PHONOLOGICAL CONSTRAINT ON THE PHONETICS OF CYPRIOT GREEK: DOES CYPRIOT GREEK HAVE GEMINATE STOPS?

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Abstract
Επανεξετάζονται τα λεγόμενα «διπλά» κλειστά της κυπριακής ελληνικής, το φωνολογικό σύστημα της οποίας συγκρίνεται με αυτό άλλων γλωσσών ή διαλέκτων της ελληνικής που διαθέτουν δύο σειρές κλειστών που αντιπαρατίθενται μεταξύ τους ως προς την ηχηρότητα, τη δασύτητα και τη διάρκεια. Βάσει των συγκριτικών υποστηρίζεται ότι η κυπριακή ελληνική διαθέτει άηχα δασέα και όχι διπλά κλειστά, ακόμα και σε μεσοφωνηεντική θέση. Τέλος, επιχειρείται διερεύνηση των παλαιοτέρων ενδείξεων της ύπαρξης δασέων στην κυπριακή καθώς και της ιστορικής τους εξέλιξης.

Keywords
cypriot Greek, geminate stop, aspirated stop, phonological constraint.

1. Introduction

We shall focus on the nature of the CG stop series / p/ , / t/ , / č/ , / k/ (henceforth summarised as **p**) and their aspirated counterparts which we write as /**p**^{h}/ , / t^{h}/ , / č^{h}/ , / k^{h}/ (summarised as **p^{h}**), in comparison with the voiced and voiceless stops of SMG.[1] For the CG **p^{h}** series, Newton (1968: 19, 1972a: 32-3) noted the phonetic roles of aspiration, tenseness (as adjective, he more usually writes ‘fortis’), and complete voicelessness.[2] Nevertheless, by assigning distinctive status to the relative duration of their closure phase in intervocalic position, he supported the view, long-standing in historical studies, and reflected in orthographic convention, that they belonged phonologically among the CG *geminates* (1972a: 22-3). So, he writes /**pp**/ (phonetically ‘voiceless and fortis...the second [element] having aspirated release’) versus /**p**/ (‘voiceless, unaspirated and quite lenis’ though ‘voiced after nasals or voiced fricatives’).

Newton’s basic claim is that of distinctive duration. Within his generative approach to dialect studies, the notion of *gemination* is always seen as a theoretical construct built on this foundation. Of the ‘geminates’ in general, he remarks that ‘phonetically speaking [they] are clearly long rather than doubled consonants’. Nevertheless, on the balance of simplicity in morphophonemic statement, he would ‘follow the common practice of treating underlying long consonants as double’ (Newton 1972b: 91-2),[3] and this was further justified for CG in terms of pattern congruity and inventory economy (1972a: 33). Never quite resolved was the question at what point in derivations the change-over should occur from theoretic geminate to phonetic long singleton. In particular, he returned on several occasions to the observation that ‘geminate’ velar obstruents behave like single segments under the morphophonemic rule of Velar Softening (Newton’s P4-5; 1972a: 120); thus the plural of / sakkos/ is, in his transcription, / sačči/ not */ sakči/ (1972a: 51). This suggests a change-over at a relatively early stage in

derivations, which would accordingly be registered in the classical phonemic 'reading transcription' output by his phonological segment (Newton 1972b: 91-2). That is, the singleton analysis would be raised at least to phonemic status, giving /**p:**/ versus /**p**/ .

In one or other form, this general approach has been widely adopted and remains dominant (eg., Hamp 1961, Malikouti-Drachman 1987, Arvaniti & Rose 2003). Accordingly, CG **p^{h}** may provide geminate (and/ or long) stop examples relevant to various issues in the recent literature: *word-initial* (Muller 2002), *non-moraic* (Arvaniti *in press*), and not *inalterable* under affrication (cf. Kirchner 2000: 514). Before these examples are employed however, one should confirm the basic characterisation attached to CG **p^{h}**.

We do not in the present paper dispute the association of **p^{h}** with the 'geminates' at some more abstract level of analysis. We focus on the surface-distinctive role assigned by Newton to closure duration. Section 2. below argues that the CG **p^{h}** series are indeed tense, voiceless aspirated stops, but not distinctively long (nor geminate). Section 3. then proposes that the CG system fits coherently into the general set of such aspirate vs. nonaspirate stop systems, and section 4. that it is also historically well-established.

1.1 The stop systems of ancient Greek, SMG and CG

Fig. 1 summarises the stop systems of ancient Greek, SMG, and two views of CG, each taken as representative of a larger type (informally labelled Vce/Asp, Vce, Asp and Gem).

Figure 1. Basic stop systems of ancient Greek, SMG and CG

1: Vce/Asp:	**anc. Gk.**	**b**	**p**	**p^{h}**
	Ancient Greek had also a range of geminates **(bb**, **pp**, **pp^{h}).**			
2: Vce:	**SMG**	**b** (<**mp**)	**p**	**---**
3: Asp:	**CGasp**	**---**	**p**	**p^{h}** (< **pp**)
	Ancient **b** and **p^{h}**, having become fricative in post-classical times, are re-introduced from other sources: SMG **b** < **mp** (via post-nasal voicing), CG **p^{h}** < **pp**.			
4: Gem:	**CGgem**	**---**	**p**	**pp**
This is the more traditional 'geminate' view of CG, in which ancient **pp** simply remains.				

1.2 Markedness

Stop systems of types 1-3 above are relatively unmarked. Fig. 2 summarises their occurrence in the languages surveyed by Maddieson (1984). It notes also Maddieson's conflation under a single type of both **p**-**p^{h}** (as in our CGasp) and b̥ **-p^{h}** (as in German or English). On this, see further Fig. 3 below.

Figure 2. Relevant stop systems in Maddieson (1984)

3 stop-series (total 76)	Vce/ Asp:	19 (the remainder have various 'glottalic' elements)
2 stop-series (total 162)	Vce:	117 including modern Greek and French
	Asp:	27 including (a) **p**-**p^{h}** as in our CGasp,
		(b) b̥-**p^{h}** as in German – see below.

Maddieson groups simple **p**-**p^{h}** systems such as CGasp with those like German (we may add English) usually described as containing a *voiced* series in opposition to **p^{h}**; this voice however is never 'full' (cf. Keating 1984, Petrova *et al.* 2000). We expand the type Asp accordingly, though retaining the cover-symbol **p**.

The type represented by CGgem would however be highly marked. Gemination (or distinctive length) is a common additional element in systems utilising the possibilities of the types above. Thus: Vce/ Asp+Gem (as in ancient Greek), Vce+Gem (as in Italian) and Asp+Gem (as in Cypriot Turkish; henceforth 'CT').[4] However, systems of the type Gem with *only* a pair of stop-series distinguished in this way are clearly rare. Maddieson (1984) has just two explicit examples: Maranungku and Delaware.

1.3 Phonological versus phonetic differences

In certain other respects, expectations vary across the theoretical divide between multi-valued and binary feature approaches, as illustrated in Fig. 3 by reference to Keating (1984) and Jessen (1998) respectively.

Figure 3. Phonological/phonetic status of **p** in Vce and Asp systems

(i) Keating (1984) sets up a single feature [voice], realised by permitted combinations of three favoured 'phonetic categories' {voiced}, {vl.unasp.} and {vl.asp.}. The series **p** is in these terms *identical* (as {vl.unasp.}) in both Vce and Asp systems.

Under a *polarisation* effect (which enhances contrast), the 'swing' series **p** may nevertheless differ in phonetic implementation across the two types Vce and Asp, being slightly aspirated in the former, slightly voiced in the latter.

(ii) Jessen (1998) sets up two features [±voice] and [±tense]. The **p**'s of Vce and Asp systems are in these terms *different* ([-voice] and [-tense] respectively, each unspecified for the other feature).

Again, implementations of **p** may vary across the types Vce and Asp. In particular, **p** in Asp systems, phonologically specified only as [-tense] (with lack of aspiration as 'basic correlate') may be (a) voiceless or (b) subject to 'passive' voicing under partially language-specific contextual-phonetic tendencies (cf. Jessen & Ringen 2002).

In both approaches we may expect small differences in the phonetic implementation of **p** across the system types Vce and Asp. Specifically, the **p** of Asp systems may show some amount of voicing. In Keating's terms, this may be seen as a *polarisation* effect (enhancing contrast). In Jessen's terms, the degree of 'passive' voicing is seen as unconstrained by the single specification [-tense]. Further, Jessen's binary approach asserts a *categorical* difference, in phonological principle, between the **p**'s of these two system types.

2. Against the geminate analysis of CG p^h

2.1 Language-general expectations: duration

Arvaniti (1999) provided evidence for distinctive length in intervocalic CG sonorants. The geminates were on average 'nearly twice as long as their singleton counterparts'. Moreover, comparison with SMG showed an expected contrast enhancement effect. For each CG sonorant (except single-tap / r/), average closure durations were *shorter* than for the corresponding (but not in pairwise contrast) SMG sonorant.

However, extension of the study to stops and fricatives (Arvaniti 2001) produced a different result. In particular, the stop closure durations cited there and in Tserdanelis & Arvaniti (2001; henceforth 'T&A') appear inconsistent with CGgem. Certainly, some degree of lengthening is associated with voiceless aspirated stops, and the **p**-**p^h** differences stated by Arvaniti are within the range generally cited for this. But they do not meet usual expectations for contrasts *primarily* of closure duration or gemination (see Fig. 4).

Figure 4. Closure duration averages (in msecs)

CG /p/:/p^h/, /t/:/t^h/ , / č/ :/ č^h/, /k/:/k^h/:- 70:108, 64:105, 40:67, 61:81 (est. from T&A: fig.1).

On average, intervocalic CG **p^h** is longer than **p** by 'approximately 36%' (T&A: 31). This is within the range cited for merely lenis/fortis singleton pairs; eg: in Breton post-tonic intervocalic stops 56.2:93.3, 49.4:110, 76.6:120.5, 44:103.7 (Falc'hun 1951: 110), in English post-tonic medial / b/ , / p/ 75:120 (Lisker 1957: 43). For distinctively long or geminate stops, however, Ladefoged & Maddiesson (1996: 92) cite differences 'between one and a half to three times the...duration of the short stops...' And estimates of greater separation are usual; eg., in Italian 'close to twice the duration' (Esposito & Di Benedetto 1999: 2058), in Turkish 60:176 (Lahiri & Hankamer 1988: 331), in Estonian 'approximately twice as long as quantity 1' (Lehiste 1966: 38). Grammont (1933: 111) estimated for Sanscrit, Greek and Latin 'toujours plus du double de la duree moyenne des breves'. More recently, in Ngalakgan 'at least twice the length', and 4:1 'in the case of apico-postalveolar' (Baker 1999: 115), and across 'Japanese, Finnish, Italian, Turkish, Swiss German' 81:188, against 334 in the 'really long' consonants of Lheidli (Bird 2003: 3).

Further, comparison with SMG did not show the expected contrast enhancement. Closure duration for each 'singleton' CG stop, in both normal and fast speech, was actually *longer* than for the corresponding SMG stop. While 'part of the discrepancy' is due to a difference of speech rate between the SMG informant groups for the two studies, the enhancement hypothesis had nevertheless to be abandoned for the extended segment set (Arvaniti 2001: 43-4).

2.2 Language-general expectations: aspiration

The data for aspiration, as measured by VOT, fall better into place. Relations between CG **p** and **p^h** are within the range reported for languages with Asp systems containing simple aspirated stops (see Fig. 5).

Figure 5. Voice Onset Time averages (in msecs)

CG /p/:/pʰ/, /t/:/tʰ/ , / č/ :/ čʰ/, /k/:/kʰ/:- 10:50, 16:62, 53:94, 34:63 (est. from T&A: fig. 2).

VOT for CG **pʰ** exceeded that for **p** 'by 84% on average' (T&A: 31-2; though note their comment on / k/). The figures fall just on the border of the fully 'aspirated' category of Cho & Ladefoged (1999: 223; cf., for Gaelic plosives: 13:64, 22:65, 28:73, but also Khonoma Angami 10:83, 9:55, 20:91). Among other two-series examples, note Lisker & Abramson's sentence data (1964: 411-2) for non-initial Cantonese / p/ vs. / pʰ/ , etc: 9:39, 15:66, 23:67 and English / b/ vs. / p/ , etc: 4:34, 7:37, 16:49 (see further Byrd 1993: 102-3).

Moreover, there is arguably a contrast enhancement effect. In CG, for each of the clear cases /p/ and / t/ (Arvaniti 2001: 40-3), in both normal and fast speech, VOT durations were slightly shorter than those of the corresponding SMG stop, and this effect will presumably increase after compensation for speech rate discrepancies. Also, in terms of Jessen's expectations, CG **p** shows 'passive' voicing: the **p** series 'often lenited intervocalically' as in the / č/ of / siča/ 'fig tree', which was 'weakly voiced throughout' (T&A: 34-5).

2.3 Distribution of ph in CG

If the 'geminate' analysis is not convincing intervocalically, then it must collapse in general. Unlike the geminate sonorants (though cf. Davy & Panayotou 2002: 156-7, *in press*: note 3), and *contra* Newton (1972a: 32-3), **pʰ** occurs in a wide range of contexts, in most of which there has never been any suggestion of closure duration as a distinctive feature. Often **pʰ** directly contrasts with **p**, as in Fig. 6 (i) below. Elsewhere the contrast is neutralised, as in (ii).

Figure 6. (Partial) distribution of **pʰ** in CG

(i) Word-initially before vowel or various sonorants:
/pʰefto/ 'fall', / kʰyoftes/ 'mince-ball', / pʰlis/ 'please', / pʰrintʰer/ 'printer'.
Contrast / pefki/ 'pine', / kyomurčis/ 'coal merchant', and so on.

Word-medially between vowels or in contact with various sonorants:
/lakʰos/ 'pit', / pʰerčʰemin/ 'quiff', / pekʰyaris/ 'batchelor', / ka(n)tʰina/ 'canteen', / kʰantʰri/ 'country (music)', / kʰomkʰyuter/ [kʰomcʰuter] 'computer'.
Contrast / lakani/ 'basin', / terčellin/ 'door ring', and so on.

(ii) In some positions only **p** occurs; eg., word-finally or after fricative:
/ stok/ 'stock', / stop/ 'stop', / ftono/ 'envy', / xtenin/ 'comb', / paxti/ 'ground rent', / paska/ 'Easter, great Christian festival', / peškešin/ 'gift, offer', / lefta/ 'money'.

After stop, only **pʰ** occurs (relevant examples only in restricted combinations):[5]
In our informants, /ptʰ/: /ptʰu/ 'damn it!', / leptʰa/ 'minutes'.
In Newton's rural data, also / pkʰy/ : / pkʰyanno/ 'hold', / xapkʰya/ 'pills' (1972a: 23, 30-3).

In one case, Newton attributes lack of the durational cue to an overriding perceptual factor: the inaudibility of closure in absolute initial position. Here therefore the 'additional' features of

tenseness and aspiration must serve ‘to identify the geminate stops’ (1968: 19). Elsewhere however there is no such special recourse. For / lept^{h}a/ ‘minutes’, he must write ‘/ lepta/ ’, treating the [t^{h}] as an allophone of the *short* stop (cf. Newton 1972a: 23), despite the definitions cited in 1. above. Other incoherences follow; for instance / kant^{h}ina/ must be written ‘/ kantina/ ’, thus obscuring both (a) the contrast with / nt/ [nd] as in / lantin/ ‘puddle’, and (b) the conditions for nasal deletion as in the variant /kat^{h}ina/.[6]

2.4 Additional points

We add three further points:

(i) Stops in the **p^{h}** series are regularly *felt* by our informants as syllable-initial, and in their speech they appear only in contexts compatible with this. For these stops, we take lack of shortening in a preceding vowel (T&A: 33-4) as confirming their monosegmental, syllable-initial status.

(ii) Clear cases of gemination do nevertheless occur in loan material, both with and without aspiration of the second element. These include post-lexical examples (eg., in deliberate versions of / ešekkipi/ [eš(:)ekcibi] ‘willy nilly’ < Tk. *eşek gibi*, and /pukk^{h}ip^{h}in/ ‘book-keeping’ < Eng. *book-keeping*). Informants readily distinguish these in terms of syllabification from the standard ‘geminate’ examples proposed by Newton.

(iii) Clear cases of *emphatic* lengthening also occur (the ‘occasional gemination’ of Newton 1968: 40-41), and this may affect the **p** series as in the example, representing an insistent demand to ‘listen!’, which he writes ‘/ akku/ ...(usually / aku/)’. Such lengthened stops do not acquire aspiration, and again our informants readily distinguish these from parallel items in ‘geminate’ **p^{h}**. For details, see Davy & Panayotou (2002: 157-8).

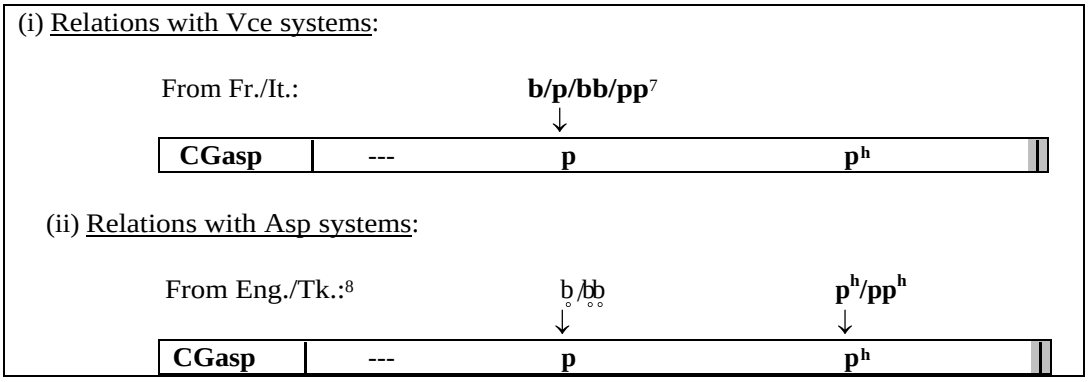
3. Language contact evidence

In Newton’s account, loans from Italian, and especially a number of suffixes which he considered ‘clearly of Italian origin’ (1968: 21-2), contribute to the face validity of the CGgem analysis (the CG **p^{h}** series is the more plausibly geminate because it can be equated to an Italian geminate series **pp**). On closer examination, data from loans and other contact phenomena confirm the similarity of CGasp to other Asp systems. The Italian loan evidence supporting CGgem turns out to be relatively problematic.

3.1 Language contact: general patterns of substitution

Fig. 7 sets out some general patterns of substitution *into* CG for singleton and (from Italian and Turkish only) for geminate stops. Except in the case of Italian pp (to be discussed in 3.2 below), the relations shown here are based on loan evidence (for examples, see Fig. 8 in the Appendix). With the same single exception, these patterns concur closely with a range of data acquired from informal tests of perceptual similarity (cf. 3.2 below) and, where available, the other data types exemplified in Fig. 9 of the Appendix.

Figure 7. General patterns of substitution



It will be seen that these relationships are much as the discussion in 2. above would lead us to expect. Substitutions across the typological divide between Asp and Vce systems (Fig. 7(i)) conflate foreign voiced-voiceless pairs (the aspiration cue being absent) and also foreign singleton-geminate contrasts. Relations with other Asp systems (Fig. 7(ii)) are contrast-preserving (on a basis of presence vs. absence of aspiration), but here again CG conflates foreign singleton-geminate contrasts. Gemination aside, the general goodness of fit with Asp systems is the more striking in that it applies here across the two sub-types (a) and (b) of Fig. 2 above.[9] In the Appendix, Fig. 9 provides further examples of this goodness of fit in substitution *from* CG across these two sub-types.

3.2 Loan substitutes for Italian pp

Against this background, Italian **pp** is exceptional. The correspondence to CG **p** in Fig. 7(i) is based on informal perceptual tests but not on loan data since, as Newton pointed out, the usual loan substitute is actually CG **p^{h}**. This despite the fact that the unaspirated **pp** of modern standard Italian is regularly heard by our informants as closer to CG **p**, never as closer to **p^{h}**, and informant comment strongly denies the latter relation when prompted. It might be supposed that in this respect CG has changed since the late medieval period, but this would simply contradict the more general gemination-conflative data above. The matter is in any case part of a larger puzzle: the presence of distinctive correlates of Italian geminates, both stops and sonorants, in 'geminating' Greek dialects across a large part of the eastern Mediterranean. If the main late medieval source was Venetian (cf. Kahane & Kahane 1982: 140), then this is unexpected (Pernot 1907: 386) since Venetian had already simplified the Latin geminates, as indeed had Genoese. There seem to be two possible solutions, not mutually exclusive. First, the phenomenon might reflect the emerging influence of Florentine, in which it appears that aspiration is a regular feature of voiceless geminate stops (Kirchner 2000: 513 and sources cited there). Second, given the facts of Venetian and Genoese, and the predominance of Venice and Genoa in political, military and commercial contact between Italy and Cyprus, the transmission of 'geminate' models was presumably in part orthographic (and perhaps substantially literary).[10] It is clear in either case that the resultant CG **p^{h}** cannot be taken as demonstrating a direct phonetic relation to an unaspirated Italian geminate **pp**.

4. Possible antiquity of the CG system

In Newton's account, relations with ancient Greek also contribute to the face validity of the CGgem analysis. Again however, as Newton himself in part suggests (1968: 20-1), the relationship may be less immediate than at first appears.

The contact data above suggest that the CGasp system was in place, though less extended distributionally, by the late medieval period when loans from French, Italian and Turkish first entered CG in large numbers. An early origin is suggested also by the presence of aspirated stops in other 'geminating' dialects of Greek (cf. Pernot 1934, Newton 1972b: 89-91, Drettas 2001), including sub-dialectal **pʰ** *versus* **pp** on Chios (Pernot 1907: 409-11). Kardiolaka surveys these aspirated stops as single segments (1992; so also most of the work she cites), and her Kalymnos measurements appear in line with this. For Greko aspirated stops against the geminates of Italian, cf. Katsoyannou (1995: 98-102). As Newton argues for all the 'geminates' (1968: 15-18), such aspirated segments look like relics of a previous areal characteristic.

Just how far back CGasp may go is partly a matter of speculation. Davy & Panayotou (*in press*) suggest that 'spontaneous gemination' (Newton 1968) does not proceed in stops at all clearly beyond the Roman period. Moreover, unlike the case of the sonorants, it responds in stops only to weakening of an immediately *following* (and by hypothesis tautosyllabic) vowel, as in the types /tulupʰa/ 'clew', /apʰekso/ 'outside' (cf. anc. τολύπη/ ᾰ̄, ἀπό + ἔξω). The accumulation of various such examples suggests the realisation of ancient **pp** as syllable-initial **pʰ** had already arisen during the late Hellenistic or early Roman periods to which the fricativisation of the older **pʰ** series is commonly attributed (Allen 1987: 23-6).

Indeed, there is no clear evidence for gemination in Cypriot stops even before the advent of the Koine from the 4th century BC onwards. It is usually considered that alphabetic gemination in the writing system that accompanied the Koine to Cyprus was by that time no longer a reflected in pronunciation.[11] In the traditional syllabary of Cyprus, the opposite is assumed. Though clusters were in general represented in the syllabary (except nasal + consonant), this is not applied to the 'geminate' stops. Thus, against alphabetic ἵππος we have not **i-pi-po* but *i-po* (cf. CG / apʰaros/).[12] Nevertheless, the enduring Cypriot 'geminate' tradition, and the absence of relevant errors in adoption of the geminate conventions of the Koine alphabetic system, as exemplified in the popular inscriptions at Kafizin in the late third century BC, suggests that Cypriots themselves did distinguish *in some way* between segments conventionally alphabeticised as **ππ** rather than **π** or **φ**. In view of the discussion above, one reasonable hypothesis might be that the 'geminate' stops were already monosegmental **pʰ**.

5. Conclusion

First, there is no evidence for the assumption that CG **pʰ** is distinctively long (or geminate). The CGasp system contains simply tense aspirated and lax unaspirated stops. Second, we have presented contact data supporting CGasp's more general goodness of fit with other systems of the type Asp. Third, we have suggested that CGasp is also (though to an undetermined depth) historically well-established.

Notes

[1] We depart here from Newton's transcriptions / pp/ , / tt/ , / čč/ and / kk/ , but continue to use the term 'geminate' (in inverted commas) to identify the general class traditionally so designated in CG and related dialect studies. We depart also from Newton's treatment of the palatal stops [c], [c^{h}]; we write /ky/, /k^{h}y/ by analogy with his /ly/, /ny/, /my/, /sy/, and so on. We compare the **p^{h}** series primarily with the sonorants / mm/ , / nn/ , / ll/ , / rr/ , seen for purposes of the present discussion as true geminates. The fricatives we leave to a further study.

[2] In line with most of our sources, we refer primarily to *aspiration*. Essentially we follow Charalambopoulos (1985) in seeing it here as 'basic correlate' (Jessen 1998: chap. 5) of the feature [tense]; cf. our Fig. 3(ii).

[3] Confusingly, Newton may also use 'geminate' symbols in phonetic representations, but this is 'for convenience' only (1972b: 92).

[4] The Asp classification of CT is based in part on the phonetic judgements of Newton (1968: 24), though differently interpreted in phonological terms. The CT series we write as **p^{h}** (orthographic ***p***) is tense, aspirated. By contrast, b̥ (orthographic ***b***) is lax, with voicing notably weak in final position (though still clearly different from standard Turkish final **p**); eg., CT *gucug* 'small', *gab* 'receptacle', *merd* 'man'.

[5] The restriction reflects the widespread influence in Cyprus of the general demotic tendency to limit obstruent clusters to fricative-stop sequences (the Fricative-Occlusive rule of Newton 1972a: 128). Stop clusters appearing in late medieval texts seem to have been largely replaced already by the time of Sakellarios (1891; eg., *s.v.* κτηνόν).

[6] The sequence / (**m)p^{h}**/ is regularly derived in Turkish and English loans (eg., / me(n)t^{h}ešes/ , /kara(n)t^{h}i/; cf Appendix, Fig. 8(ii). It is probably not a coincidence that /kant^{h}ina/ and the few other Romance loans exhibiting this sequence occur also in CT (eg., / kara(n)t^{h}ina/ 'quarantine', /parapo(n)t^{h}is/ 'vagabond'; cf. CT *garantina*, *barabonti*). The nasal deletion process seems to apply in CG before any tense stop or stop cluster; cf., though differently interpreted, Newton's examples for word-initial /t^{h}/ (1972b: 114-5) and for his rule 18a (1972a: 128).

[7] In absolute initial position (thus, including citation forms), the nasal segment in CG **mp** [**mb**] may be reduced to inaudibility (Newton 1972a: 27); eg / mpenno/ [(m)benno] 'I enter', / ntinno/ [(n)dinno] 'I dress', / nčizo/ [(J)*f*izo] 'I touch'). From this fact presumably derives the common alternative replacement of word-initial **b** in French and Italian loans by CG **mp** [(**m)b**] (eg., / ntama/ [(n)dama] 'dancing partner', / mparra/ [(m)barra] 'bar, bolt'; see further Appendix, Fig 8(i)). So too in inter-varietal loans from SMG, but in this case strongly supported (also non-initially) by the orthography.

[8] For loans from Turkish we assume a regional Anatolian input (here labelled 'Tk.'), but we cannot be sure of exact matches with modern CT.

[9] Apparent exceptions that we know of among English loans involve neutralisation or morphological derivation *within CG*, both illustrated in CG / stoper/ 'brake (of car)'.

[10] Compare the interaction with the Koine in 4. (esp. notes 11 and 12); also the loan-reflection of French geminates no longer phonetically extant (Davy & Panayotou 2000: 121, incl. note 11).

[11] The doubling convention introduced into the spelling of Attic about 550-450 BC had probably little more than graphic value a hundred years later (Teodorsson 1974: 231-5). Accordingly, Brixhe observes (1987: 32): 'la variete du grec qui se repand avec l'expansion macedonienne ne possede...plus que des consonnes isochrones'.

[12] Indeed it is not clear that geminate sonorants occurred either. The few crucial items, with Cypriot forms in other respects distinguishable from Koine, provide no evidence of such gemination. Thus Buck notes (a) αἶλος (beside ἀλ(λ)ά), and (b) ᾽Απείλων = ᾽Απόλλων (1955: 65; cf. 144-6). In that case (*contra* Newton 1968: 18), not even the geminate sonorants would be simply inherited. This is similar to the Italian 'puzzle' in 3.2 above. It might perhaps be that Koine pronunciations were at first in the older form and/or that standard spellings were reinterpreted in terms of the products of 'spontaneous' gemination.

Appendix

Figure 8. Examples of loan substitution *into* CG

(i) From Fr./It.:
Fr./It. **p**/ **b**/ **bb** → CG **p**:
For Fr. *pigeon, gaffe*, It. *pasta, gatto, maggiore*:
CG / pezunin/ 'dove', / kafa/ 'blunder', / pasta/ 'paste', / kat^{h}os/ 'cat', / mačore/ 'major'.
It. **pp** → CG **p^{h}**:
For It. *schietto, pasticcio, stecca*:
CG /sket^{h}os/ 'plain, pure', / pastič^{h}on/ 'wedding cake', / stek^{h}a/ 'billiard cue'.
Fr./It. initial **b** → CG **mp** [**mb**]:
For Fr *dame, demode,* It**.** *barra, damigiana*:
CG / ntama/ [(n)dama] 'dancing partner', / ntemote/ [(n)demote] 'old-fashioned', /mparra/ [(m)barra] 'bar, bolt', / ntamičana/ [(n)damičana] 'demijohn'.
(ii) From Tk./Eng.:
Tk./Eng. b̪, b̪b̪ → CG **p**:
For Tk. *gelberi, minder, seccade,* Eng. *jelly, brandy*:
CG / kelperin/ 'poker', / minterin/ 'sofa', / sičates/ 'prayer-mat', / čellin/ 'jelly', / pranti/ 'brandy'.
Tk./Eng. **p^{h}, pp^{h}** → CG **p^{h}**:
For Tk. *toz, menteşes, cuppe*, Eng. *cash, guarantee*:
CG / t^{h}ozin/ 'dust', /me(n)t^{h}ešes/ 'hinge', / č^{h}up^{h}es/ 'cassock', /k^{h}aš/ 'cash', /kara(n)t^{h}i/ 'guarantee'.

Figure 9: Some examples of substitution *from* CG across Asp system subtypes:

(i) CT loans prob. from CG: CG **p** → CT b̪:
Eg: CT *bulli* 'chick', *dirabez* 'table', *cira* 'Greek lady', *galliga* 'farrier' (cf. CG / pullin/ , / trapezin/ , / čira/ , / kallikas/).
(ii) English renderings of Cypriot Greek names: CG **p** → Eng. b̪:
In the usage habitual to two English speakers, one British, one American, married to CG speakers:
Eg: [d̪]*oxni*, [d̪]*era* (Τόχνη, Τέρα), [b̪]*aphos*, *El*[b̪]*ida* (Πάφος, Ελπίδα), [d̪Ẓ]*ellattis*, [d̪Ẓ]*ami Kebir* (Τζιελλάττης. Τζιαμί Κεπίρ), [g̪]*ikkos*, *A*[g̪]*amas* (Κίκκος, Ακάμας).
(iii) CT renderings of Cypriot Greek names: CG **p** → CT b̪:
Regularly in traditional CT renderings:
Eg: *Baf, Bellabayis* (Πάφος, Πέλλαπαϊς), *Dohni, Vadili* (Τόχνη, Βατυλή), *Gerinia*/*Girne, Gilan* (Κερύνια, Κοιλάνι).
(iv) English-CG cross-varietal perception: Eng. b̪ → CG **p** → Eng. b̪:
In reading listed English words containing ***b*** spellings:
CG-speaking university students regularly use CG **p** (as subsequently self-confirmed), and native speakers of English (of several varieties) identify these items in terms of the intended English b̪. Eg: *ban, sobbing, down, sender, Jane, edge, goal, angle*.

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