]	POSTSTRID	PALATAL{i,e}
ke	a. ke ☜			*
	b. ce		*!	
	c. tʃe	*!		

In the case of stem-internal /sk/ (56), though, the sequence of non-identical sibilants [st͡ʃ] (candidate c) is not allowed, due to OCP[+str] (see Mascaró 2007). The alternative is to form a sibilant geminate by opting for either a coronal geminate [ss] (candidate d) or a palatal [ʃʃ] (candidate e). In the former case (d), the realization of the dorsal /k/ as a coronal [s] is penalized twice by MAX[pl]. In the latter case (e), MAX[pl] is satisfied assuming that [ʃ] has dorsal specification, but the retraction of /s/ violates IDENT[ant(erior)] (Rose & Walker 2004; Hansson 2007). On condition that OCP[+str] and MAX[pl] dominate IDENT[ant], candidate /ski/ → [ʃʃi] (e), i.e. the attested IG variant, prevails.

(56) ASP of /sk/ in IG

Input	*Output*	PAL{i,e}	POSTSTR	IDENT[str]	OCP[str]	MAX[pl]	IDENT[ant]
ski	a. ski	*!					
	b. sci		*!				
	c. st͡ʃi			*	*!		
	d. ssi			*		*!*	
	e. ʃʃi ☜			*			*

Note that in MedG PALATALIZATION{i,e} is top-ranked and POSTERIORSTRIDENCY is low-ranked regardless of the morphological structure (57). Therefore, all candidates involving the stridentization of /k/ (/ski/ → [st͡ʃi] (c), [ssi] (d), [ʃʃi] (e)) are ruled out by IDENT[str]. Hence, candidate /ski/ → [sci] (b), which contains a non-strident palatal, wins the evaluation process.

(57) Non-assibilating palatalization (MedG)

Input	*Output*	PALATAL{i,e}	IDENT[str]	POSTSTR
ski	a. ski	*!		
	b. sci ☜			*
	c. stʃi		*!	
	d. ssi		*!	
	e. ʃʃi		*!	

5. OO clusters

This section examines the rankings that gave rise to the substantially different manifestations of obstruent clusters not containing sibilants. Based on the lexicon that has survived in IG, two different environments are distinguished. First, the behavior of codas before a coronal onset is significantly variable, especially in voiceless clusters. Second, regarding the unique labial–dorsal cluster /vg/, a great deal of variation is observed within all IG varieties (see also Nicholas 2007).

Let's commence our exploration of the evolution of OO clusters with the consonants preceding a coronal onset, which are summarized in Table (58). The analysis is based on inputs comprised of fricative–stop voiceless clusters, since no other combinations are found rootinternally or at morpheme boundaries in IG (cf. MedG), and voiced clusters, which are always specified as [+cont] in the input.

(58) Attested variants of $OO_{[PN]}$ in IG

IG varieties	/xt/	/ft/	/θt/	/ɣð/	/vð/
MedG	xt	ft	st	ɣd	vd
Early SIG, Martano SIG	ft	ft	st	vd	vd
Sternatia/Calimera SIG	tt	tt	st	dd	dd
SIG+	rt	rt	st	rd	rd
Roghudi CIG	θt	θt	st	dd	dd
Galliciano CIG	tt	tt	st	dd	dd
Bova CIG	st	st	st	dd	dd

In MedG, alterations in place features are not observed in OO clusters, as the coda could be occupied by segments of all three major PoAs. However, in terms of MoA, [–cont] is eliminated in the coda via spirantization, and, at the same time, cooccurring continuants were avoided via despirantization of the onset (cf. OS, given that there is no [–cont] version of /s/). Productive MoA dissimilation targeted all obstruent clusters consisting of adjacent segments of the same MoA, i.e. $O_{[-cont]}O_{[-cont]}$ (/kt/, /pt/) and $O_{[+cont]}O_{[+cont]}$ (/xθ/, /fθ/, /fx/, /ɣð/, /vð/, /vɣ/). The process resulted in coda weakening and onset strengthening in terms of MoA. In other words, the prevailing structure consisted of a [+cont] coda followed by a [–cont] onset ([xt], [ft], [fk], [ɣd], [vd], [vg]). Similarly, $O_{[-cont]}O_{[+cont,\ -str]}$ formed at morphological boundaries (/kθ/, /pθ/; /tθ/ is an accidental gap) turned into fricative–stop clusters ([xt], [ft]). On the other hand, fricative–stop sequences (i.e. /xt/, /ft/, /θt/) remain unchanged as for their values of [±cont].[13]

The constraint hierarchy that generated this pattern in MedG and was passed on to (early) IG is OCP[+cont] >> *STOP.CODA >> IDENT[cont] (59) (for the necessity of the ranking

[13] This tendency is found in Vernacular MedG, which more or less followed the natural path of linguistic evolution. Learned Greek, on the other hand, revived obsolete structures, e.g. [kt], [vɣ], [ɣð], [fx], [xθ], [sθ], etc. The rules of this orthography-based, artificial version of Greek enforced the realization of obstruent clusters of identical continuancy within the same stem, thus counteracting, in a way, the effect of the ranking holding in vernacular speech. Therefore, input clusters sharing the same value of [±cont] surfaced faithfully, and assimilation repaired stop–fricative and fricative–stop clusters by altering the MoA of the first consonant, e.g. /xt/ → [kt], /kθ/ → [xθ].

OCP[+cont] >> *STOP.CODA see OS, section 3). IDENT[cont] must be dominated by both OCP[+cont] and *STOP.CODA, so that both clusters of continuants (candidates b) and clusters beginning with a stop (candidates c, d) are eliminated from the race. Thus, regardless of the input specification, markedness always prefers the fricative–stop output (candidates a). Since fricatives continue being admissible in coda position, a change to, for instance, a sibilant (candidate e) is blocked due to the ranking IDENT[str] >> *STOPFRIC.CODA. IDENT[str] must also dominate IDENT[cont], in order for underlying fricatives not to be stridentized.

(59) MoA dissimilation in OO (MedG)

Input	*Output*	OCP [+cont]	*STOP.CODA	IDENT [str]	IDENT [cont]	*STOPFRIC.CODA
xθ	a. xt ☜				*	*
	b. xθ	*!				*
	c. kθ		*!		*	*
	d. kt		*!		**	*
	e. st			*!	*	
kt	a. xt ☜				*	*
	b. xθ	*!			**	*
	c. kθ		*!		*	*
	d. kt		*!			*
	e. st			*!	*	
kθ	a. xt ☜				**	*
	b. xθ	*!			*	*
	c. kθ		*!			*
	d. kt		*!		*	*
	e. st			*!	**	
xt	a. xt ☜					*
	b. xθ	*!			*	*
	c. kθ		*!		**	*
	d. kt		*!		*	*
	e. st			*!		

MedG did not allow the coronal fricatives [θ] and [ð] in the coda, even though other fricatives were admissible and did not get repaired via, for instance, a change to stridents, due to the ranking IDENT[str] >> *STOPFRIC.CODA. In the rare cases that /θt/ or /θθ/ occur across morphological boundaries (in deverbal adjectives and in the passive aorist, respectively) the coda turns into a sibilant, owing to a high-ranked phonotactic constraint *θ.CODA, which renders the violation of IDENT[str] non-fatal (compare the candidates below).[14]

(60) Absence of [θ] in the coda (MedG)

Input	*Output*	*θ.CODA	IDENT[str]	*STOPFRIC.CODA
θt	a. θt	*!		*
	b. st ☜		*	*
θθ	a. θt	*!		*
	b. st ☜		*	*
ft	a. ft ☜			*
	b. st		*!	

The /θ/ → [s] change before an obstruent continues in all IG dialects, even Roghudi CIG, where [θ] is allowed in the coda. Given the rarity of preconsonantal /θ/,[15] I take this exception to be attributed to analogy and do not discuss the fate of coronal–coronal OO clusters further.

Finally, both members of OO clusters share a common value of [±voice]. Based on the ranking AGREE[voice] >> IDENT[voice], IDENT-ONS[voice] (see section 4), the coda is assimilated to the following onset with respect to voicing.

(61) Regressive voice assimilation in Ot and Od

Input	*Output*	AGREE[voice]	IDENT[voice]	IDENT-ONS[voice]
vt	a. vt	*!		
	b. ft ☜		*	
	c. vd		*	*!

[14] The omitted candidate /θθ/ → [θθ] may be taken to not violate *θ.CODA and definitely does not violate OCP[+cont], but is nevertheless eliminated by *GEMINATE, since adjacent identical consonants cannot emerge in MedG.

[15] The lexical environments where this change was observable are extremely limited. Essentially, a handful of roots are involved, e.g. /plaθ/ 'mold', /aleθ/ 'grind', /ɣneθ/ 'spin'.

fd	a. vt	*!		
	b. ft		*	*!
	c. vd ☜		*	

The main point of departure between MedG and Early SIG was the change in the rankings defining PoA. As shown in chapter 4, the Early SIG grammar was constructed based on the ranking *{[dor].[¬dor]}, LINEARITY >> MAX[pl] >> *{[dor].[¬dor], [per].[¬per]} (62). The ranking continues being active in current Martano SIG.

(62) PoA shift *dor* > *lab* in Ot (Early SIG, Martano SIG)

Input	*Output*	*{[dor].[¬dor]}	LINEAR	MAX[pl]	*{[dor].[¬dor], [per].[¬per]}
xt	a. xt	*!		*	*
	b. ft ☜			*	*
	c. θt			**!	
	d. tx		*!		
ft	a. xt	*!			
	b. ft ☜				*
	c. θt			*!	
	d. tf		*!		

The MedG hierarchy determining the admissible MoA features was not modified in Early SIG and today's Martano SIG. At this stage, voiceless and voiced clusters with dorsals as their first element have the same fate, which is the realization as a fricative–stop labial–coronal sequence.

(63) Emergence of fricatives in the coda (Early SIG, Martano SIG)

Input	*Output*	*STOP .CODA	OCP [+cont]	IDENT [str]	IDENT [cont]	STOPFRIC .CODA
xt	a. ft ☜					*
	b. fθ		*!		*	*
	c. pθ	*!			**	*
	d. pt	*!			*	*
	e. st			*!		

ɣð	a. vd ☜				*	*
	b. vð		*!			*
	c. bð	*!			*	*
	d. bd	*!			**	*
	e. zd			*!	*	

Most contemporary SIG-speaking communities, the most prominent of which are located in Sternatia and Calimera, have excluded both dorsals and labials and shifted both to coronals. Consider the following Tableau (winner to be revised immediately below, after taking into consideration MoA):

(64) PoA shift *dor, lab* > *cor* in OO (Sternatia & Calimera SIG)

Input	*Output*	*{[dor].[¬dor], [per].[¬per]}	*{[dor].[¬dor]}	LINEARITY	MAX[pl]
xt	a. xt	*!	*		
	b. ft	*!			*
	c. θt ☜				**
	d. tx			*!	
ft	a. xt	*!	*		
	b. ft	*!			
	c. θt ☜				*
	d. tx			*!	

Regarding MoA, Sternatia and Calimera SIG went for a geminate stop [tt], which only incurred a violation of the bottom-ranked IDENT[cont]. The fricative geminate, which would be equal with respect to IDENT[cont], does not constitute a viable option since the sound [θ] is not found in the sound inventory of SIG (the affected candidates are given in parentheses in 65). Fatal violations of IDENT[str] and IDENT[son] prevent [st] and [rt], respectively, from surfacing.

(65) Realization of Ot as [tt] (Sternatia & Calimera SIG)

Input	*Output*	*STOPFRIC .CODA	IDENT [str]	IDENT [son]	IDENT [cont]	*GEMIN
xt, ft	a. tt ☜				*	*
	b. (θt)	*!				
	c. st		*!			
	d. rt			*!		
	e. (θθ)				*	*

Regarding the voiced counterparts, a geminate stop [dd] is the winner as well. Here the elimination of the geminate fricative [ðð] is made by *VOIFRICGEMIN.[16]

(66) Realization of Oð as [dd] (Sternatia & Calimera SIG)

Input	*Output*	*VOIFRICGEM	*STOPFRIC .CODA	IDENT [str]	IDENT [son]	IDENT [cont]
ɣð, vð	a. dd ☜					**
	b. ðd		*!			
	c. zd			*!		
	d. rd				*!	
	e. ðð	*!				

The parallel system dubbed SIG+, which also shifts dorsals and labials to coronals (see ranking in 64), favors the conversion of obstruent codas to a rhotic by means of the core ranking *STOPFRIC.CODA, IDENT[str] >> IDENT[cont] >> IDENT[son] (enriched with additional constraints addressing specific segments or structures).

[16] In SIG, voiced fricatives are observed only intervocalically as the outcome of lenition (see chapter 2), therefore [ð] would face additional problems on top of being a non-strident obstruent.

(67) Realization of Ot as [rt] (SIG+)

Input	*Output*	*STOPFRIC.CD	IDENT[str]	IDENT[cont]	IDENT[son]
xt, ft	a. tt			*!	
	b. st		*!		
	c. rt ☜				*

(68) Realization of Oð as [rd] (SIG+)

Input	*Output*	*VOIFRICGEM	*STOPFRIC .CODA	IDENT [str]	IDENT [cont]	IDENT [son]
ɣð, vð	a. dd				**!	
	b. ðd		*!			
	c. zd			*!		
	d. rd ☜				*	*
	e. ðð	*!				

As mentioned above, Bova CIG avoided dorsals and labials in the coda via PoA shifts to coronals due to the ranking *{[dor].[¬dor], [per].[¬per]}, *{[dor].[¬dor]}, LINEARITY >> MAX[pl]. In voiceless clusters, if we abstract away from MoA features, this results in the creation of [θt]. In Bova CIG, the presence of [θ] is unproblematic. Nevertheless, fricatives of all PoAs are forbidden in the coda (Tableau 69, candidate b). Thus, when the MoA-related ranking kicks in, all PoA shifts of voiceless obstruents result in [st] (candidate c). Plosive (candidate a) or fricative geminates (candidate e) and [rt] (candidate d) are eliminated by *GEMINATE and IDENT[son], respectively.

(69) Realization of Ot as [st] (Bova CIG)

Input	*Output*	*STOPFRIC .CODA	IDENT [son]	*GEMIN	IDENT [cont]	IDENT [str]
xt, ft	a. tt			*!	*	
	b. θt	*!				
	c. st ☜					*
	d. rt		*!			
	e. θθ			*!	*	

The voiced fricatives fail to undergo spirantization, as [zd] (Tableau 70, candidate c) is not allowed in IG. The next best solution according to the constraint hierarchy is a geminate [dd] (candidate a):

(70) Realization of Oð as [dd] (Bova CIG)

Input	*Output*	*VoiFricGemin	*zd	*StopFric.Coda	Ident[son]	*Gemin	Ident[cont]	Ident[str]
ɣð, vð	a. dd ☜					*	**	
	b. ðd			*!				
	c. zd		*!					*
	d. rd				*!		*	
	e. ðð	*!				*		

Roghudi CIG prioritizes metathesis to ensure that codas host only coronals. This works seamlessly in OS clusters, but encounters problems when metathesis brings a stop into the coda position, given that the dialect also prohibits non-continuant codas via the dominance of *Stop.Coda over Ident[cont]. *Stop.Coda is also taken to rank above the hierarchy determining the PoA changes. Thus, even if candidates (d) in (71) would be optimal on the basis of PoA, they are eliminated from the race because they do not conform with the MoA requirements. Assuming that *{[dor].[¬dor], [per].[¬per]} strictly dominates Max[pl], the violations of Max[pl] are rendered non-fatal, hence the preference for shifts to a coronal (candidates c vs. candidates a, b).[17] Interestingly, Roghudi CIG is the only Greek dialect allowing for [θ] to surface in a coda as a result of /x/ and /f/ shifting to a coronal.

[17] Besides, the segments that cross-linguistically exhibit significant propensity to metathesis are sibilants and liquids (see also section 1).

(71) PoA shift *dor, lab* > *cor* in OO (Roghudi CIG)

Input	*Output*	*STOP.CODA	*{[dor].[¬dor], [per].[¬per]}	MAX[pl]	LINEARITY
/xt/	a. xt		*!		
	b. ft		*!	*	
	c. θt ☜			**	
	d. tx	*!			*
/ft/	a. xt		*!		
	b. ft		*!		
	c. θt ☜			*	
	d. tf	*!			*

Further changes targeting the MoA features are not observed, as Roghudi CIG allows fricatives in the coda, as long as they are coronals. Independently, though, the voiced fricative [ð] cannot be found in a coda in IG via the constraint *ð.CODA. Therefore, the geminate [dd] wins.

(72) Realization of Oð as [dd] (Roghudi CIG)

Input	*Output*	*VOIFRIC GEM	*ð CODA	*zd	IDENT [son]	*GEM	*STOPFRIC CODA
ɣð, vð	a. dd ☜					*	
	b. ðd		*!				
	c. zd			*!			
	d. rd				*!		
	e. ðð	*!				*	

The last dialect under investigation, Galliciano CIG, also circumvents metathesis in clusters not containing a sibilant and a PoA shift takes place instead. Unlike Roghudi CIG, though, here the coda excludes not only stops but also fricatives, and the sound inventory does not encompass [θ] (hence, the output [θt], which is ruled out on the basis of the constraint system, is given in parentheses and the geminate [θθ] is omitted from the output set). The conversion to a strident or a sonorant is blocked by the ranking IDENT[son], IDENT[str] >> IDENT[cont], *GEMINATE. The voiced fricative [ð] does not come in a geminated version. Thus, the outcome of shifts is a geminate stop in both voiceless and voiced clusters:

(73) PoA shift *dor, lab* > *cor* in OO (Galliciano CIG)

Input	*Output*	*StopFric.Coda	Ident[str]	Ident[son]	*Geminate	Ident[cont]	*{[dor].[¬dor], [per].[¬per]}	*{[dor].[¬dor]}	Max[pl]	Linear
xt	a. xt	*!					*			
	b. ft	*!					*		*	
	c. (θt)	*!							**	
	d. tx	*!								*
	e. st		*!						*	
	f. rt			*!					*	
	g. tt ☜				*	*			*	
ft	a. xt	*!					*			
	b. ft	*!					*			
	c. θt	*!							*	
	d. tf	*!								*
	e. st		*!						*	
	f. rt			*!					*	
	g. tt ☜				*	*			*	

(74) Realization of Oð as [dd] (Galliciano CIG)

Input	*Output*	*VoiFricGem	*StopFric.Coda	Ident[str]	Ident[son]	*Geminate	Ident[cont]	*{[dor].[¬dor], [per].[¬per]}	*{[dor].[¬dor]}	Max[pl]	Linear
ɣð	a. ɣd		*!					*			
	b. vd		*!					*		*	
	c. ðd		*!							**	
	d. ðɣ		*!								*
	e. zd			*!						*	
	f. rd				*!					*	
	g. dd ☜					*	*			*	
	h. ðð	*!*								*	
vð	a. ɣd		*!					*			
	b. vd		*!					*			
	c. ðd		*!							*	
	d. ðv		*!								*
	e. zd			*!						*	
	f. rd				*!					*	
	g. dd ☜					*	*			*	
	h. ðð	*!*								*	

Finally, in IG, the labial–dorsal combination is instantiated by the unique case of /vɣ/. The pronunciations that are currently found are presented below:

(75) *vg* variants in IG

IG varieties	/vɣ/
MedG	vg
Early SIG, Martano SIG	vg
Sternatia/Calimera SIG, SIG+, Roghudi/Galliciano/Bova CIG	g^w ~ gg^w ~ gg ~ g (~vg)

As predicted by the definition of the markedness constraints related to PoA features allowed in coda position, which make crucial reference to the level of markedness of the following onset, the labial /v/ is not forced to shift towards a less marked PoA before the dorsal /ɣ/. Rather, since the two consonants share the feature [per], the cluster counts as semi-homorganic. Compare, for instance, the violation profile of /vɣ/ with that of /vð/ during the period when MAX[pl] was demoted below *{[dor].[¬dor], [per].[¬per]}. In both cases OCP[+cont] eliminates the faithful candidate (a). Given the input /vð/, *{[dor].[¬dor], [per].[¬per]} rules out the output [vd] (candidate b) and the violation of MAX[pl] that [dd] (candidate c) incurs is not fatal. By contrast, /vɣ/ → [ðg] yields a fatal violation of MAX[pl], because the competitor /vɣ/ → [vg] (candidate b) does not violate *{[dor].[¬dor], [per].[¬per]}.

(76) Absence of PoA shift in /vɣ/

Input	*Output*	OCP[+cont]	*{[dor].[¬dor], [per].[¬per]}	MAX[pl]
vð	a. vð	*!		
	b. vd		*!	
	c. dd ☜			*
vɣ	a. vɣ	*!		
	b. vg ☜			
	c. ðg			*!

Moreover, fricatives were admissible in the coda thanks to the ranking IDENT[cont], IDENT[str], IDENT[son] >> *STOPFRIC.CODA. Once they ceased to be allowed, the IG grammars had to choose a new optimum for /vɣ/ among an array of alternatives not violating *STOPFRIC.CODA. Among those alternatives, the geminate [gg] required a PoA shift of the labial to a dorsal, which translates into a violation of DEP[pl], and a change from [+cont] to [–cont], and the labiovelar [g^w] involves fusion of the two segments, which is penalized by UNIFORMITY. The choice between [gg] and [g^w] is based on the interplay between the IDENT[cont] and DEP[pl], on the one hand, and UNIFORMITY, on the other hand. If IDENT[cont] and DEP[pl] are dominated by UNIFORMITY (77), then [gg] surfaces. Reversely (78), if either of the constraints disfavoring [gg] are ranked above UNIFORMITY, then [g^w] is the winner.

(77) Realization of /vɣ/ as [gg]

Input	*Output*	*STOPFRIC.CODA	UNIFORM	DEP[pl]	IDENT[cont]
vɣ	a. vg	*!			*
	b. gg ☜			*	**
	c. g^w		*!		

(78) Merge of /vɣ/ into [g^w]

Input	*Output*	*STOPFRIC.CODA	IDENT[cont]	DEP[pl]	UNIFORM
vɣ	a. vg	*!	*		
	b. gg		*!*	*	
	c. g^w ☜				*

A presumably rarer variant of [gg] appears to be the singleton [g], which is reported by Katsoyannou 1995 (albeit not confirmed by my dataset). Presumably, for a number of speakers, MAX-$C_{[per]}$, which is in general considered to outrank the constraints determining featural change, is demoted to the bottom of the hierarchy (79):

(79) Realization of /vɣ/ as [g]

Input	*Output*	*STOPFRIC .CODA	IDENT [cont]	DEP [pl]	UNIFORM	MAX-$C_{[per]}$
vɣ	a. vg	*!	*			
	b. gg		*!*	*		
	c. g^w				*!	
	d. Øg ☜					*

Other alternatives, such as [zg] or [rg] are not encountered. In fact, the former is disallowed by a phonotactic constraint *zg in IG, at least as far as the native lexicon is concerned. The latter, though, could be possible in SIG+, under the ranking in (80):

(80) Realization of /vɣ/ as [rg] (SIG+)

Input	*Output*	*zg	*STOPFRIC.CODA	UNIF	MAX-C	IDENT [cont]	IDENT [son]
vɣ	a. vg		*!			*	
	b. gg					**!	
	c. g^w			*!			
	d. Øg				*!		
	e. rg ☜					*	*
	f. zg	*!					

6. CN clusters

In MedG, /ON/ clusters used to be qualified as complex onsets. At some point during the preliminary stages of IG, the MSD requirements became stricter, and complex onsets of the sonority distance manifested in ON ceased to be tolerated, which fuelled a series of processes aiming at improving the novel coda–onset clusters resulting from [O.N] syllabification. This section addresses the evolution of heterosyllabic obstruent–nasal (ON) and nasal–nasal clusters IG inherited from MedG. Liquid–nasal sequences are examined in section 8.

In IG, the coronal nasal /n/ is never preceded by a coronal obstruent. More precisely, /tn/ and /sn/ are inexistent in all stages of Greek and /θn/ is extremely rare (see chapter 2), thus the analysis of /On/ is limited to the clusters presented below:

(81) Attested variants of Cn in IG

IG varieties	/kn/	/xn/	/ɣn/	/pn/	/fn/	/vn/	/mn/
Pre-SIG	xn	xn	ɣn	fn	fn	vn	mn
Early SIG, Martano SIG	fn	fn	vn	fn	fn	vn	mn
Martano SIG+	vn	vn	vn	vn	vn	vn	mn
Calimera SIG, Sternatia SIG	nn	nn	nn	nn	nn	nn	nn
Bova CIG	nn	nn	nn	nn	nn	nn	nn
Roghudi CIG, Galliciano CIG	nn	nn	nn	nn	nn	nn	nn

With the exception of /sm/, etymological /Om/ clusters are only found at the boundary between a root and a suffix. Their realization is summarized below:

(82) Attested variants of Cm in IG

IG varieties	/km, xm, ɣm/	/pm, fm, vm/	/C[PN]m/
MedG, pre-SIG	ɣm	m	zm
SIG, CIG	mm	mm	zm ~ mm

Let's begin with On clusters. Pre-SIG does not differ from Late MedG with respect to the PoA features admitted in the coda. Consider Tableau (83). As MAX[pl] and LINEARITY outrank *{[dor].[¬dor]} and *{[dor].[¬dor], [per].[¬per]}, shifted (e.g. /kn/ → [pn], /kn/ → [nn]) and transposed (e.g. /kn/ → [nk]) candidates are eliminated. The selection between the two surviving candidates that stay true to their PoA specification is made based on the ranking *STOP.CODA >> IDENT[cont]: the candidate including a plosive coda, /kn/ → [kn], is ruled out, and /kn/ → [xn], where the obstruent is spirantized, is rendered optimal. Given an underlying fricative–nasal cluster, e.g. /xn/, the grammar also selects a fricative–nasal cluster as the winning candidate. The increasing sonority across the syllable borders is not problematic, as SYLCONT(0) is ranked at the bottom of the hierarchy.

(83) Spirantization in On (Pre-SIG)

Input	*Output*	MAX[pl]	LINEAR	*{[dor].[¬dor], [per].[¬per]}	*{[dor].[¬dor]}	*STOP.CODA	IDENT[cont]	SYLCONT(0)
kn	a. kn			*	*	*!		*
	b. xn ☜			*	*		*	*
	c. pn	*!		*		*		*
	d. fn	*!		*			*	*
	e. nn	*!*						
	f. nk		*!					

Moreover, since marked PoA features are not avoided in Pre-SIG, the nasal cluster /mn/ surfaces as [mn] (84).

(84) Faithful realization of /mn/ (Pre-SIG)

Input	*Output*	MAX[pl]	LINEAR	*{[dor].[¬dor],[per].[¬per]}	*{[dor].[¬dor]}	*STOP.CODA	IDENT[cont]	SYLCONT(0)
mn	a. mn ☜			*				
	b. nn	*!						
	c. nm		*!					

Like in obstruent clusters, the ban of dorsals in the coda that dawned in Early SIG and continued in the variety of Martano led to the neutralization of dorsals and labials before a coronal nasal, and plosive codas continued being inadmissible. The modifications in the constraint hierarchy did not have any bearing on the realization of /mn/ as [mn]. A representative example of a PoA shift from a dorsal to a labial and a simultaneous change from [–cont] to [+cont] is given below:

(85) PoA shift *dor* > *lab* and spirantization in On (Early SIG, Martano SIG)

Input	*Output*	*{[dor].[¬dor]}	LINEAR	MAX[pl]	*{[dor].[¬dor], [per].[¬per]}	*STOP.CODA	IDENT[cont]	SYLCONT(0)
kn	a. kn	*!			*	*		*
	b. xn	*!			*		*	*
	c. pn			*	*	*!		*
	d. fn ☜			*	*		*	*
	e. nn	*!*		**				
	f. nk		*!					

The effect of the constraint AGREE[voice], according to which codas must have the same voicing value as the adjacent onset, was optionally extended to /On/ clusters in Early SIG. Essentially, the cluster [fn] (coming from /fn/, /pn/, /xn/, or /kn/) occurred next to a voiced [vn] variant.

(86) Regressive voice assimilation in On (Early SIG)

Input	*Output*	AGREE[voice]	IDENT[voice]
fn	a. fn	*!	
	b. vn ☜		*

The evolution of /On/ is similar in the majority of SIG varieties, e.g. Sternatia and Calimera and in Bova CIG. All these enclaves allow exclusively strident or sonorant coronals in the coda. The PoA hierarchy rules out all dorsal and labial codas ([kn], [xn], [pn], [fn]) and the ranking of *STOPFRIC.CODA above IDENT[str] and IDENT[son] ensures that the fricative coronal [θ] is not preferred over sibilant or sonorant coronal codas. Even though at least in Bova IDENT[str] is ranked below IDENT[son] (see section 5), the output [sn] cannot win, because of a phonotactic constraint forbidding the particular sequence. Inevitably, the grammar resorts to a candidate involving a sonorant coda. Between the two options, [rn] and [nn], the former should have an advantage, since the geminate nasal violates IDENT[nas] in addition to IDENT[son]. However, IG has a dispreference for cooccurring sonorant coronals, formulated by means of the constraint OCP-COR[+son] (Pater & Coetzee 2005; Anttila 2008). As long as OCP-COR[+son] outranks IDENT[nas], /xn/ → [nn] wins against /xn/ → [rn].

(87) OCP-COR[+son] Assign a violation mark for every pair of adjacent sonorant coronal consonants

(88) PoA shift *dor, lab* > *cor* in On; realization as [nn] (Sternatia & Calimera SIG, Bova CIG)

Input	*Output*	LINEAR	*{[dor].[¬dor], [per].[¬per]}	MAX[pl]	*sn	*STOPFRIC.CODA	IDENT[son]	IDENT[str]	OCP-COR[+son]	IDENT[nas]
kn	a. kn		*!			*				
	b. xn		*!			*				
	c. pn		*!	*		*				
	d. fn		*!	*		*				
	e. nk	*!								
	f. nn ☜			**			*			*
	g. rn			**			*		*!	
	h. θn			**		*!				
	i. sn			**	*!			*		

A glance at the violations the dorsal and labial obstruents incur with respect to *{[dor].[¬dor], [per].[¬per]} and *STOPFRIC.CODA in (88) raises the question whether it is actually MoA requirements that exclude these segments from the coda. However, the ranking *{[dor].[¬dor], [per].[¬per]} >> MAX[pl] is crucial in the grammar, as it is responsible for the shift observed in the nasal cluster /mn/ (Tableau 89). In NN clusters MoA restrictions are not relevant, so in the shift /mn/ → [nn] (candidate b) we see PoA restrictions at play in their pure form.

(89) PoA shift in /mn/ (Sternatia & Calimera SIG, Bova CIG)

Input	*Output*	LINEAR	*{[dor].[¬dor], [per].[¬per]}	MAX[pl]	*STOPFRIC.CODA
mn	a. mn		*!		
	b. nn ☜			*	
	c. nm	*!			

In Roghudi and Galliciano CIG, metathesis is available. However, it applies only to /Os/ (see also LDM in section 2). Metathesis of /On/ would yield [nO] that is by all means admissible. However, aligning with cross-linguistic tendencies (see Ultan 1971; Blevins & Garrett 2004), the only segments allowed to move in IG are rhotics and sibilants. Therefore, a parametrized LINEARITY{¬r, s} constraint penalizing metathesis of non-sibilant and non-rhotic consonants is posited (see Alber 2001). Therefore, even though general LINEARITY would allow, for instance, /kn/ and /mn/ to surface as [nk] (admissible in IG) and [nm] (not found in Greek in general), respectively, these candidates are ruled out by LINEARITY{¬r, s}. This in turn leaves room for shifted candidates to emerge.

Notably, Roghudi CIG permits [θ] in the coda thanks to the ranking IDENT[cont] >> *STOPFRIC.CODA (cf. Galliciano which does not allow [θ] at all). Yet, /kn/ → [θn] loses to /kn/ → [nn] due to the domination of SYLCONT(0) over IDENT[nas] (cf. Pre-SIG, Early SIG, Martano SIG).

(90) PoA shift *dor*, *lab* > *cor* in On; realization as [nn] (Roghudi & Galliciano CIG)

Input	*Output*	LINEAR {¬r, s}	*{[dor].[¬dor], [per].[¬per]}	MAX [pl]	LINEAR	SYLCONT (0)	IDENT [nas]
kn	a. kn		*!				
	b. xn		*!				
	c. pn		*!	*			
	d. fn		*!	*			
	e. nk	*!			*		
	f. nn ☜			**			*
	g. θn			**		*!	

mn	a. mn		*!					
	b. nm	*!			*			
	c. nn ☜			*				

Even though meeting the imperative that sonority should fall across syllable borders was not critical in most varieties of IG, and certainly not in the early stages, speakers seem to have opted for alternatives that do not sacrifice syllable contact in a small number of lexical items containing /On/. Vowel epenthesis divided the cluster and created two syllables, each having a simplex onset. Liquidization of the nasal, on the other hand, increased its sonority, thus the innovative cluster qualified anew as a complex onset. These alternatives possibly emerged in the early stages of IG, when MSD(+2.5) first became top-ranked, yet MAX[pl] was still above *{[dor].[¬dor], [per].[¬per]}, therefore peripherals did not have the option to shift to a coronal [n]. The patterns are schematically presented below (for actual data see chapter 2):

(91) Realizations of On

/On/	*Description*
.On	poor complex onset (i.e. MSD is not met)
O.n	coda–onset of poor SylCont (i.e. rising sonority)
n.n	conversion of /O/ into [n] ensures good SylCont and unmarked coda in terms of PoA and MoA
OV.n(V)	vowel epenthesis splits the cluster and creates two simplex onsets
.OL	conversion of /n/ into liquid ensures MSD for complex onsets is met

The fact that a heterosyllabic parsing of [O.n] is unhindered in some of the IG varieties indicates that SYLCONT(0) is typically bottom-ranked. The alternative variants are taken to emerge due to the promotion of SYLCONT(0) above {DEP-V, IDENT[nas]}.sub (92). The output [.OV.n] (candidate d) wins if DEP-V is the subordinate and [.OL] (candidate e) is selected if IDENT[nas] is the lowest-ranked of the class.

(92) Alternative realizations of On

Input	*Output*	MAX[pl]	MSD (2.5)	SYLCONT (0)	DEP-V	IDENT [nas]
On	a. .On		*!			
	b. O.n			*!		
	c. n.n	*!(*)				*
	d. .OV.n (☜)				*(!)	
	e. .OL (☜)					*(!)

Let's now move on to Om clusters. Although in theory nothing blocks homorganic clusters, the actual data suggest that clusters of labials are not permitted, with the exception of NO, e.g. [mb] (mapped on /np/ or /nv/). During the early stage of SIG where dorsals shift to labials, the clusters [xm]/[ɣm] were reshaped into a geminate [mm] instead of [fm]/[vm], whereas the etymological /fm/ and /vm/ also surface as [mm]. The bias against adjacent labial consonants in fact dates back to MedG and even AncG. Such clusters are in principle encountered in derived contexts, e.g. at the boundary between a root ending with a labial obstruent and a suffix beginning with /m/. AncG as well as Modern dialects that preserve geminate consonants, among which IG, repair labial clusters through assimilation of the coda to the onset, i.e. [mm]. The non-geminating dialects, on the other hand, opt for deletion of the root-final obstruent.

The avoidance of adjacent labials can be attributed to a constraint OCP-LABIAL (Coetzee & Pater 2006) (for the persistence of NO clusters see section 7).

(93) OCP-LAB Assign a violation mark for every pair of adjacent labial segments

In dialects allowing geminates, such as IG, a labial cluster surfaces as a geminate as long as OCP-LAB and MAX-C dominate *GEMINATE (on the exceptional case of NO see section 7). Given that /m/ always occupies the second place of an underlying labial cluster in IG, IDENT[son] and IDENT[nas] should also be dominated.

(94) Repair of labial clusters through the formation of a geminate

Input	*Output*	OCP-LAB	MAX-C	IDENT[son]	IDENT[nas]	*GEMIN
fm	a. fm	*!				
	b. mm ☜			*	*	*
	c. Øm		*!			

In dialects that have abandoned geminates, MAX-C is demoted below at least one constraint among *GEMINATE, IDENT[son], and IDENT[nas], thus the illicit cluster is repaired via deletion of the root-final consonant, i.e. /fm/ → [Øm].

(95) Repair of labial clusters through deletion

Input	*Output*	OCP-LAB	*GEMIN	IDENT[son]	IDENT[nas]	MAX-C
fm	a. fm	*!				
	b. mm		*!	*	*	
	c. Øm ☜					*

The hierarchy OCP-LAB, MAX-C >> *GEMINATE, IDENT[nas] holds in all IG varieties throughout their history. When dorsals are prohibited in the coda in Early SIG, obstruents preceding a coronal /n/ retain their non-sonorant status, i.e. /ɣn/ → [vn], *[mn], *[nn], because the violation of IDENT[son] is fatal. However, if a labial /m/ follows, the top-ranked OCP-LAB rules out the /ɣm/ → [vm] candidate. The next best, i.e. the /ɣm/ → [mm], is thus selected despite violating IDENT[son].[18]

(96) /ɣn/ vs. /ɣm/

Input	*Output*	OCP-LAB	*{[dor].[¬dor]}	IDENT[son]	MAX[pl]
ɣn	a. ɣn		*!		
	b. vn ☜				*
	c. mn			*!	*
	d. nn			*!	**

[18] Curiously enough, the etymological geminate labials /pp/ and /mm/ were optionally dissolved into a [NO] cluster in SIG (see chapter 2).

ɣm	a. ɣm		*!		
	b. vm	*!			*
	c. mm ☜			*	*

At surface level, the only obstruent coronal–nasal sequence that is possible in IG is [zm], which is the mapping of /sm/ or derives from /θm/, which cannot surface faithfully due to the general avoidance of [θ] in the coda even in the varieties having the particular sound. The rising sonority slope did not pose a problem for the greatest part of IG. Nevertheless, it appears that Syllable Contact became stricter in the most recent history of IG, especially in Galliciano and Roghudi CIG, as variation between [zm] (SD = 1) and [mm] (SD = 0) is observed. As shown in Tableau (97), in these dialects, the constraint SYLCONT(0) is ranked above all constraints militating against the changes leading from /sm/ to [mm], i.e. DEP[pl], IDENT[str], IDENT[son], and IDENT[nas]. In previous versions of IG, at least one of these faithfulness constraints outranked SYLCONT(0).

(97) [zm] vs. [mm]

Input	*Output*	SYLCONT(0)	DEP[pl]	IDENT[str]	IDENT[son]	IDENT[nas]
sm	a. zm	*!				
	b. mm		*	*	*	*

7. NC clusters

In IG, nasals may immediately precede stops. Cross-linguistically, it is impressively widespread that nasals are homorganic with the following obstruent. IG is no exception: when it comes to nasal–stop clusters, a coda /n/ surfaces as [n] before coronals, [m] before labials, and [ŋ] before dorsals. These structures are preferred by AGREE[place] (Alderete et al. 1999; Baković 2000; see also Gnanadesikan 1997) operating specifically in NO clusters (Rubach 2008):

(98)	AGREE[place].NO	Assign a violation mark for every NO cluster the members of which do not have the same specification for place

AGREE[place].NO must dominate DEP[pl] so that place assimilation of /n/ before labials and dorsals does not incur a fatal violation (consider Tableau 99, candidates (b)). Moreover, the general avoidance of cooccurring labials is overlooked in the case of NO, because AGREE[place].NO outranks OCP-LAB (see optimal candidate /np/ → [mp]). Expectedly, before another coronal, the faithful realizations of /n/ prevails (see optimal candidate /nt/ → [nt]).

(99) Place assimilation in NO[–cont]

Input	*Output*	AGREE[place].NO	OCP-LAB	DEP[pl]
np	a. np	*!		
	b. mp ☜		*	*
nk	a. nk	*!		
	b. ŋk ☜			**
nt	a. nt ☜			
	b. mt	*!		*

In addition to PoA, the members of NO$_{[-\text{cont}]}$ clusters often agree as to [±voice]; more precisely, voiceless obstruents get voiced after a nasal. This tendency is motivated by the constraint *NC̥ (Pater 1996):

(100) *NC̥ Assign a violation mark for every sequence of a nasal followed by a voiceless consonant

In MedG, *NC̥ and IDENT[nas][19] dominate IDENT[voice], thus triggering voice assimilation of post-nasal voiceless stops. The illicit structure at hand is not repaired via the creation of a voiceless geminate or a rC cluster, because the violation of IDENT[nas] is fatal. CIG stays true to this pattern.

[19] IDENT[son] is also violated by /nt/ → [tt].

(101) Progressive voice assimilation in NO (CIG)

Input	*Output*	*NC̥	IDENT[nas]	IDENT[voi]
nk, np, nt	a. ŋk, mp, nt	*!		
	b. ŋg, mb, nd ☜			*
	c. kk, pp, tt		*!	
	d. rk, rp, rt		*!	

In SIG, on the other hand, post-nasal obstruents preserve their voicelessness. The prerequisite for this pattern to emerge is that IDENT[voi] outranks *NC̥. IDENT[nas] is also high-ranked so that the NO cluster is not replaced by a voiceless geminate.[20]

(102) Voiceless NO in SIG

Input	*Output*	IDENT[voi]	IDENT[nas]	*NC̥
nk, np, nt	a. ŋk, mp, nt ☜			*
	b. ŋg, mb, nd	*!		
	c. kk, pp, tt		*!	

More recently, though, the ranking between IDENT[nas] and *NC̥ has become variable, even though both consistently rank below IDENT[voi]. Since the grammar does not strictly distinguish between candidates on the basis of this particular ranking, geminates coexist with NO[–voi] clusters:

(103) Absence of progressive voice assimilation in NO (SIG)

Input	*Output*	IDENT[voi]	*NC̥	IDENT[nas]
nk, np, nt	a. ŋk, mp, nt (☜)		*(!)	
	b. ŋg, mb, nd	*!		
	c. kk, pp, tt (☜)			*(!)

NO clusters are always voiced when followed by a liquid since MedG, e.g. [ndr], *[ntr]. The neutralization to [+voice] has probably led to a ubiquitous $O_{[+voi]}$ in the input, e.g. /ndr/ even in

[20] Rarely, devoicing targets underlying /ng, nd/, potentially motivated by analogy.

those cases where etymology would suggest /ntr/. Optional devoicing of an underlying $O_{[+voi]}$ is not allowed, even in SIG.

A final idiosyncrasy of IG in comparison with MedG concerns the realization of the nasal–fricative clusters /nx/, /nf/ and /nθ/. Although in MedG and in most Greek dialects these clusters are realized as NO, i.e. [ŋx], [ɱf], [n̪θ], the most widespread option in IG is a geminate [xx], [ff], and [θθ]. The avoidance of fricatives after a nasal via several strategies is not unheard of in natural languages (see Steriade 1993; Riehl 2008; de Lisi 2021 for Latin) and can be formalized by means of the constraint *$NC_{[+cont]}$:

(104) *$NC_{[+cont]}$ Assign a violation mark for every sequence of a nasal followed by a continuant

In MedG, the IDENT constraints prohibiting changes of [±cont] and [±son] dominate *$NC_{[+cont]}$. This means that fricatives make it to the surface even though they participate in marked clusters.

(105) Realization of post-nasal fricatives (MedG)

Input	*Output*	IDENT [cont]	IDENT [son]	IDENT [nas]	*$NC_{[+cont]}$
nx, nf, nθ	a. ŋx, ɱf, nθ ☜				*
	b. xx, ff, θθ		*!	*	
	c. ŋk, mp, nt	*!			
	d. kk, pp, tt	*!	*	*	

In IG, nasal–fricative sequences containing dorsals and coronals are avoided via assimilation of the nasal, as *$NC_{[+cont]}$ and IDENT[cont] dominate IDENT[nas] and IDENT[son]. Rhotacization of the nasal, i.e. /nx, nθ/ → [rx, rθ], creates a sequence of continuants that is penalized by OCP[+cont], while the despirantization of the fricatives, i.e. [rk, rt], fatally violates IDENT[cont].

(106) Avoidance of post-nasal fricatives (IG)

Input	*Output*	OCP [+cont]	*NC$_{[+cont]}$	IDENT [cont]	IDENT [son]	IDENT [nas]
nx, nθ	a. ŋx, nθ		*!			
	b. xx, θθ ☜				*	*
	c. ŋk, nt			*!		
	d. kk, tt			*!	*	*
	e. rx, rθ	*!				*
	f. rk, rt			*!		*

Since labial fricatives do not despirantize after a rhotic, /nf/ can skip the violation of IDENT[cont] and be realized as [rf] (Tableau 107, candidate e; here taken to satisfy OCP[+cont]; see section 8 for further details). Occasional instances of [ff] (candidate b) could be attributed to analogy to other nasal–fricative clusters (see 106).

(107) Realization of /nf/ as [rf] (IG)

Input	*Output*	OCP [+cont]	*NC$_{[+cont]}$	IDENT [cont]	IDENT [son]	IDENT [nas]
nf	a. ɱf		*!			
	b. ff (☜)				*!	*
	c. mp			*!		
	d. pp			*!	*	*
	e. rf ☜					*
	f. rp			*!		*

More recently, [θθ] has been despirantized in SIG and Galliciano CIG due to the abandonment of [θ] in general. Furthermore, in the contemporary version of IG, both [θθ] and [tt] are mostly degeminated (see chapter 2).

8. LC clusters

The two liquids /r/ and /l/ exhibit significantly different behavior in a pre-consonantal position. Whereas preconsonantal rhotics did not undergo changes, laterals have been avoided via a series of strategies since MedG. I follow Walsh-Dickey 1997 (see also Kappa 2021) in taking /l/ to bear a Dorsal node. Along these lines, the repair strategies targeting preconsonantal /l/ were triggered by the prohibition of [dor] segments in the coda. As shown in Tableau (108), when dorsals ceased to be admitted in coda position by virtue of the ranking *{[dor].[¬dor]} >> MAX[pl], laterals preceding a coronal obstruent /t/, /θ/, or /s/, turned into [r], i.e. a coronal sonorant. Changing to a non-sonorant coronal or a nasal fatally violates IDENT[son] and IDENT[nas], respectively. An intermediate shift to a sonorant labial [m], although less costly with respect to MAX[pl], was not possible, since the resulting cluster is eliminated by AGREE[place].NO (see section 7).

(108) Rhotacization of coda /l/

Input	*Output*	*{[dor].[¬dor]}	AGREE[pl].NO	IDENT [son]	MAX [pl]	IDENT [nas]
lt, lθ, ls	a. lt, lt, ls	*!				
	b. rt, rt, rs ☜				**	
	c. nt, nt, ns				**	*!
	d. st, st, ss			*!	**	
	e. mt, mt, ms		*!		*	
	f. ll			*!		

An exception is noticed in the case of /ln/ (Tableau 109), which turns into [ll] (candidate c) (on the evolution of which see chapter 2) instead of turning into [rn] (candidate d). This change does not involve a violation of Ident[son], so (c) survives after MAX[pl] eliminates (d).

(109) Realization of /ln/ as [ll]

Input	*Output*	*{[dor].[¬dor]}	IDENT [son]	MAX [pl]	DEP [pl]	IDENT [nas]
ln	a. ln	*!				
	b. nn			*!*		*
	c. ll ☜				**	*
	d. rn			*!*		

Before a labial –in practice, /m/– though, three different variants are observed. The most frequent pattern is a PoA shift of /lm/ to [mm] (110, candidate b), on condition that MAX[pl] strictly dominates IDENT[nas]. For some speakers, though, the particular ranking seems to be reversed, which renders the candidate /lm/ → [rm] (candidate c) equally or more harmonic to /lm/ → [mm]. Another rare alternative optimum involves vowel epenthesis and the subsequent parsing of /l/ as a simplex onset, i.e. /lm/ → [lVm] (candidate c), and is selected in case DEP-V, which in general outranks MAX[pl] and IDENT[nas], gets demoted.

(110) Realizations of /lm/

Input	*Output*	*{[dor].[¬dor]}	DEP-V	MAX[pl]	IDENT[nas]
lm	a. lm	*!			
	b. mm (☜)			*	*(!)
	c. rm (☜)			**(!)	
	d. lVm (☜)		*(!)		

The additional violation of MAX[pl] the /lC/ → [rC] candidates incur is non-fatal in the case of lateral–fricative sequences, e.g. /lf/ (Tableau 111). Since post-consonantal labial fricatives do not undergo despirantization, the nasal–fricative cluster [ɱf] is ruled out by *NC[+cont] (see section 7). Moreover, candidate /lf/ → [ff] yields a fatal violation of IDENT[son]. Thus, the grammar opts for rhotacization of the /l/.

(111) Realization of /lf/

Input	*Output*	*{[dor].[¬dor]}	*NC[+cont]	IDENT [son]	MAX[pl]	IDENT[nas]
lf	a. lf	*!				
	b. ɱf		*!		*	*
	c. ff			*!		
	d. rf ☜				**	

As mentioned above, the occurrence of pre-consonantal /r/ was uninterrupted throughout the history of IG. Nonetheless, not all rC clusters remained intact since MedG. /r/ is specified as [+cont], thus MoA dissimilation is triggered when it is followed by dorsal and coronal fricatives, i.e. /rx/ → [rk], /rθ/ → [rt], /rɣ/ → [rg], and /rð/ → [rd], due to the ranking OCP[+cont] >> IDENT[cont], but not when it precedes labials, i.e. /rf/ → [rf], [rv] → [rv], owing to the protection the top-ranked FAITH-CC[+cont, lab] offers (see 50 above).

(112) Exceptional underapplication of MoA dissimilation in rO (MedG)

Input	*Output*	FAITH-CC[+cont, lab]	OCP[+cont]	IDENT[cont]
rx, rθ	a. rx, rθ		*!	
	b. rk, rt ☜			*
rf	a. rf ☜		*	
	b. rp	*!		*

/rs/ resisted dissimilation as well. In a subset of SIG varieties, e.g. Martano, where OCP[+cont] violations are not fatal (see section 3, 4), /rs/ survives as [rs]. However, in Sternatia SIG, an intrusive [t] splits the sequence, just like it happens with derived [rs] that maps onto /xs/ or /fs/ (see 43 above), due to the ranking OCP[+cont] >> DEP-C.

(113) [t] insertion in /rs/ (SIG)

Input	Output	OCP[+cont]	DEP-C
rs	a. rs	*!	
	b. rts ☜		*

In CIG, /r/ is currently followed by a post-alveolar affricate [tʃ] which has resulted, first, from the palatalization of /s/ and, second, the insertion of an intrusive [t]. *S*-retraction is fairly common in the /rs/ context (see Kokkelmans 2020). It has been convincingly argued that, in languages with two-sibilant inventories, such as IG (/s/ and /ʃ/), a [(dento)alveolar, laminal] sibilant preceded by a [(retracted) alveolar, apical] /r/ undergoes assimilation resulting in an apical retracted alveolar [s̠], that is subsequently reanalyzed as /ʃ/, which is perceptually less ambiguous and creates a better dispersed contrast between phonologically distinct sibilants (Kokkelmans 2020, 2021). I do not incorporate the articulatory and perceptual traits of this evolutionary path into the OT constraints, thus I simply take the avoidance of [rs] to be driven by a phonotactic constraint *rs operating in CIG. An intrusive [t] makes it to the surface form due to the ranking OCP[+cont] >> DEP-C.

(114) Palatalization and [t] insertion in /rs/ (CIG)

Input	*Output*	*rs	OCP[+cont]	DEP-C
rs	a. rs	*!	*	
	b. rʃ		*!	
	c. rtʃ ☜			*

Finally, let's take a look at /rN/ clusters. /rm/ is realized faithfully (Tableau 115, candidate a). Alternative outputs such as [rr] (candidate b) or [mm] (candidate c) are ruled out as they both incur a violation of IDENT[nas].

(115) /rN/

Input	*Output*	IDENT[nas]
rm	a. rm ☜	
	b. rr	*!
	c. mm	*!

The case of /rn/ is more complicated, as the adjacent sonorant coronals are punished by OCP-COR[+son]. Thus, /rn/ (Tableau 116) may either surface faithfully as [rn] (candidate a) or be progressively assimilated to [rr] (candidate b). The ranking between between OCP-COR[+son] and IDENT[nas] is taken to be variable, thus both options can be selected. The unavailability of the variant [nn] (candidate c) is attributed to the presence of FAITH-LIQUID in the constraint set:

/rn/ → [rr] outperforms [rn] → [nn] with respect to FAITH-LIQUID. Note that [rn] never constitutes the optimal candidate given an input /On/; e.g. /xn/ cannot surface as [rn], because this violates both OCP-COR[+son] and IDENT[nas].

(116) Variation in the realization of /rn/ (cf. /On/)

Input	*Output*	OCP-COR[+son]	IDENT[nas]	FAITH-LIQUID
rn	a. rn (☜)	*(!)		
	b. rr (☜)		*(!)	
	c. nn		*	*!
xn	a. rn	*	*!	
	b. nn ☜		*	

9. Word-initial "codas"

The claim that all but OL clusters are always parsed as coda–onset poses the question what happens to clusters which cannot be syllabified as onsets when they are found in word-initial position. I assume that the left edge of a Prosodic Word (PrW) must coincide with the left edge of a syllable, which is captured via the alignment constraint ALIGN(L, PrW; L, σ) (see McCarthy & Prince 1993). Moreover, I take degemination to apply word-initially under the influence of *INITIALGEMINATE (Kennedy 2008). Extraprosodic elements are penalized by PARSE-C (Kennedy 2008).

(117) a. ALIGN(L, PrW; L, σ) — Assign a violation mark if the left edge of a PrW does not coincide with the left edge of a syllable

b. *INITIALGEMINATE — Assign a violation mark for every word-initial geminate consonant

c. PARSE-C — Assign a violation mark for every extraprosodic consonant

The ranking *INITIALGEMINATE >> MAX-C >> ALIGN(L, PrW; L, σ) >> PARSE-C accounts for the avoidance of initial geminates, on the one hand, and the preservation of true initial clusters at the cost of full parsing, on the other hand. Provided that *INITIALGEMINATE outranks MAX-C, degemination takes place so that the PrW begins with a singleton, i.e. /pp/ → [Ø.p]. The first member of a true cluster, though, e.g. /sp/, cannot be deleted: given that *INITIALGEMINATE is no longer relevant, the violation of MAX-C is fatal. Moreover, ALIGN(L, PrW; L, σ) prevents candidates in which the first consonant of the PrW is not syllabified in an onset, i.e. /sp/ → [s.p]. Thus, the first consonant of a heterosyllabic cluster is taken to be extrasyllabic, i.e. [<s>.p], when it initiates a PrW. With the consonant at hand left unparsed, the leftmost segment of the PrW is indeed an onset consonant.

(118) Avoidance of word-initial geminates via deletion

Input	*Output*	*INITIALGEMIN	MAX-C	ALIGN(L, PrW; L, σ)	PARSE-C
#pp	a. #Ø.p ☜		*		
	b. #p.p	*!		*	
	c. #<p>.p	*!			*

(119) Avoidance of word-initial codas via extraprosodicity

Input	*Output*	*INITIALGEMIN	MAX-C	ALIGN(L, PrW; L, σ)	PARSE-C
#sp	a. #Ø.p		*!		
	b. #s.p			*!	
	c. #<s>.p ☜				*

When the heterosyllabic sequence is found in a medial position of a larger prosodic constituent, then the "problematic" first part of the geminate or the first consonant is normally syllabified in the coda of the word-final syllable that precedes, as *INITIALGEMINATE and ALIGN(L, PrW; L, σ) are no longer relevant, hence the violation of PARSE-C is now fatal:

(120) Coda within an extended PrW

Input	*Output*	*INITIALGEMIN	ALIGN(L, PrW; L, σ)	PARSE-C
o# #pp	a. op.p ☜			
	b. o<p>.p			*!

o# #sp	a. os.p ☜			
	b. o<s>.p			*!

10. Word-final codas

Although codas are in general attested in IG, in an absolute final position, syllables are unexceptionally open (see chapter 3 on the potential influence of Romance) due to the effect of the constrain *FINALCODA. Final /s/ or /n/, i.e. the two consonants allowed word-finally in MedG, were in principle deleted in IG.

(121) *FINALCODA Assign a violation mark for every final coda consonant

The asymmetry between word-medial and word-final codas is generated by the hierarchy *FINALCODA >> MAX-C >> *CODA (Tableau 122). The deletion of a medial preconsonantal consonant (/sC/ → [∅.C], /nC/ → [∅.C]) fatally violates MAX-C, thus the optimum is a coda–onset cluster (/sC/ → [s.C], /nC/ → [n.C]).[21] The violation of MAX-C is not fatal in the case of a final consonant (/s#/ → [∅#], /n#/ → [∅#]), because the faithful antagonist (/s#/ → [s#], /n#/ → [n.#]) is ruled out by the less stringent, top-ranked *FINALCODA. The generic *CODA ranks below MAX-C, thus deletion of all codas independently of the position is not observed.

(122) Medial vs. Final codas

Input	*Output*	*FINALCODA	MAX-C	*CODA
sC	a. s.C ☜			*
	b. ∅.C		*!	
nC	a. n.C ☜			*
	b. ∅.C		*!	
s#	a. s.#	*!		*
	b. ∅# ☜		*	
n#	a. n.#	*!		*
	b. ∅# ☜		*	

[21] Even in the case of assimilation, e.g. /sm/ → [mm], the consonantal slot is not lost.

Within a larger prosodic constituent, word-final consonants do emerge in certain phonological contexts, although not necessarily in their full form. As summarized in Table (123), /s/ emerges as a sibilant only prevocalically, while before onsets (simplex or complex, i.e. CL) it manifests itself as additional length of the adjacent consonant, and before non-tautosyllabic clusters, including geminates (represented as CC in the table), it deletes. The nasal /n/ exhibits similar behavior, with cross-dialectal variation arising in the case of /n# #$C_{[-cont]}$/: in CIG, a prenasalized voiced stop is created, just like in medial position, whereas in SIG the /n/ assimilates to the following stop, although nasal–stop clusters are allowed word-medially. Tables (123–124) summarize the possibilities (for linguistic examples see chapter 2, section 3.9).

(123) Word-final /s/ next to word-initial V, .C, and C.

Underl. Form	Realization	Description
s# #V	.sV	*realization as [s]*
s# #CV	C.CV	*realization as extra length added to the onset*
s# #CLV	C.CL	*realization as extra length added to the onset*
s# #CCV	ØC.CV	*deletion*

(124) Word-final /n/ next to word-initial V, .C, and C.

Underl. Form	Realization	Description
n# #V	.nV	*realization as [n]*
n# #CV	C.CV	*realization as extra length added to the onset*
n# #$C_{[-cont]}$V	$.^{n}$CV (CIG)	*realization as a prenasalized voiced stop (onset)*
	C.CV (SIG)	*realization as extra length added to the onset*
n# #CLV	C.CL	*realization as extra length added to the onset*
n# #$C_{[-cont]}$LV	$.^{n}$CLV (CIG)	*realization as a prenasalized voiced stop (onset)*
	C.CLV (SIG)	*realization as extra length added to the onset*
n# #CCV	ØC.CV	*deletion*

The above sandhi phenomena have a close affinity to lexically induced *Radoppiamento Fonosintattico* (RF) in Italo-Romance, i.e. syntactic doubling triggered by words that used to contain a final consonant, which is currently absent in most environments (see chapter 3). The residual consonant that fuels lexical RF has received several accounts. Early research has analyzed it as a full consonant (Rohlfs 1966) or a feature [+consonantal] (Bertinetto & Loporcaro 1988; Loporcaro 1988) that undergoes total sandhi assimilation in certain environments. Within a moraic framework (Hayes 1989), the trigger is represented as an unfilled (Repetti 1991) or floating (Borelli 2000) mora, which is filled or associated in appropriated environments. Recently, along the lines of Gradient Symbolic Representations (GSR; Smolensky & Goldrick 2016), Amato (2019) assumed a partially active consonant, the activity of which is added to the adjacent onset in the form of additional weight. However, these approaches do not suffice to account for the IG pattern. First, a full consonant in all positions does not explain the asymmetrical behavior of pre-consonantal /s/ and /n/ word-medially and in sandhi in the exact same phonological context. The postulation of the feature [+consonantal] would entail the emergence of a default consonant intervocalically; instead, the distinct realizations [s] and [n] in IG (see also Fanciullo 1986 for Southern Italo-Romance dialects) suggest that final segments retain a more nuanced connection with their previous self apart from the property of being consonants. The moraic approaches fail to capture intervocalic segments as well as the coalesced prenasalized stop in CIG, since these do not contribute to the moraicity of the simplex onset they occupy. Finally, the GSR account should be capable of accounting for all patterns, provided that the constraint weights and the activity level of the input and output elements are appropriately manipulated. However, this model proves less elegant with respect to a typological analysis, as what counts as a minimal difference that defines a new typological category is rather obscure.

On this basis, I posit that the ghost-like behavior of the final segments is to be attributed to an impoverished underlying representation. In particular, what has been left of the old /s/ and /n/ in addition to a root node is a MoA feature [+strident] or [+nasal], respectively, which are licensed exclusively by association to strong positions, e.g. in onsets. By contrast, medial segments remain fully specified. Henceforth the "defective" segments will be dubbed /(s)/ and /(n)/ (collectively (C)). In the spirit of positional markedness (Zoll 1996, 1998; Walker 2011; Crosswhite 2001, 2004), I introduce the constraint LICENSE((F),ONSET):

(125) LICENSE((F),ONSET) Features of impoverished (C) are licensed only in onsets

Between vowels, final /(s)/ and /(n)/ emerge as a strident or a nasal consonant of default PoA, i.e. as a coronal, and are resyllabified in the onset. The antagonist involving deletion of the consonantal root incurs a fatal violation of MAX-C.

(126) Intervocalic final /(C)/

Input	*Output*	LICENSE((F),ONSET)	MAX-C
V(s)# #V	a. V.sV ☜		
	b. VØ.V		*!
Vn# #V	a. V.nV		
	b. VØ.V		*!

Before prevocalic consonants or OL clusters, the impoverished (C) cannot be syllabified in the onset, since the result violates the MSD required for a tautosyllabic parsing, i.e. SD ≥ +2.5 (see chapter 2).[22] Moreover, the realization as a proper strident or a nasal is not licensed in the coda, due to the fatal violation of LICENSE((F), ONSET). Deletion is blocked by MAX-C. Therefore, (C) is pushed into the coda and emerges as a consonant that copies the featural makeup of the adjacent onset. All faithfulness constraints that this copying process violates, given here as {FAITH}, are ranked below MSD(+2.5), LICENSE((F),ONSET), MAX-C, and UNIFORMITY, which penalizes coalescence (see immediately below). The selection of the winning candidates is illustrated in Tableau (127):

(127) Final /(C)/ as additional length before an onset

Input	*Output*	MSD (2.5)	LICENSE ((F),ONS)	MAX-C	UNIF	{FAITH}
V(s)# #kLV	a. V.skLV	*!				
	b. Vs.kLV		*!			
	c. VØ.kLV			*!		
	d. Vk.kLV ☜					*
V(n)# #kLV	a. V.nkLV	*!				
	b. Vn.kLV		*!			
	c. VØ.kLV			*!		
	d. Vk.kLV ☜					*
	e. V.ᵑkLV				*!	

[22] In the case of OL, it also ignores the general prohibition of triconsonantal onsets in IG.

Exceptionally, the final (n) in CIG may make it to the onset and thus be realized as a nasal element, if it coalesces with a following stop. The victory against the surface geminate is secured via the ranking of {FAITH} above UNIFORMITY, which penalizes the merged prenasalized stop.

(128) Final /(n)/ as a prenasalized onset in CIG

Input	*Output*	LICENSE((F),ONS)	MAX-C	{FAITH}	UNIF
V(n)# #kLV	a. V.ᵑgLV ☜				*
	b. Vk.kLV			*!	
	c. Vŋ.gLV	*!			
	d. VØ.kLV		*!		

Finally, deletion before a heterosyllabic sequence, be it a cluster or a geminate, is inevitable, since the only available coda position is occupied. The candidate /V(C)# #ft/ → [VC.ft] fatally violates MSD(+2.5), and the candidates containing a complex coda (/V(C)# #ft/ → [VCf.t] and /V(C)# #ft/ → [Vff.t]) are eliminated by the undominated constraint *COMPLEXCODA (Rose 2000).

(129) Deletion of final /(C)/ before a coda

Input	*Output*	*COMPLCODA	MSD(+2.5)	LICENSE((F),ONS)	MAX-C
V(s)# #ft	a. VØf.t ☜				*
	b. Vs.ft		*!	*	
	c. Vsf.t	*!		*	
	d. Vff.t	*!			
V(n)# #ft	a. VØf.t ☜				*
	b. Vn.ft		*!	*	
	c. Vnf.f	*!		*	
	d. Vff.t	*!			*

An alternative strategy is vowel epenthesis, the application of which is restricted to specific lexical items such as the negation /de(n)/. In the vast majority of lexical items containing a final (C), epenthesis is prevented, presumably due to the ranking DEP-V >> MAX-C. Along the lines of constraint indexation (Pater 2000, 2005, 2007), I hypothesize that an indexed constraint

MAX-C^{L} militates against deletion of consonants contained in the lexical item bearing an index '^{L}', e.g. /de(n)/^{L}. Hence, vowel insertion takes place instead. The exceptional blocking of deletion is achieved via the ranking MAX-C^{L} >> DEP-V >> MAX-C. Compare (130–131):

(130) Deletion of final non-indexed /(n)/ before a coda

Input	*Output*	MAX-C^{L}	DEP-V	MAX-C
V(n)# #ft	a. VØf.t ☜			*
	b. Vn.**i**f.t		*!	

(131) Exceptional blocking of deletion due to indexation

Input	*Output*	MAX-C^{L}	DEP-V	MAX-C
V(n)^{L}# #ft	a. VØf.t	*!		*
	b. Vn.**i**f.t ☜		*	

Through the same lens, the idiosyncratic avoidance of word-final /(s)/ in the inflectional morpheme denoting 2SG in the indicative in CIG, e.g. /kanis/ → [kánis**e**] (CIG) (cf. /kanis/ → [kániØ], SIG; see chapter 2) via insertion of the vowel [e] could be explained as exceptional faithfulness to an indexed morpheme /(s)^{L}/ '2SG'. In SIG, on the other hand, the morpheme is stored in the lexicon as a plain /(s)/, thus marginal cross-dialectal variation emerges.

(132) Deletion of /(s)/ '2SG' (SIG)

Input	*Output*	MAX-C^{L}	DEP-V	MAX-C
(s)#	a. Ø# ☜			*
	b. se#		*!	

(133) Exceptional blocking of deletion due to indexation of /(s)^{L}/ '2SG' (CIG)

Input	*Output*	MAX-C^{L}	DEP-V	MAX-C
(s)^{L}#	a. Ø#	*!		*
	b. se# ☜		*	

Take-home message

- This chapter built on the findings of the two previous chapters regarding the ranking conditions determining the broad patterns observed in each IG variety and offered a fine-grained analysis of the exact realization of heterosyllabic clusters (cf. abstract representations in chapter 4) and the specific phonotactics governing long-distance metathesis of liquids (cf. general pattern in chapter 5).

- More detailed ranking conditions that determine intra-dialectal variation were identified, the most important of which were:
  - the rankings determining the choice among strident coronals, sonorant coronals, affricates, and geminates in languages blocking marked PoA and MoA features in the coda:

Table 1	Optima	Rankings
Sternatia, Calimera	/ks/ → [t͡s] /xt/ → [tt]	• {IDENT[str], IDENT[son]}.sub >> {IDENT[cont], UNIF, *GEMIN}.dom
Calimera^{+}, Rogh/Gall^{+}	/ks/ → [ss] /xt/ → [tt$^{(h)}$]	• {IDENT[son], UNIF}.sub >> IDENT[str] >> {IDENT[cont], *GEMIN}.dom
SIG^{+}	/ks/ → [rs] /xt/ → [rt]	• {IDENT[str], {IDENT[cont], *GEMIN}.dom}.sub >> IDENT[son] • UNIF >> {IDENT[son], IDENT[cont]}.dom
Bova CIG	/ks/ → [t͡s] /xt/ → [st]	• IDENT[son] >> IDENT[str] • {IDENT[son], IDENT[cont]}.dom >> UNIF • {*GEMIN, IDENT[cont]}.dom >> {UNIF, IDENT[str]}.dom

  - the rankings determining the presence of adjacent continuants (Table 2) and the strategy employed to avoid them (Table 3):

Table 2	Optima	Rankings
Pre-SIG, Early SIG, Martano SIG	/fs/ → [fs]	{DEP-C, *STOP/CODA}.sub >> OCP[cont]
MedG Early Sternatia SIG	/fs/ → [ps] /fs/ → [fts]	{DEP-C, OCP[cont]}.sub >> *STOP/CODA

Table 3	Optima	Rankings
MedG	/fs/ → [ps]	DEP-C >> *STOP/CODA
Early Sternatia SIG	/fs/ → [fts]	*STOP/CODA >> OCP[cont]

- the rankings determining the application of voice assimilation before a nasal:

Table 4	Optima	Rankings
Early SIG	/fn/ → [fn]	IDENT[voi] >> AGREE
Martano SIG^{+}	/fn/ → [vn]	AGREE >> IDENT[voi]

- the rankings determining the application of voice assimilation after a nasal (Table 5) and alternatives when it's blocked (Table 6):

Table 5	Optima	Rankings
CIG	/nt/ → [nd]	{*NC̥, IDENT[nas]}.sub >> IDENT[voi]
SIG	/nt/ → [nt] ~ [tt]	IDENT[voi] >> {IDENT[nas], *NC̥}.dom

Table 6	Optima	Rankings
SIG 1	/nt/ → [nt]	IDENT[nas] >> *NC̥
SIG 2	/nt/ → [tt]	*NC̥ >> IDENT[nas]

- the rankings determining whether rising sonority is allowed across syllable boundaries:

Table 7	Optima	Rankings
IG	/sm/ → [zm]	{IDENT[nas], IDENT[str], IDENT[son], DEP[pl]}.dom >> SYLCONT(0)
Galliciano CIG	/sm/ → [mm]	SYLCONT(0) >>{IDENT[nas], IDENT[str], IDENT[son], DEP[pl]}.dom

- the rankings determining the realization of /vɣ/ (unproblematic in terms of PoA) in languages not allowing for non-strident obstruents in the coda:

Table 8	Optima	Rankings
Bova CIG etc.	/vɣ/ → [gʷ]	IDENT[cont] >> UNIFORM
Galliciano CIG	/vɣ/ → [gg]	UNIFORM >> IDENT[cont]

- the rankings determining alternative realizations of /On/ apart from [O.n]:

Table 9	Optima	Rankings
V insertion	/On/ → [OVn]	IDENT[nas] >> DEP-V
Liquidization of /n/	/On/ → [OL]	DEP-V >> IDENT[cont]

- Cross-dialectal differences regarding LDM affecting /str/ sequences (Table 10) and the realization of /nC/ in external sandhi (Table 11) were attributed to different representations:

Table 10	Optima	Representations
SIG	/#C…str/ → [#C…str]	/s͡tr/
CIG	/#C…str/ → [#Cr…st]	/str/

Table 11	Optima	Representations
SIG	/(n)##C/ → [CC]	[C.C]
CIG	/(n)##C/ → [nC]	[.^{n}C]

CHAPTER 7

Conclusions

This dissertation investigated the phonology of IG dialects as it evolved from its immediate predecessor, i.e. MedG. Special emphasis was given on the impact of contact over diachronic typological changes as well as on the extensive cross- and intra-dialectal microvariation. With its focus on syllable structure, this study fills a gap in the research on contact-induced phonological changes in IG by shedding light on the typologically distinct stages IG has gone through for the first time.

Chapter 2 offered an up-to-date description of the contemporary sound inventory of IG varieties based on original data collected in 2019. During my fieldwork I had the opportunity to interview informants from almost all villages where IG is still spoken. This offered a comprehensive picture of contemporary IG and in turn enabled a fresh look at the consonantal phonemic inventory (cf. Profili 1983; Katsoyannou 1995). A major goal was to determine which realizations correspond to which phonemes, taking into consideration allophonic variation. Through this lens, several segments present in phonemic inventories of previous works were analyzed as allophones rather than as separate phonemes. A crucial innovation was analyzing geminates as deprived of any phonological status they might have been granted in previous literature. Instead, I proposed that surface geminates map onto two underlying segments: either of two identical segments or, more frequently, two different consonants. In case of the latter, processes such as P(lace)o(f)A(rticulation) shifts and M(anner)o(f)A(rticulation) alterations yield a surface geminate. The chapter also explored other phonological processes that lead to allophony, such as glide formation, assibilating palatalization before front vowels, intervocalic lenition, retroflexion of liquids, voice assimilation of post-nasal stops and pre-consonantal sibilants. Moreover, the principles that determine syllable structure in each variety at each historical stage were identified. These included sonority distance requirements, position of complex onsets in a root, features admissible in pre-consonantal codas, and the conditions under which final codas emerge. Subsequently, phonological processes that are triggered due to requirements related to syllable structure, e.g. L(ong)D(istance)M(etathesis) of liquids to the root-initial onset, PoA shifts targeting codas, metathesis in heterosyllabic obstruent clusters, changes in MoA features, were also investigated. Further attention was paid to sandhi phenomena yielding post-lexical geminates or clusters. For the sake of completeness, a brief overview of stress properties in IG was offered. Because they were shown not to differ significantly from MedG and several other Modern Greek dialects, the rest of the thesis did not delve into prosodic phonology.

Chapter 3 drew theory-neutral comparisons between Greek and Romance on the basis of specific phenomena found in IG but not encountered in MedG. The goal of this chapter was to determine whether the innovations observed in IG should be attributed to endogenous changes, i.e. innovations consistently found in other Modern Greek dialects, or should be regarded as the outcome of contact. In this case, the encountered changes are almost absent in Greek but thrive in Romance, especially in dialects surrounding the IG enclaves. It was concluded that the retroflexion of /ll/, assibilating palatalization before front vowels, lenition of intervocalic onsets, the presence of lexical geminates and, to some extent, sandhi geminates could be attributed to general tendencies underlying the Greek phonological systems. Word-final open syllables are found in both language families, albeit not in the Greek dialects with which IG shares most of its characteristics, thus it is more plausible that Romance has played a role in the elision of word-final consonants in IG. On the other hand, the retroflexion of /tr/, and, crucially, key traits associated with syllable structure, i.e. restricted coda inventories in terms of admissible PoA and MoA features, where non-coronal, non-strident obstruents are excluded, and the preference for initial complex onsets are entirely absent in Greek[1] but overwhelmingly present in Romance. Therefore, contact is a reasonable explanation for these innovations in IG.

The way the contact-induced restrictions on syllable structure are imposed by the grammar of the various stages of IG constitutes the subject matter of the typological analysis advanced in chapters 4 and 5. These chapters illuminate the conditions leading to diachronic and diatopic variation in IG phonology for the first time. As such, this thesis engages in the first analysis of the phenomena at hand within a broader typological perspective rather than a language-specific point of view. Within Property Theory (Alber & Prince 2015; in prep.), the changes that gave rise to different grammars, i.e. typologically different historical stages, were formalized as reversions of the hierarchical order between constraints.

The diachronic changes IG codas and complex onsets underwent lead to a gradual decrease of markedness. The coda is a weak position (e.g. see Beckman 1998), thus it typically does not host marked features. This includes the PoA features [dor] (dubbed *k*) and, secondarily, [per] (dubbed *p*) and the MoA feature bundles [–son, –cont] (dubbed t_{MoA}) and [–son, +cont, –str] (dubbed *θ*). Unmarked features such as [P(lace)N(ode] (dubbed t_{PoA}) and [+str]

[1] With the exception of Tsakonian; however, it is very unlikely that Tsakonian and IG were ever in contact.

or [+son] (dubbed *s*) are found unexceptionally in all IG varieties, contemporary and historical. In the case of PoA features, I claimed that the coda position progressively ceased to accommodate values more marked than the adjacent onset. Regarding MoA features, no comparison with the adjacent onset was made; I maintained that the coda position tolerated marked MoA features to a certain extent in each stage of IG. In both cases, the trajectory of change heads towards increasingly less marked structures, a process roughly illustrated in figures (1–2):

(1) PoA features in coda (assuming that the onset C is less marked than the coda)

k.C, p.C, t_{PoA}*.C*	*p.C,* t_{PoA}*.C*	t_{PoA}*.C*
→	→	→
MedG	Early SIG, Martano SIG	remaining IG

(2) MoA features in coda

t_{MoA}*.C, θ.C, s.C*	*θ.C, s.C*	*s.C*
→	→	→
(Learned Greek)	Vernacular MedG Early SIG, Martano SIG Roghudi CIG	other IG

Marked structures such as complex onsets of the shape C(onsonant)L(iquid) are preferably found in prominent positions, e.g. the initial syllable. Assuming that, the closest CL is found in the initial syllable, the better, CL in the third syllable, i.e. CL_3, is more marked than CL_2, which is still more marked than CL_1.

(3) Position of complex onsets

CL_3, CL_2, CL_1	CL_2, CL_1	CL_1
→	→	→
MedG	(not attested in IG)	IG

Along these lines, the distinction between a stage allowing for all marked structures (e.g. marked PoA and MoA features in the coda, non-initial CL) and one tolerating a certain degree of markedness was accounted for via the competition of f(aithfulness).constraints, on the one hand, and positional m(arkedness).constraints, on the other hand. As long as f.constraints dominated m.constraints, the grammar allowed for all clusters to be faithfully realized independently of their degree of markedness. Once at least one m.constraint got promoted above faithfulness, the grammar opted for candidates in which the marked structure that the dominant m.constraint disallowed was repaired. The analysis extracted the properties of each typological system, i.e. the rankings sufficient to derive the entire typology. The properties defining the PoA, the MoA, and the LDM typology, the values each language of the typological system takes, and the correspondence between language types and IG varieties are presented in the tables below (4–9). As noted in the relevant chapters, the typologies include languages that are either attested outside the Greek family or are (yet) undocumented.

(4) Properties of PoA typology

P.yes/no some/no [per] segments are allowed in the coda	F.sub < > m.{[dor].[¬dor], [per].[¬per]}
K.yes/no [dor] segments are/are not allowed in the coda	F.sub < > m.{[dor].[¬dor]}
F.met/shift marked clusters undergo metathesis/shift	f.MAX < > f.LINEAR

(5) PoA typology

	P.yes/no	**K.yes/no**	**F.met/shift**
L.kpt:f *MedG*	*yes*	*yes*	*moot*
L.k:shift *Early SIG, Martano SIG*	*yes*	*no*	*shift*
L.k:met *(undocumented in IG)*	*yes*	*no*	*met*
L.kp:shift *Sternatia+ SIG, Bova CIG; Galliciano/Roghudi CIG+*	*no*	*moot*	*shift*
L.kp:met *Galliciano CIG, Roghudi CIG*	*no*	*moot*	*met*

(6) Properties of MoA typology

O=O.yes/no all *O* are/are not realized as *O*	f.tθ < > m.tθ
FAITH.+T/–T faithfulness does/does not protect *t* in the coda	f.t < > m.t
CHANGE.–T/+T changes in the coda ignore/affect *t*	f.t < > M.dom

(7) MoA typology

	O=O yes/no	**FAITH +T/–T**	**CHANGE –T/+T**
L.tθ *Learned Greek*	*yes*	*+T*	*moot*
L.θθ *MedG, Early IG, Martano SIG, Roghudi CIG*	*yes*	*–T*	<+*T*>
L.ts *(undocumented in IG)*	*no*	<+*T*>	*–T*
L.ss *Sternatia$^+$ SIG, SIG$^+$, Bova CIG, Galliciano CIG*	*no*	*moot*	*+T*

(8) Properties of LDM typology

METCL.yes/no metathesis / no metathesis from CL	m.ALIGN < > f.LINEAR
METLC.yes/no metathesis / no metathesis from LC	m.LC < > f.LINEAR
DISTANCE.Loc/Dist local / non-local metathesis	f.LOCAL < > M.sub
M.LC/CL$_2$ only LC/CL$_2$ survives albeit marked	m.ALIGN < > m.LC

(9) LDM typology

	MetCL yes/no	MetLC yes/no	Distance Loc/Dist	M. LC/CL_2
L.OnOn.MetLC.Dist *(undocumented in IG)*	*yes*	*yes*	*Dist*	*moot*
L.OnCd.MetLC.Loc *(undocumented in IG)*	*yes*	*yes*	*Loc*	*LC*
L.OnOn.MetLC.Loc *(undocumented in IG)*	*yes*	*yes*	*Loc*	*CL_2*
L.OnCd.Loc *(undocumented in IG)*	*yes*	*no*	*Loc*	*<LC>*
L.OnOn.Dist *IG*	*yes*	*no*	*Dist*	*<LC>*
L.MetLC.Loc *(undocumented in IG)*	*no*	*yes*	*Loc*	*<CL_2>*
L.MetLC.Dist *(undocumented in IG)*	*no*	*yes*	*Dist*	*<CL_2>*
L.NoMet *MedG*	*no*	*no*	*moot*	*moot*

The insights of the property analysis were implemented for the formal comparison among Greek, IG in particular, and Romance grammars as well as the account of variation between chronologically or geographically adjacent languages. Two grammars G1 and G2 were taken to differ minimally. One could be the immediate continuation of the other, if only one switch in a property value is required in order to get from G1 to G2. Crucially, pace Alber (2015), I posited that the change from mootness to value and vice versa does not count for minimality. Along these lines, I proposed possible reconstructions of the evolutionary paths that led from MedG to the various versions of IG as well as from Latin to several Romance languages. In some cases, the unattested language types constituted possible intermediate stages, i.e. potential "missing links" between attested languages.

As mentioned above, the typological analysis contributed substantially to the modelling of contact-induced grammatical change. I showed that IG shares crucial rankings with Italo-Romance grammars rather than with the Greek system, at least as far as property values determining the emergence of the least marked structure are concerned. The less conservative versions of IG, including Sternatia^{+} SIG, SIG^{+}, and all CIG, clearly show convergence with Italo-Romance, as summarized in (10):

(10) Greek vs. IG & Italo-Romance

	PoA	**MoA**	**LDM**
	P.yes/no	**O=O.yes/no**	**MetCL.yes/no**
MedG *Standard Greek etc*	*yes*	*yes*	*no*
IG *Italo-Romance*	*no*	*no*	*yes*

The final chapter (chapter 6) provided OT analyses for specific structures within the previously developed typological analysis. Crucially, it identified more fine-grained distinctions between IG varieties belonging to the same broad typological category. The critical subcategorizations concerned:

- the choice among strident coronals, sonorant coronals, affricates, and geminates in languages blocking all marked PoA and MoA features in the coda:

(11) Variation among languages allowing for [+str/+son] coronals

Varieties	Optima	Rankings
Sternatia, Calimera	/ks/ → [t͡s] /xt/ → [tt]	• {IDENT[str], IDENT[son]}.sub >> {IDENT[cont], UNIF, *GEMIN}.dom
Calimera^{+}, Rogh/Gall^{+}	/ks/ → [ss] /xt/ → [tt$^{(h)}$]	• {IDENT[son], UNIF}.sub >> IDENT[str] >> {IDENT[cont], *GEMIN}.dom
SIG^{+}	/ks/ → [rs] /xt/ → [rt]	• {IDENT[str], {IDENT[cont], *GEMIN}.dom}.sub >> IDENT[son] • UNIF >> {IDENT[son], IDENT[cont]}.dom
Bova CIG	/ks/ → [t͡s] /xt/ → [st]	• IDENT[son] >> IDENT[str] • {IDENT[son], IDENT[cont]}.dom >> UNIF • {*GEMIN, IDENT[cont]}.dom >> {UNIF, IDENT[str]}.dom

- the (in)tolerance of adjacent continuants (12) and the strategy employed to avoid them (13):

(12) Variation depending on the presence of adjacent continuants

Varieties	Optima	Rankings
Pre-SIG, Early SIG, Martano SIG	/fs/ → [fs]	{DEP-C, *STOP/CODA}.sub >> OCP[cont]
MedG Early Sternatia SIG	/fs/ → [ps] /fs/ → [fts]	{DEP-C, OCP[cont]}.sub >> *STOP/CODA

(13) Variation among languages disallowing adjacent continuants

Varieties	Optima	Rankings
MedG	/fs/ → [ps]	DEP-C >> *STOP/CODA
Early Sternatia SIG	/fs/ → [fts]	*STOP/CODA >> OCP[cont]

- the application of voice assimilation before a nasal:

(14) Variation in voicing in [O.n]

Varieties	Optima	Rankings
Early SIG	/fn/ → [fn]	IDENT[voi] >> AGREE
Martano SIG$^+$	/fn/ → [vn]	AGREE >> IDENT[voi]

- the application of voice assimilation after a nasal (15) and other alternatives (16).

(15) Variation in voicing in [n.O]

Varieties	Optima	Rankings
CIG	/nt/ → [nd]	{*NC̥, IDENT[nas]}.sub >> IDENT[voi]
SIG	/nt/ → [nt] ~ [tt]	IDENT[voi] >> {IDENT[nas], *NC̥}.dom

(16) Variation in dialects not allowing voicing of [n.O]

Varieties	Optima	Rankings
SIG 1	/nt/ → [nt]	IDENT[nas] >> *NC̥
SIG 2	/nt/ → [tt]	*NC̥ >> IDENT[nas]

- the visible effects of syllable contact requirements:

(17) Variation depending on whether rising sonority is allowed across syllable boundaries

Varieties	Optima	Rankings
IG	/sm/ → [zm]	{IDENT[nas], IDENT[str], IDENT[son], DEP[pl]}.dom >> SYLCONT(0)
Galliciano CIG	/sm/ → [mm]	SYLCONT(0) >>{IDENT[nas], IDENT[str], IDENT[son], DEP[pl]}.dom

- the realization of /vɣ/ in languages not allowing for non-strident obstruents in the coda:

(18) Variation in /vɣ/ in languages not allowing non-strident obstruent codas

Varieties	Optima	Rankings
Bova CIG etc.	/vɣ/ → [g^w]	IDENT[cont] >> UNIFORM
Galliciano CIG	/vɣ/ → [gg]	UNIFORM >> IDENT[cont]

- alternative realizations of /On/ apart from [O.n]:

(19) Alternative realizations of /On/

Alternatives	Optima	Rankings
V insertion	/On/ → [OVn]	IDENT[nas] >> DEP-V
Liquidization of /n/	/On/ → [OL]	DEP-V >> IDENT[cont]

The above cases of variation were taken to reside in the grammar. On the other hand, cross-dialectal differences regarding LDM affecting /str/ sequences (20) and the realization of /nC/ in external sandhi (21) were attributed to different representations:

(20) Variation in /str/

Varieties	Optima	Representations
SIG	/#C…str/ → [#C…str]	/st͡r/
CIG	/#C…str/ → [#Cr…st]	/str/

(21) Variation in /(n)##C/

Varieties	Optima	Representations
SIG	/(n)##C/ → [CC]	[C.C]
CIG	/(n)##C/ → [nC]	[.^{n}C]

The dissertation aimed at offering a comprehensive picture of the diachronic and synchronic phonology of IG, with special emphasis on the consonantal system and, more specifically, consonant clusters. Inevitably, several aspects of the IG phonology worth delving into, e.g. prosody or an in-depth investigation of the phonology-morphosyntax interface, were left out of the analysis. Future research should shed more light on these matters. Given the despairing numbers of true native speakers, exploring the prosody of "original" IG poses certain insuperable obstacles, the greatest of which being an imminent deadline. Nevertheless, semi-speakers are still relatively easy to recruit and, moreover, the occasional revitalization attempts have created small cores of L2 speakers. As the majority of these speakers have Italian as their L1, the impact of Italo-Romance on heritage and L2 IG could be of particular interest. Moreover, at least in the case of heritage speakers, investigating and formalizing the impact of IG on Italo-Romance phonology might be of importance.

Via the proposed analysis we gain insight into the ranking conditions that generate the systematic patterns found in each IG variety as well as coexisting variants that follow a different pattern. Further research could measure the frequency of the attested outputs and pursue a formal analysis of variation within a probabilistic model (e.g. Boersma 1998; Boersma & Hayes 2001; Coetzee 2006; Smolensky & Goldrick 2016). Such an approach could also accommodate the vast variation resulting from lenition, which were not addressed in detail.

Finally, the hypothesis that only changes between specified property values are considered when comparing two grammars and switches from and to mootness do not count for minimality should be tested further. Another intriguing theoretical question that emerged but was not rigorously studied is whether the change from and to an entailed value, i.e. <*a*> → *b*; *a* → <*b*>, should be taken into account. Further research ought to implement Property Theory to similarly related language groups in order to corroborate or invalidate these assumptions.

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