Typological change in Italiot Greek: Place features in the coda

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Το παρόν άρθρο διερευνά τις τυπολογικές αλλαγές που παρατηρούνται στη διαχρονία των ελληνικών διαλέκτων της Κάτω Ιταλίας (συγκεκριμένα της Απουλίας και της Καλαβρίας) με έμφαση στα χαρακτηριστικά τόπου άρθρωσης που επιτρέπονται σε προ-συμφωνική έξοδο συλλαβής. Διακρίνονται τρία ιστορικά στάδια, στα οποία η θέση εξόδου μπορεί να καταληφθεί (α) από υπερωικά, χειλικά, και κορωνιδικά σύμφωνα, (β) από χειλικά και κορωνιδικά σύμφωνα, ή (γ) Χαποκλειστικά από κορωνιδικά σύμφωνα. Οι μη αποδεκτές έξοδοι αποφεύγονται είτε μέσω μετατόπισης του τόπου άρθρωσης του εν λόγω συμφώνου (συγκεκριμένα, τροπή υπερωικού σε χειλικό ή κορωνιδικό, τροπή χειλικού σε κορωνιδικό) είτε μέσω αμοιβαίας μετάθεσης με το επόμενο σύμφωνο (για παράδειγμα, μετάθεση του συμπλέγματος **υπερωικό-κορωνιδικό** σε **κορωνιδικό-υπερωικό**).

Με βάση την ιεραρχία μαρκαρίσματος **υπερωικό** < **χειλικό** < **κορωνιδικό** (de Lacy 2002· το σύμβολο '<' διαβάζεται 'λιγότερο αρμονικό από'), υποστηρίζεται ότι οι σταδιακές τροποποιήσεις του συνόλου των τεμαχίων που μπορούν να συλλαβοποιηθούν σε θέση εξόδου αποσκοπούν στη μείωση του βαθμού μαρκαρίσματος, δεδομένης της διαγλωσσικής προτίμησης για αποφυγή μαρκαρισμένων χαρακτηριστικών στη συγκεκριμένη θέση. Στο πλαίσιο της Θεωρίας του Βελτίστου (Prince & Smolensky 2004) και, ειδικότερα, με βάση τις υποθέσεις της Θεωρίας Ιδιοτήτων (Alber & Prince 2015), αναλύεται η τυπολογική ποικιλία που προκύπτει μέσω της σταδιακής διαχρονικής αλλαγής, με στόχο να αναδειχθούν οι ιεραρχίες μεταξύ περιορισμών με βάση τις οποίες οργανώνεται το τυπολογικό σύστημα. Εντοπίζονται τρεις συνθήκες ιεράρχησης, οι οποίες καθορίζουν τη διάκριση μεταξύ (α) των γλωσσών που επιτρέπουν υπερωικά σε θέση εξόδου και των γλωσσών που τα απαγορεύουν, (β) των γλωσσών που επιτρέπουν τόσο υπερωικά όσο και χειλικά σε θέση εξόδου και των γλωσσών που τα απαγορεύουν, και (γ) των γλωσσών που επιδιορθώνουν μαρκαρισμένες εξόδους μέσω μετάθεσης και των γλωσσών που επιστρατεύουν μετατοπίσεις των χαρακτηριστικών τόπου άρθρωσης προς λιγότερο μαρκαρισμένες τιμές.

Keywords: Italiot Greek; place of articulation in coda; typology; Property Theory

1. Introduction

The term Italiot Greek (IG) subsumes the Modern Greek varieties still surviving in the southernmost parts of the Italian peninsula, in two main linguistic enclaves: in the area of Grecia Salentina, Apulia, and in Bovesia, Calabria (Rohlfs 1930; 1950; Karanastassis 1984–1992; 1997; Manolessou 2005). Henceforth, the sets of Salentinian and Calabrian varieties are collectively referred to as **SIG dialect** and **CIG dialect**, respectively. Over the centuries, the Italiot branch has witnessed diachronic changes

that have resulted in drastic typological discrepancies both between contemporary IG and its immediate predecessor, i.e. Medieval Greek (MedG), and among IG varieties, at cross- and intra-dialectal level. In this paper I investigate the different typological stages that are distinguished on the premises of the place features licensed in the non-final coda position and I offer a formal analysis of the diachronic and diatopic variation, framed within **Property Theory** (Alber & Prince 2015; In prep.).

The paper is structured as follows: section 2 offers an outlook of the changes pre-consonantal consonants have undergone in the diachrony of the SIG and CIG varieties as to their PoA features. In section 3, conclusions are drawn as to the syllabic status of the consonants at hand, and the gradual reduction of the segment inventory occurring in codas is accounted for via the postulation of **Coda Conditions** (*a la* Ito 1988) sensitive to particular place features, along the lines of Rice's (1994) model of the Place node. The proposed typological analysis within Property Theory is presented in section 4. Section 5 interprets diachronic language change in terms of Property Theory. Section 6 rounds up the discussion.

2. PoA features in preconsonantal position

The IG dialects inherited a substantial number of consonant (C) clusters from MedG[1]. A subset of these clusters, i.e. obstruent — liquid sequences and all clusters the first member of which is a coronal segment (/s/, /r/, n/)[2], were preserved intact in contemporary IG:

(1) Preservation of MedG clusters in IG

	MedG	IG	gloss	underlying representation
a.	*ákri*	*ákri*	'edge'	/obstruent-liquid/
b.	*skórðo*	*skórdo*	'garlic'	/sC/, /rC/
c.	*mandíli*	*mandíli*	'handkerchief'	/nC/
d.	*ambéli*	*ambéli*	'vineyard'	/nC/ (PoA assimilation of the /n/)

[1] For the purposes of the present work, MedG is taken to refer exclusively to the versions of this common language that were prevalent in Southern Italy. For a comprehensive view of MedG in general see Holton et al. (2019).

[2] The preconsonantal lateral /l/ was replaced by /r/, e.g. *almiró* > *armiró* (Rohlfs 1930; Holton et al. 2019).

However, many of the etymological clusters displayed significant diachronic alterations that have shaped a contemporary picture bearing little resemblance with the ancestor language. As a rule, throughout the history of IG, the first member of a biconsonantal cluster underwent changes with respect to its place of articulation (PoA) in certain phonological contexts. In particular, in MedG, dorsal, labial, and coronal segments were allowed to precede obstruents and nasals. Soon after its split-off with common MedG, SIG witnessed a shift of dorsals to labials before a coronal or a labial (Rohlfs 1950; Karanastassis 1997; Tzitzilis 2004)[3]. On the contrary, in the same context, etymological labials were immune to shifting[4]. Pre-consonantal labials still persist in the variety of Martano. Representative examples are given below for illustration, with the shifting clusters marked in bold (unless stated otherwise, data are taken from Rohlfs (1930) and Karanastassis (1984–1992) and confirmed via own fieldwork)[5]:

(2) PoA shifts in SIG: dorsal > labial

a. MedG	*o**xt**ó*	*ef**t**á*	*é**ks**i*	*p**s**ári*	*lí**xn**o*	*kap**n**ó*
	‘eight’	‘seven’	‘six’	‘fish’	‘lamp’	‘smoke’
b. Mart. SIG	*o**ft**ó*	*ef**t**á*	*é**fs**e*	*af**s**ári*	*lí**fn**o*	*kaf**n**ó*

A more recent development took place and led to today’s SIG (e.g. as spoken in Sternatia and Calimera), where both etymological and derived (i.e. dating back to dorsals) labials further shifted to a coronal before another coronal (henceforth, the set of SIG varieties in which both dorsals and labials have been eliminated are referred to as *Sternatia*$^{+}$). On the other hand, in Bova CIG, both dorsals and labials shifted directly to coronals.

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[3] The same shift is observed in the diachrony of Romanian dialects as well as Latin loanwords in Albanian (Seigneur & Pagliano 2003 and references therein).

[4] Moreover, the labial-dorsal cluster /vg/ was arguably preserved at that point, and also survives partially in Martano SIG, e.g. *a**vg**ó* ‘egg’ (own fieldwork; for an overview of the extant literature on the particular cluster see Nicholas 2007). In general, though, it has coalesced into the contour segment [gw], which is often geminated, i.e. [gg^{w}], or simplified, i.e. [g], and it is also found as [gg]. These transformations are to be attributed to restrictions with respect to the manner of articulation in the coda (Apostolopoulou, In prep.). For the purposes of the present paper, it suffices to say that the labial in /vg/ din not need to be targeted by a PoA shift.

[5] Lambrinos (1994) also reports the change of obstruent codas preceding another obstruent to a rhotic, i.e. /xt/, /ft/ → [rt], /ks/, /ps/ → [rs].

(3) PoA shifts in SIG and CIG: dorsal, labial > coronal

a. MedG	*oxtó*	*eftá*	*éksi*	*psári*	*líxno*	*kapnó*
b. Stern^{+} SIG	*ottó*	*ittá*	*éttse*	*attsári*	*línno*	*kannó*
			~ésse	*~assári*		
c. Bova CIG	*ostó*	*está*	*ét(t)si*	*tsári*	*línno*	*kannó*

Roghudi and Galliciano CIG also abandoned both dorsal and labial codas at once. Remarkably, even though /Ct/ and /Cn/ clusters follow the same path as in Bova, i.e. they undergo a PoA shift resulting in a coronal, /Cs/ clusters display local transposition that creates /sC/ clusters (Karanastassis 1984–1992). Although the outcome of /ks/ → [sk] has been concealed by subsequent palatalization of the derived [sk] cluster into [ʃʃ], the /ps/ → [sp] metathesis is synchronically transparent. Consider the data below (the metathesized forms are marked in bold):

(4) PoA shifts and Local metathesis of Cs in IG

a. MedG	*oxtó*	*eftá*	*éksi*	*psári*	*líxno*	*kapnó*
b. Roghudi CIG	*oʒtó*	*eʒtá*	***éʃʃi***	***sp*ári**	*línno*	*kannó*
c. Galliciano CIG	*ottʰó*	*ettʰá*	***éʃʃi***	***sp*ári**	*línno*	*kannó*

3. Cluster syllabification and coda conditions

In IG, the Minimal Sonority Distance requirements (see Murray & Vennemann 1983; Vennemann 1988; Zec 1995) for a consonant sequence to be tautosyllabic are satisfied exclusively by obstruent-liquid clusters[6]. The above described PoA shifts affect pre-consonantal heterorganic codas, i.e. any pre-consonantal segment that is not followed by a liquid. Notably, the clusters at hand behave as heterosyllabic independently of their position in the word, including the word-initial position, e.g. /psári/ → [fsári]. A word-initial 'coda' is resyllabified in the rime of a preceding open syllable, e.g. [of.sá.ri] 'the fish'. In a post-pausal position, it is treated as an appendix, e.g. [<f>.sá.ri] (see Vaux & Wolfe 2009) or, in the case of geminates, it is lost via

[6] This claim is further supported by evidence coming from voice assimilation and sandhi phenomena (for a detailed analysis see Apostolopoulou, In prep.).

degemination, e.g. #[.sá.ri] (see Newton 1972). Optionally, vowel anaptyxis may aid the avoidance of extra-prosodic elements, e.g. [af.sá.ri].

I maintain that the gradual PoA shifts as well as local metathesis are motivated by a general preference for as unmarked as possible pre-consonantal codas, given the markedness hierarchy **dorsal (*k*) < labial (*p*) < coronal (*t*)**[7] (Ito 1988; 1989; McCarthy 1988; Paradis & Prunet 1991; Lombardi 1991; 2002; de Lacy 2002; 2006; Lahiri & Reetz 2002; 2010; Walker 2019). PoA shifts towards more unmarked values were conditioned by the presence of an adjacent onset bearing PoA specification of lower markedness. The avoidance of heterorganic coda-onset clusters is common cross-linguistically and has been formalized by means of a **Coda Condition** or **CodaCond** (Steriade 1982; Ito 1988; 1989; Yip 1991; McCarthy 2008; a. o.). This condition makes room for codas occupied by the first part of geminates as well as consonants that are homorganic to the following onset. Along these lines, before a *t* onset, a coda may only be occupied by another *t*. Remarkably, *k* and *p* are considered equally bad, in line with a flatly organized Place node (Clements 1985; Clements & Hume 1995; Sagey 1986; McCarthy 1988; see Figure 1).

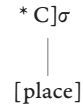

Figure 1: CodaCond (Ito 1989: 224)

Based on the *k* < *p* < *t* hierarchy, the PoA shifts or the transposition of the cluster members observed in the history of IG serve to repair illicit codas and reduce the markedness of the coda-onset cluster. Importantly, though, according to the CodaCond, converting a *k* into a *p* does not improve the markedness of the coda, and is thus rejected as a possibility (see de Lacy 2002; 2006).

Building on ideas proposed by Rice & Avery (1993) based on previous work by Jakobson et al. (1952) and Hyman (1973), Rice (1994) proposes a hierarchical structure of the Place node, with *k* and *p* grouping together to form the **Peripheral** node. *K* additionally contains a Dorsal node, whereas *p* is a default peripheral. Similarly, *t* is the default value under the bare Place node. The hierarchical structure is illustrated in Figure 2 (the parentheses indicate the default feature under each node):

[7] With '<' denoting 'less harmonic than', translating in 'more marked than'.

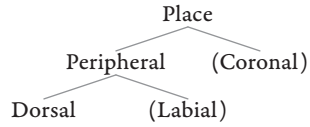

Figure 2: Place node in Peripheral model (Rice 1994: 192)

The markedness relations among *k*, *p*, and *t* are determined by the amount of structure they contain: the more complex a segment is, the more marked it is considered. It follows that *t* is unmarked in comparison to *p* and *k*, and *p* is less marked than *k*. In this vein, a shift is conceptualized as the (de)linking of place features resulting in a structure of different markedness degree. If [dorsal] delinks, then the consonant becomes a relatively unmarked, default *p* and the distinction between *k* and *p* is neutralized. Moreover, if the entire peripheral node is pruned, then all places merge to *t*, i.e. the default feature for the bare Place node. The Figure 3 below demonstrates the possible shifts:

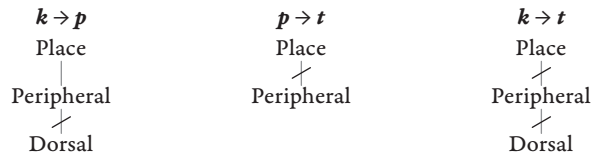

Figure 3: Feature delinking

Along the same lines, linking a feature creates a more marked segment (Figure 4).

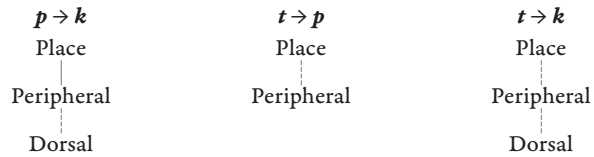

Figure 4: Feature linking

In light of Rice's (1994) Peripheral Model, I postulate more nuanced CodaConds that are sensitive to particular sub-constituents under the Place node, i.e. CodaCond-[peripheral] and CodaCond-[dorsal] (Apostolopoulou 2022; In prep.; see Figure 5).

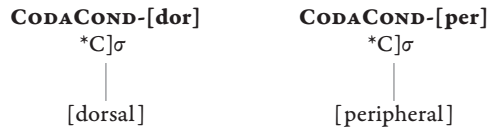

Figure 5: CodaConds along the lines of Rice (1994)

Depending on which CodaCond is active in a language, the coda may host segments of up to a certain degree of markedness. Crucially, the avoidance of *k* alone, e.g. via a *k* > *p* shift, is predicted, as the removal of one PoA feature does reduce the markedness of the coda.

4. Property Analysis

The analysis is couched within Optimality Theory (Prince & Smolensky 2004), with historical change being represented in terms of unfaithful input-output correspondence. Basic familiarity with this theoretical framework is assumed. The section 4.1 introduces the cornerstones of Property Theory, the hypotheses of which are utilized for the typological organization of the distinct languages under investigation. Then, the Con and the Gen of the proposed account are outlined (sections 4.2 and 4.3, respectively), and a presentation of the violation profiles of each candidate as well as the generated factorial typology follow (section 4.4). The typological analysis is presented in section 4.5.

It should be underscored that the present analysis addresses exclusively the typology of PoA features admitted in coda position analysis. Further distinctions between IG varieties are determined by restrictions imposed on the manner features that can be hosted in the coda. Due to space limitations, the issue is not addressed here (see Apostolopoulou, In prep. for a comprehensive analysis).

4.1. Property Theory

As mentioned above, the cross- and intra-dialectal variation in IG is formalized within **Property Theory** or **PT** (Alber & Prince 2015; In prep.; Alber 2015; Alber et al. 2016; Alber & Meneguzzo 2016; Danis 2017; Merchant & Krämer 2018; DelBusso 2018;

Kokkelmans 2021; Apostolopoulou 2022; In prep.; Alber & Kokkelmans, Forthc.). In a nutshell, the **properties** are the crucial ranking conditions that suffice to generate every language of the factorial typology. A property is represented as X < > Y, with X and Y standing for constraints or constraint sets, and may take two logically opposite values *a* and *b*, depending on which side dominates. Value *a* corresponds to X >> Y and value *b* to Y >> X. A specific member of a constraint set 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. Table 1 illustrates the possibilities described above (capital letters represent constraints).

Property	value *a*	value *b*
A < > B	A >> B	B >> A
'A vs. B'	'A dominates B'	'B dominates A'
{C, D}.dom < > E	if C >> D, then at least C >> E if D >> C, then at least D >> E	E >> C and D
'The dominant between C and D vs. E'	'At least one — i.e. the dominant — constraint between C and D dominates E'	'E dominates both C and D, regardless of the ranking between them'
{F, G}.sub < > H	F and G >> H	if F >> G, then at least H >> G if G >> F, then at least H >> F
'The subordinate between F and G vs. H'	'Both F and G dominate H, regardless of the ranking between them'	'H dominates at least one -i.e. the subordinate- constraint between F and G'

Table 1: Schematic properties

Each language of the system is assigned a value for each property. Alternatively, a property can be **moot** with respect to a language, if the particular ranking has no bearing on the selection of the optima. This means that, no matter which side dominates, the same candidate always wins (on the basis of the property values that hold for the particular language).

Differences between historically or geographically adjacent grammars represent **minimal** switches of the typological property values. 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).

Pace Alber (2015), I assume that the switch from some value to mootness for a property *A* does not constitute an additional change, but rather it may follow from the resetting of a different property *B*. Likewise, the acquisition of a value for a previously moot property is triggered by the reversion of the values of another property, thus it does not compromise the minimality of change (see Apostolopoulou 2022; In prep.).

Changes can presumably occur in any direction. Nevertheless, in case a switch results in material loss in the diachronic dimension, it is highly uncertain that the relevant underlying distinctions remain recoverable. To illustrate, let's assume that a language initially possesses both feature A and feature B, and later loses feature A, due to a property value reset that brings about neutralization of the distinction between the two features in a certain context. Thus, only feature B emerges in the context of feature C. Unless the neutralization is involved in morphophonological alternations, which would guarantee the visibility of the mapping of certain Bs onto an underlying A, the grammar may replace A with B in the relevant context (see discussion on Lexicon Optimization in section 4.3). Inevitably, in the occasion of re-reversing the property at hand, becoming faithful to A is no longer an option.

4.2. The Con

The fine-grained CodaConds postulated in section 3 above are formulated as positional markedness constraints (Zoll 1996; 1998) organized stringently (Prince 1997a; 1997b; 1999; de Lacy 2002; 2006; Alber & Meneguzzo 2016; Merchant & Krämer 2018).

(5) Markedness constraints
   a. CodaCond-[dor]
      Assign a violation mark for each output consonant specified as [dorsal] and syllabified as coda preceding an onset not specified as [dorsal]

   b. CodaCond-[per]
      Assign a violation mark for each output consonant specified as [peripheral] and syllabified as coda preceding an onset not specified as [peripheral]

Input-output discrepancies are penalized by faithfulness constraints. Linearity is violated when the linear order of input segments surfaces scrambled in the output

(McCarthy & Prince 1995). MAX[place] and DEP[place] (see McCarthy & Prince 1995) militate against the deletion or the insertion of any PoA feature under the Place node, i.e. either [peripheral] or [dorsal].

(6) Faithfulness constraints
   a. LINEARITY
      Assign a violation if the precedence relations in the input are not preserved in the output

   b. MAX[place]
      Assign a violation mark for every place feature ([peripheral], [dorsal]) in the input that has no correspondent in the output

   c. DEP[place]
      Assign a violation mark for every place feature ([peripheral], [dorsal]) in the output that has no correspondent in the input

Crucially, in the case of PoA shifts, faithfulness is violated in a gradient fashion. Shifts involving the delinking of one feature, like *k* → *p* and *p* → *t*, incur one violation of MAX[place], while *k* → *t*, which requires the loss of two place features, constitutes two violations. Similarly, the insertion of feature specification may incur one or two violations of DEP[place], depending on the number of new place features being linked.

4.3. The GEN

The present analysis focuses on the realization of pre-consonantal codas in a certain context at each stage of IG. For the purposes of this work, tautosyllabic parsings are ignored. Given this disclaimer, the constraint system evaluates coda segments that (a) are specified as [dorsal, peripheral], (b) are specified as [peripheral], and (c) do not bear further specification under the Place node. The behavior of each of the above segments is examined within the context of an adjacent onset that is occupied by either *k*, *p*, or *t* and remains unaltered. The coda segments, on the other hand, may surface faithfully, shift to a different value of PoA, or metathesize with the onset. The schematic candidates are in the Table 2 (the inputs are syllabified for readability).

Input /k/	Outputs	Input /p/	Outputs	Input /t/	Outputs
/$k_1.k_2$/	→ [k.k]	/p.k/	→ [k.k]	/t.k/	→ [k.k]
	→ [p.k]		→ [p.k]		→ [p.k]
	→ [t.k]		→ [t.k]		→ [t.k]
	→ [$k_2.k_1$]		→ [k.p]		→ [k.t]
/k.p/	→ [k.p]	/p.p/	→ [k.p]	/t.p/	→ [k.p]
	→ [p.p]		→ [p.p]		→ [p.p]
	→ [t.p]		→ [t.p]		→ [t.p]
	→ [p.k]		→ [$p_2.p_1$]		→ [p.t]
/k.t/	→ [k.t]	/p.t/	→ [k.t]	/t.t/	→ [k.t]
	→ [p.t]		→ [p.t]		→ [p.t]
	→ [t.t]		→ [t.t]		→ [t.t]
	→ [t.k]		→ [t.p]		→ [$t_2.t_1$]

Table 2: GEN

A note is in order here. Along the lines of Lexicon Optimization (Prince & Smolensky 2004; Inkelas 1994; Beckman & Ringen 2004; cf. Krämer 2006; 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. However, provided that morphophonological alternations continue granting visibility to /xt/ (or any other structure that has ostensibly faded out at the synchronic level), the "original" sequence can be considered a legitimate input, at least with respect to the derived environments. This is the case with IG, where the same innovations are observed both within roots, as presented in section 2, and across morphological boundaries, e.g. at the boundary between a verbal stem and the suffix /t/, which forms deverbal adjectives (/aniɣ-t-ó/ open-ADJ-N.SG 'open' → MedG [anixtó], Martano SIG [aniftó], Roghudi CIG [aniθtó], etc.; cf. /aniɣ-o/ open-1SG 'I open' → Roghudi CIG [aníɣo] ~ [anígo], *[aníðo]). For this reason, even though I remain agnostic as to the possibility that root-internal changes were fossilized in the course of time, I include all PoA features in the input set rather than assuming that some inputs are absent in certain stages.

4.4. Violation Tableaux

The violation profile of all candidates is illustrated with the help of Violation Tableaux (VT)[8]. To begin with the homorganic clusters, the VTs (1–3) render it evident that any violation of faithfulness results in harmonically bounded candidates (shaded cells) (Samek-Lodovici & Prince 1999). The faithful realizations, on the other hand, satisfy the entire constraint system. Therefore, homorganic clusters remain intact.

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
k_1k_2	k_1k_2	0	0	0	0	0
	pk	0	0	1	0	0
	tk	0	0	2	0	0
	k_2k_1	0	0	0	0	1

VT 1: Homorganic clusters /kk/

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
p_1p_2	kp	1	1	0	1	0
	p_1p_2	0	0	0	0	0
	tp	0	0	1	0	0
	p_2p_1	0	0	0	0	1

VT 2: Homorganic clusters /pp/

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
t_1t_2	kt	1	1	0	2	0
	pt	0	1	0	1	0
	t_1t_2	0	0	0	0	0
	t_2t_1	0	0	0	0	1

VT 3: Homorganic clusters /tt/

[8] The VTs, the Factorial Typology, and the Property Analysis were calculated with the aid of OTWorkplace (Prince et al. 2017).

The same holds for codas preceding a more marked onset, i.e. /pk/ (VT 4), /tk/ (VT 5), and /tp/ (VT 6). In the case of /pk/ → [pk], the onset and the coda share the feature [peripheral], thus CodaCond-[per] is not violated. Coronal codas also satisfy markedness, since *t* is always less marked than a heterorganic consonant. Faithfulness is naturally satisfied in all cases as well. Thus, every unfaithful candidate is harmonically bounded.

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
pk	kk	0	0	0	1	0
	pk	0	0	0	0	0
	tk	0	0	1	0	0
	kp	1	1	0	0	1

VT 4: Coda less marked than onset /pk/

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
tk	kk	0	0	0	2	0
	pk	0	0	0	1	0
	tk	0	0	0	0	0
	kt	1	1	0	0	1

VT 5: Coda less marked than onset /tk/

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
tp	kp	1	1	0	2	0
	pp	0	0	0	1	0
	tp	0	0	0	0	0
	pt	0	1	0	0	1

VT 6: Coda less marked than onset /tp/

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 Max[place], Dep[place], and Linearity, but violating at least CodaCond-[per], or get repaired via either a shift to a less marked value, by violating Max[place], or metathesis, by violating Linearity. Shifts cannot head towards more marked values.

Specifically, as illustrated in VT 7, given the input /pt/, the *p* may either get realized unchanged, shift to *t* via the delinking of [peripheral], or transpose with *t*; however, turning into *k* by linking the feature [dorsal] is not an option. The candidate /pt/ → [kt] always loses over /pt/ → [pt], since, apart from the violation of CodaCond-[per], it yields an additional violation of CodaCond-[dor] and of Dep[place].

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
pt	kt	1	1	0	1	0
	pt	0	1	0	0	0
	tt	0	0	1	0	0
	tp	0	0	0	0	1

VT 7: Coda more marked than onset /pt/

The full range of alterations is visible through the possible realizations of /kt/ (VT 8). The input /kt/ can be associated to all four outputs [kt], [pt], [tt], and [tk].

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
kt	kt	1	1	0	0	0
	pt	0	1	1	0	0
	tt	0	0	2	0	0
	tk	0	0	0	0	1

VT 8: Coda more marked than onset /kt/

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 is blocked, i.e. /kp/ → *[tp] (VT 9). In particular, the candidate /kp/ → [pp] harmonically bounds the candidate /kp/ → *[tp] due to the violations of Max[place] (1 vs. 2, respectively).

input	output	CodaC-[dor]	CodaC-[per]	Max[pl]	Dep[pl]	Linear
kp	kp	1	1	0	0	0
	pp	0	0	1	0	0
	tp	0	0	2	0	0
	pk	0	0	0	0	1

VT 9: Coda more marked than onset /kp/

4.5. Property Analysis

The constraint hierarchies holding for each language are demonstrated below in the form of Skeletal Bases or SKB (Brasoveanu & Prince 2005/2011). Very briefly, in each row, the constraints marked with a 'W(inner)' dominate the constraints marked with a 'L(oser)'.

Max[place]	Linearity	CodaCond-[dor]	CodaCond-[per]
W		L	L
	W		

SKB 1: L-kpt

CodaCond-[dor]	Linearity	Max[place]	CodaCond-[per]
W		L	
	W	L	
		W	L

SKB 2: L-*k-shift

CodaCond-[dor]	CodaCond-[per]	Linearity	Max[place]
	W		L
		W	L

SKB 3: L-*kp-shift

CodaCond-[dor]	Max[place]	Linearity	CodaCond-[per]
W		L	
	W	L	
		W	L

SKB 4: L-*k-met

CodaCond-[dor]	CodaCond-[per]	Max[place]	Linearity
	W		L
		W	L

SKB 5: L-*kp-met

The generated factorial typology is comprised of five languages:

(i) L-kpt all PoA features are admitted in coda;
(ii) L-*k-shift *k* is repaired via shift;
(iii) L-*kp-shift *k* and *p* are repaired via shift;
(iv) L-*k-met *k* are repaired via metathesis;
(v) L-*kp-met *k* and *p* are repaired via metathesis

The optima each grammar selects are presented in Table 3 (the unfaithful candidates are shaded). The Greek dialects corresponding to each language in the factorial typology are demonstrated in the rightmost column[9].

	kk	**kp**	**kt**	**pk**	**pp**	**pt**	**tk**	**tp**	**tt**	
L-kpt	kk	kp	kt	pk	pp	pt	tk	tp	tt	MedG, Standard
L-*k-SHIFT	kk	pp	pt	pk	pp	pt	tk	tp	tt	Early SIG, Martano SIG
L-*kp-SHIFT	kk	pp	tt	pk	pp	tt	tk	tp	tt	Sternatia^{+} SIG, Bova CIG
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 CIG

Table 3: Factorial typology

Certain rankings in the above presented hierarchies 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. These crucial rankings constitute the properties of the typological system under investigation and are summarized below:

(7) **Properties**
a. **PERIPHERAL**: {MAX[pl], LINEARITY}.sub < > CODACOND-[per]
'Does the language admit *p* in coda?'
Value **yes**: MAX[pl], LINEARITY}.sub >> CODACOND-[per]
Value **no**: CODACOND-[per] >> MAX[pl], LINEARITY}.sub

[9] L-*k-met does not correspond to a documented stage of IG. In theory, it could have constituted an intermediate stage between L-kpt and L-*kp-met.

b. **Dorsal**: {Max[pl], Linearity}.sub < > CodaCond-[dor]
'Does the language admit *k* in coda?'
Value **yes**: Max[pl], Linearity}.sub >> CodaCond-[dor]
Value **no**: CodaCond-[dor] >> Max[pl], Linearity}.sub

c. **Shift/Met**: Max[pl] < > Linearity
'Does the language repair codas via metathesis or shift?'
Value **met**: Max[pl] >> Linearity
Value **shift**: Linearity >> Max[pl]

Property Peripheral, i.e. the ranking between the lowest-ranked faithfulness constraint and CodaCond-[per], determines the presence of peripheral codas: if all faithfulness is dominant, then both a shift and metathesis incur fatal violations. Thus, at least *p* survives. Reversely, if at least one faithfulness constraint is outranked by CodaCond-[per], then the marked codas, i.e. *p* and *k*, are avoided via the resolution strategy violating the low-ranked faithfulness constraint. Similarly, property Dorsal distinguishes between the languages that in addition to *p* admit *k* and those that employ a repair strategy to avoid it. The selection between the two available solutions, i.e. shift or metathesis, is made by property Shift/Met, i.e. the crucial ranking between the two faithfulness constraints, the subordinate of which is rendered non-fatally violable[10].

L-kpt, L-*k-shift, and L-*k-met allow consonants bearing a peripheral node (value Peripheral-**yes**), whereas L-*kp-shift and L-*kp-met prevent them from surfacing (value Peripheral-**no**). Among the languages allowing for *p*, L-kpt is the only language also admitting *k* (value **yes**), whereas L-*k-shift and L-*k-met take the value **no**. Property Dorsal is moot with respect to L-*kp-shift and L-*kp-met: 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

[10] It is worth mentioning that, although Dep[place] does not participate in any of the above crucial rankings, its elimination from the Con is not without consequences. The candidates /pk/→ [kk] (VT 4), /tk/→ [pk], /tk/→ [kk] (V T5), and /tp/→ [pp] (VT 6) are harmonically bounded precisely because they incur violations of Dep[place]. The removal of the particular constraint results in free alternation among all outputs not violating markedness constraints, i.e. /pk/→ [pk] ~ [kk], /tk/→ [tk] ~ [pk] ~ [kk], and /tp/→ [tp] ~ [pp].

Table 4 illustrates the property values each language in the factorial typology is assigned with respect to each property.

	Peripheral	Dorsal	Shift/Met
L-kpt	**yes**	**yes**	**moot**
L-*k-shift	**yes**	**no**	**shift**
L-*kp-shift	**no**	**moot**	**shift**
L-*k-met	**yes**	**no**	**met**
L-*kp-met	**no**	**moot**	**met**

Table 4: Property Table

5. Language change

In terms of Property Theory, the minimal diachronic change is captured as minimal, i.e. one-at-a-time, switches in the property values. Let's take a closer look at the critical re-sets that gave rise to different historical stages within the IG dialectal branch. When MedG (L-kpt) evolved to Early SIG (L-*k-shift), the grammar ceased to tolerate *k*, i.e. property Dorsal was reset from **yes** to **no**. Peripheral-**yes** remained unchanged. Shift/Met, on the other hand, was moot with respect to the ancestor language. However, it becomes relevant in all languages repairing marked features in coda. Thus, a new value is acquired once at least one of the properties determining the presence of such features are set to value *no*, which calls for the selection between the two repair strategies at hand. In the case of Early SIG, the value **shift** was preferred.

	Peripheral	Dorsal	Shift/Met
L-kpt MedG	yes	**yes**	moot
L-*k-shift Early SIG, Martano SIG	yes	**no** ↓	**shift**

Table 5: L-kpt > L-*k-shift

The passage from Early SIG to contemporary Sternatia^{+} SIG, on the other hand, was determined by a switch in the value of Peripheral from *yes* to *no*. In this way,

the most recent development of SIG banned all peripherals from pre-consonantal codas.

	Peripheral	Dorsal	Shift/Met
L-*k-shift Early SIG, Martano SIG	**yes**	no	shift
L-*kp-shift Sternatia+ SIG	**no**	moot	shift

Table 6: L-*k-shift > L-*kp-shift

In the case of the change from MedG to Bova SIG, it was Peripheral that was reset to the value **no**. Naturally, Dorsal became moot with respect to the new stage. Finally, just like in SIG, the value **shift** was acquired by Bova speakers.

	Peripheral	Dorsal	Shift/Met
L-kpt MedG	**yes**	yes	moot
L-*kp-shift Bova CIG	**no**	moot	**shift**

Table 7: L-kpt > L-*kp-shift

Finally, the CIG varieties of Roghudi and Galliciano 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 particular, Shift/Met was assigned the value **met**[11].

	Peripheral	Dorsal	Shift/Met
L-kpt MedG	**yes**	yes	moot
L-*kp-met Roghudi/Galliciano CIG	**no**	moot	**met**

Table 8: L-kpt > L-*kp-met

[11] 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 (Apostolopoulou, In prep.).

Interestingly enough, through the lens of typological changes, IG seems to lean toward an Italo-Romance grammatical system rather than sticking with the Greek dialectal group. In particular, regardless of the repair strategy primarily employed, the most recent versions of IG belong to language types that prevented segments specified as [peripheral] from being parsed in a coda. In a similar vein, Italo-Romance abandoned peripheral codas inherited by Latin, e.g. o[k.t]o > *o*[*t.t*]*o* 'eight', *se*[*p.t*]*em* > *se*[*t.t*]*e* 'seven', etc. (Rohlfs 1966; Krämer 2009). On the contrary, the vast majority of Modern Greek dialects that sprang from MedG retain all PoA in the respective context, even though the segments at hand have undergone other changes leading to better codas, e.g. *o*[*k.t*]*o* > *o*[*x.t*]*o* 'eight', *e*[*p.t*]*a* > *e*[*f.t*]*a* 'seven' (manner dissimilation resulting in a more sonorous 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. The two distinct groups are presented below:

	Peripheral	Dorsal	Shift/Met
L-kpt MedG, Latin, Modern Greek	**yes**	yes	moot
L-*kp-() IG, Italo-Romance	**no**	moot	(some value)

Table 9: L-kpt vs. L-*kp-()

6. Conclusions

In this paper I explored two diachronic processes, i.e. shift by means of feature deletion and metathesis, that gradually shaped the coda inventory of IG by progressively eliminating marked PoA features. Through the lens of Rice's (1994) Peripheral model regarding the representation of PoA features, I offered a typologically oriented account within Property Theory, which pinned down the three crucial ranking conditions that define the generated typological system. Property Dorsal allows or blocks the presence of [dorsal], i.e. *k*, in a language, Peripheral determines the presence or absence of [peripheral], i.e. *k* and *p*, and Shift/Met decides through which repair strategy the avoidance of marked codas is achieved.

The gradual diachronic change advanced via changes of single property values. In the case of IG, MedG (L-kpt) evolved into Early SIG (L-*k-shift) by switching the value of DORSAL from **yes** to **no**, and took a further step to Sternatia+ SIG (L-*kp-shift) by resetting PERIPHERAL from **yes** to **no**. Thus, the three chronologically sequential dialects vary minimally with respect to a property determining the tolerable degree of markedness in the coda.

Instead, in Calabria, both *k* and *p* were eradicated at once through the switch from PERIPHERAL-**yes** to PERIPHERAL-**no**. The minimal difference between Bova, on the one hand, and Roghudi and Galliciano, on the other hand, lies in the repair strategy each variety employed, i.e. the acquisition of SHIFT/MET-*shift* and SHIFT/MET-*met*, respectively.

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