ΚΗ ΓΑΣ ΚΗ ΓΥΚΙΑΣ:
A Computer Assisted Epigraphic Study of the Isoglosses of Central Greece

by

Thomas W. Broadwater

(Under the Direction of Jared S. Klein)

Abstract

Given the predominance of Attic-Ionic Greek in classical Greek literature, this dialect has long been treated as representative of the language as a whole. However, epigraphic evidence depicts a more varied landscape throughout the wider Hellenic world. Modern statistical and quantitative methods enable the dialectologist to not only survey large amounts of epigraphical data but also to quantify their confidence in their results. In this initial survey, the author demonstrates a programmatic method for the development and management of an inscriptional data set, and applies that set to the study of two isoglosses in Central Greece between the 4th and 2nd centuries BCE. The author shows that the οι/υ and η/ᾱ isoglosses remained largely stable during the period of interest.

Index words: Classical Greek, Epigraphy, Statistics, Linguistics, R, Programming, Attica, Megaris, Boiotia, Dialectology

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Dedication

For Brienne,

τῇι καλλίστηι καὶ ἀρίστηι καὶ σοφωτάτηι,

ἧς ἄνευ πάντα ἀδύνατα καὶ ἀπρακτέα.

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Contents

Background

The Geographical Arrangement of the Greek Dialects

The ancient Greek dialects were divided into two principal groups based on the retention of the inherited segment *ti (τι) or the assibilation *ti > *si (σι). The third-person singular ending of present athematic verbs evidences this isogloss most consistently: Doric δίδωτι '(s)he gives' vs. Attic δίδωσι. When drawn on a map, notwithstanding some exceptions, the τι/σι isogloss line divided Attica from the rest of the Greek mainland and Ionia from the surrounding Greek dialects of Anatolia.

The North Greek family included the Aiolic and West Greek groups, including Laconian, Megarian, and the other Doric varieties. These dialects historically retained the segment *ti (τι); however, Lesbian selected the assibilated *si (σι) sometime before the alphabetic period via prolonged contact with Ionic. The West Greek dialects differentiated themselves from Aiolic by, for example, the extension of the future/aorist marker -ξ- to all verbs with a present in -ζω regardless of the underlying stem. For example, compare the Doric middle aorist infinitive ἐργαξάσθαι 'to work' with the Attic cognate ἐργάσασθαι. Additionally, the West Group innovated the 'Doric Future' -σέω by blending the thematic future -σω with the contract future -έω. For example, Delphic κλεψέω 'I will steal' and Heraclean ἐργαξῆται '(s)he will work' vs. Attic κλέψω and ἐργάσαται, respectively.[1] These dialects occupied the Pelopon-

[1] J. Méndez Dosuna, "The Doric Dialects," in *A History of Ancient Greek from the Beginnings to Late Antiquity*, ed. A.-F. Christidis, 4th ed., vol. 1 (Cambridge, UK: Cambridge University Press, 2015), 449.

nese – with the exception Arcadia – Megaris, the stretch between Boiotia and Thessalia, and the mainland from the Ionian sea to the western slopes of the Pindos Mountains.

The Aiolic group saw frequent innovations along with selections from neighboring dialects, differentiating itself by such isoglosses as the development of Proto-Greek labiovelars into labials before front vowels: compare Thessalian πέμπε 'five' to Attic πέντε. Furthermore, the group developed the athematic dative plural ending -εσσι, as seen in Lesbian [χρη]μάτεσσι 'money' corresponding to Attic χρήμασι, and extended the endings -ων, -οντος to the perfect active participle in place of -ώς, -ότος. For example, Boiotian ϝεϝυκονομειόντων 'having managed' corresponds to Attic ᾠκονομηκότων, and ἀπειλθείοντες 'having departed' to ἀπεληλυθότες.[2] This group occupied the countries of Thessalia and Boiotia on the western coast of the Ionian sea, as well as the island of Lesbos and the country of Aiolia on the northern-western coast of Anatolia.

The Southern Greek family included the Mycenaean, Arcado-Cypriot, and Attic-Ionic dialects. These dialects assibilated *ti (τι) to *si (σι) sometime before the Mycenaean period, as indicated by the Mycenaean do-so-si /dōsonsi/ 'they will give,' vs. Attic δώσουσι.[3] While the Mycenaean syllabary complicates any attempts at discerning Mycenaean isoglosses, orthographically adjacent vowels in such forms as do-e-ro /doelos/ (Attic δοῦλος) and e-ke-e /ek^{h}een/ (ἔχειν) indicate a general lack of vowel contraction.[4]

The Attic dialect differentiated itself primarily via two isoglosses. First, the dialect lost the bilabial glide at an early date: compare Attic οἰκία 'home' with Boiotian ϝοικία. Second, Attic-Ionic underwent an exclusive vowel shift, raising the long vowel ᾱ to η. As a result, where Doric inscriptions mention the βουλᾱ́ 'council' and the δᾶμος 'deme, people,' Attic inscriptions mention the βουλή and the δῆμος. Attic further differentiated itself from Ionic by

[2]J. Méndez Dosuna, "The Aeolic Dialects," in *A History of Ancient Greek from the Beginnings to Late Antiquity*, ed. A.-F. Christidis, 4th ed., vol. 1 (Cambridge, UK: Cambridge University Press, 2015), 461–62.

[3]John Chadwick, "Mycenaean Greek," in *A History of Ancient Greek from the Beginnings to Late Antiquity*, ed. A.-F. Christidis, 4th ed., vol. 1 (Cambridge, UK: Cambridge University Press, 2015), 400.

[4]Chadwick, "Mycenaean Greek," 396.

two exclusive changes. First, Attic reversed the vowel change after ε, ι, or ρ. For example, the ā-stem ending is raised in the Ionic variant ἱστορίη 'inquiry,' but lowered in the Attic ἱστορία. Second, Proto-Greek clusters with a non-labial consonant and a palatal glide resulted in the geminate stop ττ in Attic and the fricative σσ in Ionic (and most other dialects): Attic πράττω 'I do' and θάλαττα 'sea' vs. Ionic πράσσω and θάλασσα. The Attic-Ionic dialect, defined by the raising of ᾱ to η, occupied the country of Attica, comprising the Attic Peninsula, Ionia on the western coast of Anatolia, Euboia, and the Cyclades.

The Arcado-Cypriot dialect is defined by differed by, among others, three basic isoglosses. First, the vowel ε raised to ι, most typically in proximity to a nasal consonant, as demonstrated by Arcado-Cyrpiot ἰν 'in' vs. Attic ἐν. Second, the vowel ο raised to υ, sometimes in proximity to a nasal consonant but most often word-finally. For example, cf. Arcado-Cypriot neuter ἄλλυ 'other' vs. Attic-Ionic ἄλλο. Finally, Arcado-Cypriot preferred the athematic suffix -ής (also spelled -ές́) over -εύς, as is found in other dialects. For example, the Cypriot forms ἰjερές́ 'priest' and βασιλές́ 'king,' as well as Arcadian φονές́ 'murderer,' may be compared with Attic-Ionic ἱερεύς, βασιλεύς, and φονεύς.[5] Last, the Arcado-Cypriot dialect formed middle present and future tenses with -τοι rather than -ται, as seen in Cypriot κεῖτοι '(s)he lies down' vs. Attic κεῖται.[6] The mediopassive ending -τοι occurs elsewhere only in Mycenaean: e-u-ke-to /euk^{h}etoi/ '(s)he offers prayers' corresponding to Attic-Ionic εὔχεται.[7] The Arcado-Cypriot dialect occupied the region of Arcadia in the highlands of the central Peloponnese and the island of Cyprus.

[5]A. Panayotou, "Arcado-Cypriot," in *A History of Ancient Greek from the Beginnings to Late Antiquity*, ed. A. -F. Christidis, trans. Chris Markham, 4th ed., vol. 1 (Cambridge, UK: Cambridge University Press, 2015), 420.

[6]Panayotou, "Arcado-Cypriot," 421.

[7]Chadwick, "Mycenaean Greek," 400.

The Phonological Inventory of Proto-Indo-European

Proto-Indo-European as typically reconstructed contained 25 phonemic consonants: fifteen stops, one fricative, two nasals, two liquids, two semivowels, and three obscure consonants called laryngeals. Stops showed the broadest variety, having distinguished between at least three places of articulation, two voices, and two secondary articulations. The nasals, liquids, and semivowels – collectively called resonants – as well as laryngeals could all function as syllable nuclei, whereas the stops and fricatives could not.

The labial stops included voiceless *p, voiced *b, and voiced aspirated *b^h, closely mirrored by the dental stops *t, *d, and *d^h. The velar stops – *k, *g, and *g^h – and the palatovelar stops – *$\acute{k}$, *$\acute{g}$, and *$\acute{g}^h$ – maintained this pattern. Additionally, the velar series distinguished between "plain" velars and labiovelars, which included a labial coarticulation: *k^w, *g^w, *g^{wh}. The only phonemic fricative, *s, could assimilate for voice when in a consonant cluster, as in *nizdós 'nest,' derived from the root *sed- 'sit.'

The reconstructed inventory contained six resonants: two nasals, two liquids, and two semivowels. The nasals included *m and *n, the liquids *l and *r, and the semivowels *w and *y. These, along with the three laryngeals – *h_1, *h_2, and *h_3 – could function as syllabic nuclei. A ring diacritic below the resonant indicates syllabicity, as with the laryngeal in *$d^h\underset{\circ}{h_1}$tós 'placed,' from the root *d^heh_1-.

The phonological inventory also distinguished between seven and ten vowels across three heights: high, mid, and low. The high vowels *i and *u, as well as the rare low vowel *a, may or may not have also occurred as the long vowels *$\bar{\text{i}}$, *$\bar{\text{u}}$, and *$\bar{\text{a}}$. The fact that the collocation of *VHC (a vowel followed by a laryngeal and then a consonant) resulted in *$\bar{\text{V}}$C (a consonant after a long vowel) significantly impedes any attempt to reconstruct these long vowels as phonemic.

Table 1: Proto-Indo-European consonants. Note the placement of the laryngeals, which are organized for convenience and not to describe their articulation beyond their potential syllabicity.

	Labial	Dental	Palatal	Palatovelar	Velar	Labiovelar
Voiceless Stop	*p	*t		*ḱ	*k	*k^{w}
Voiced Stop	*b	*d		*ǵ	*g	*g^{w}
Aspirated Stop	*b^{h}	*d^{h}		*ǵ^{h}	*g^{h}	*g^{wh}
Fricative		*s				
Laryngeal				*h$_1$	*h$_2$	*h$_3$
Nasal	*m	*n				
Liquid		*l *r				
Semivowel	*w		*y			

The mid vowels *e and *o certainly did have the long counterparts *ē and *ō, as necessitated by the ablaut system. The stem *ph$_2$ter- 'father' clearly exemplifies this. The nominative singular *ph$_2$tḗr contains a long *ē, whereas the vocative singular *ph$_2$ter contains a short *e in the same environment, creating a minimal pair. The Greek avatars πατήρ and πάτερ reflect this distinction. The compound stem *h$_1$su-ph$_2$tor- 'born of a good father' shows a similar pattern, with the nominative *h$_1$suph$_2$tōr and the vocative *h$_1$suph$_2$tor. The avatars εὐπάτωρ and εὐπάτορ again reflect this distinction.

Table 2: Proto-Indo-European vowels. Note the dubious long vowels in parentheses.

	Front			Back
High	*i (*ī)			*u (*ū)
	*e *ē		*o *ō	
Low		*a (*ā)		

Proto-Indo-European to Attic Greek

Stops

Labial and Dental Stops

The PIE labial and dental stops followed a relatively simple derivation into Attic Greek. The voiced and voiceless stops remained largely unchanged. Labial stops *p and *b were retained as π and β, as in πέτομαι 'I fly' < *peth$_2$- and βελτίων 'better' < *bel- 'strong.'[8] Dental stops *t and *d were similarly retained: from *telh$_2$-, τελαμών 'strap,' and from *h$_3$dont-, ὀδούς 'tooth.' The voiced aspirated stops *d^h and *b^h first devoiced to *t^h and *p^h, then were retained in Attic Greek, as in θετός 'placed' < *d^{h}h$_{\circ 1}$tós and φέρω 'I bear' < *b^{h}er-.

Velars

The velar series, however, took a relatively complicated path. Greek being a centum language, the palatovelars *ḱ, *ǵ, and *ǵ^h first merged with the plain velars *k, *g, and *g^h in all contexts. The plain, unaspirated velars then passed directly into Greek: compare κέλλω 'I put to harbor' < *kel- to κενός 'empty' < *ḱen-, and ἐγείρω 'I awaken' < *h$_1$ger- to γελάω 'I laugh' < *ǵelh$_2$-. As seen with dental and labial stops, voiced aspirated velars, both original and resulting from the centum merger, were retained as voiceless aspirates: στείχω 'I walk' < *steyg^h-; χήν 'goose' < *ǵ^{h}áns.

The labiovelar series was consistently fronted, but with a conditioned variation depending on what followed. Before *a or *o, the unaspirated labiovelars *k^w and *g^w resulted in the labial stops π and β, respectively. For example, πότερος 'which (of two)' < *k^{w}oteros and βοῦς 'cow' < *g^{w}ōus. However, *k^w resulted in a dental stop when followed by a front vowel, as in τίς 'who?' < *k^{w}is and τε 'and' < *k^{w}e, while voiced *g^w resulted in a dental only before *e:

[8] R. S. P. Beekes and Lucien van Beek, *Etymological Dictionary of Greek*, Leiden Indo-European etymological dictionary series (Leiden: Brill, 2016), s.v. βέλτερος.

ἀδελφός 'brother' < *sm̥g^{w}elb^{h}os vs. βίος 'life' < *g^{w}ih$_3$os. Grammatical paradigms for stems ending in a labiovelar were leveled by analogy, with verbs adopting the stem consonant of the first-person singular, and nominals that of the nominative singular. Hence the third-person singular λείπει '(s)he leaves behind' < *leyk^{w}-, standing in for ˣλείτει; and the genitive singular ἔπεος 'word' < *wek^{w}-, rather than ˣἔτεος. Labiovelars notably lost their labial coarticulation when following or preceding the vowel *u in a process called the Boukolos Rule. This change takes its name after the noun βουκόλος 'cowherd' < *g^{w}ōu-k^{w}ol- which presents a medial κ where a labiovelar would typically have returned a ˣπ, as exemplified in αἰπόλος 'goatherd' < *ayg-k^{w}ol-. This rule took effect before the Mycenaean period: the inscription 51=An20 [18] from Pylos mentions 90 missing cowherds, spelled qo-u-ko-ro /g^{w}oukoloi/ with the secondary velar stop in the syllable -ko-.[9]

Voiced aspirated labiovelars were first devoiced in accordance with other aspirated stops. Similar to plain labiovelars, aspirated labiovelars developed a conditioned variation between labial, dental, and velar stops. Like plain voiced labiovelars, aspirated labiovelars fronted to a dental before *e, as in θείνω 'I kill' < *g^{wh}en-yō. Before a non-front vowel or before *i, the result was a labial consonant, e.g., φόνος 'murder' < *g^{wh}on- (o-grade from *g^{wh}en-) and ὄφις < *og^{wh}is 'serpent.'

The voiced aspirates were subject to the effects of Grassmann's law, which interfered with consecutive heterosyllabic aspirates. In these *C^{h}...C^{h} conditions, the first aspirate lost its aspiration. That the resulting consonant remained voiceless indicates that the change occurred at least after the devoicing of aspirated stops. In reduplicated presents, the result is an unaspirated reduplicated syllable with an aspirated root onset, as in τίθημι from *d^{h}i-d^{h}eh$_1$-. Some nominal stems alternate between C^{h} ...Cς in the nominative singular or C^{h} ...Cσιν in the dative plural and C ...C^{h}- in the other case-number combinations, owing

[9]Michael Ventris and John Chadwick, *Documents in Mycenaean Greek: Three Hundred Selected Tablets from Knossos, Pylos and Mycenae with Commentary and Vocabulary*, First Paperback Edition (Cambridge: Cambridge University Press, 2015), 182.

to the loss of aspiration in C^hs clusters. For example, the underlying form $|t^hrik^h-|$ 'hair' emerges as the nominative singular θρίξ and dative plural θρίξιν, but the accusative singular τρίχα and genitive plural τριχῶν show the full effect of Grassmann's law.

Table 3: Exemplary Labiovelar Outcomes. Source: Benjamin W. Fortson,*Indo-European Language and Culture: An Introduction*, 2nd ed, Blackwell Text-books in Linguistics 19 (Chichester, U.K. ; Malden, MA: Wiley-Blackwell, 2010), 253

	Before *e	Before *i	Before C or back V
$*k^w$	τε 'and' < $*k^we$	τίς 'who?' < $*k^wis$	πότερος 'which?' < $*k^wo$-teros πέμπτος 'fifth' < $*penk^wtos$
$*g^w$	ἀδελφός 'brother' < $*sm̥$-g^welb^hos	βίος 'life' < $*g^wih_3os$	βοῦς 'cow' < $*g^wōus$
$*g^{wh}$	θείνω 'I kill' < $*g^{wh}en$-yō	ὄφις 'snake' < $*og^{wh}is$	βάλλω 'I throw' < $*g^wl̥$-nō νήφω 'I go without drink' < $*ne$-eg^{wh}-ō φρήν 'midriff' < $*g^{wh}rēn$

Laryngeals and Resonants

Laryngeals

Sometime before the Proto-Greek period, the laryngeals $*h_1$, $*h_2$, and $*h_3$ had "colored" adjacent *e-vowels by discernibly altering their quality. The vocalic result of a laryngeal-vowel segment is annotated as a^x, meaning the vowel corresponding to $*h_x$: a^1 = e, a^2 = a, and a^3 = o.

A *VHC collocation, with a post-vocalic, pre-consonantal laryngeal, resulted in Greek $ā^x$, exemplified by the triad τίθημι 'I place' < $*d^heh_1$-, ἵστᾱμι 'I set up' (Doric) < $*steh_2$-, and δίδωμι 'I give' < $*deh_3$-. Pre-vocalic *HV had the same qualitative effect but without any

lengthening, returning a^x as in ἐστί 'is' < *$h_1$es-, ἄγω 'drive' < *h_2eǵ-, and ὄψομαι 'I will see' < *$h_3$ek^w-.[10]

Glides

The glide *y resolved in various ways depending on its position and the adjacent phonemes. First, when in initial position, the glide fortified into the Greek ζ, as in ζυγόν 'yoke' < *yugóm, with an initial *y- evidenced by Hittite *iugan*, Sanskrit *yugám*, and Latin *iugum*.[11] Meanwhile, when the glide followed a laryngeal in an initial cluster, the segment *h_xy- resulted in Greek /h-/. Cognates to the relative pronoun ὅς 'which' < *$h_x$yo- retain the initial glide in various other languages, such as *yá-* in Sanskrit, *ya-* in Avestan, and *yo-* in Celtic (extant in the Gaulish *dugiionti-io* 'who serve').[12] Moreover, the word for 'liver,' ἧπαρ < *h_xyēk^{w}r̥, is cognate with Old Avestan *yākarə* and Middle Persian *ǰakar* beside Sanskrit *yákr̥t* and Latin *iecur*,[13] indicating both the presence of an initial *-y- in these stems as well as establishing the need for a laryngeal to condition the varying outcomes of that glide.[14]

Next, *y resulted in various medial outcomes depending primarily on what preceded and secondarily on what followed. For example, when a vowel directly preceded the glide, its retention depended entirely on the following segment. An intervocalic glide elided entirely, as seen in τρεῖς 'three' < *tréyes (*trey-). Here, the vowel -ει- is a spurious diphthong, created by the contraction of ε-ε which resulted from the glide's elision. The Aiolic and Severer Doric τρῆς evidence this, as in these dialects ε-ε contracted to η.[15] Furthermore, Sanskrit *tráyaḥ* and attests to the presence of the intervocalic *-y-, which is also implicit in the adverb

[10]Vit Bubenik, "The Phonology of Greek," in *Handbook of Comparative and Historical Indo-European Linguistics*, ed. Jared Klein, Brian Joseph, and Matthias Fritz (De Gruyter, 2017), 641, https://doi.org/10.1515/9783110261288-040.

[11]Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. ζυγόν.

[12]Benjamin W. Fortson IV, *Indo-European Language and Culture: An Introduction*, 2nd ed, Blackwell Textbooks in Linguistics 19 (Chichester, U.K. ; Malden, MA: Wiley-Blackwell, 2010), 144.

[13]Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. ἧπαρ.

[14]It should be noted however, that, this laryngeal explanation is controversial in the absence of any other incontrovertible evidence that the forms in question began with laryngeals.

[15]Herbert Weir Smyth, *Greek grammar*, ed. Gordon M. Messing (Mansfield Centre, Conn: Martino Publ, 2013), 59D.

τρίς ‘thrice’ corresponding to Sanskrit *tríḥ*, the compounding element τρι-, and various other formations derived from the ∅-grade *tri-.[16]

However, the glide remained as the second element of a diphthong when it occurred before a consonant and after a vowel, as in οἶδα ‘I know’ < *woyd-. When following a consonant, the glide *y underwent diverging processes. After a nasal or rhotic, the cluster underwent metathesis, creating a secondary diphthong. For example, the nasal cluster *-ny- metathesized in μέλαινα ‘black (f.)’ < *melanya, as did the rhotic cluster *-ry- in φθείρω ‘I destroy’ < *d^hg^{wh}er-yō,[17] and in μοῖρα ‘portion’ < *mor-ya.[18] However, this metathesis failed to occur in the cluster *ly, which resulted in the geminate λλ in Attic Greek. For example, the adjective ἄλλος ‘other’ < *$h_2$el-yo- demonstrates the resulting λλ, with Latin *alius*, Gothic *aljis*, and Old Irish *aile* all attesting to the presence of the glide *-y- in this formation. Moreover, the verb στέλλω ‘I dispatch, make ready’ < *stel-yō attests to the same gemination. The derived noun στόλος ‘equipment’ demonstrates that the root did not originally end in a cluster, while the Old Church Slavonic cognate *po-steljǫ* ‘I spread out’ attests to an original yod-present.[19]

Finally, when the glide *y followed a stop, those *Cy collocations underwent a series of changes known as the First and Second Greek Palatalizations. The First affected the apical stops *t, *d and *t^h < *d^h, assibilating them into *ts, *dz and *t^hs. If uninterrupted, these affricates resulted in an Attic σ. For example, the verb σέβομαι ‘I shrink in awe of’ < *tyeg^w- shows the assibilation of *ty- to σ- in initial position, with the cluster evidenced by the Sanskrit cognate *tyaj-* ‘flee.’ Additionally, the noun σῆμα ‘sign’ < *d^hyeh$_2$-, cognate with the Sanskrit *$d^hyá$-* ‘thought,’ demonstrates the same assibilation in aspirated clusters. The adjective μέσος ‘middle’ < *med^{h}yos demonstrates that the shift also occurred medially, with the cluster *-d^hy- evidenced by Sanskrit *$mád^hya$-* and Latin *medius*. Lastly, the construction

[16]Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. τρεῖς.
[17]Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. φθείρω.
[18]Fortson IV, *Indo-European Language and Culture*, 650.
[19]Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. στέλλω.

of feminine participles indicates that the assibilation took place even when following another consonant. For example, take the masculine and feminine participles φέρων and φέρουσα, both from *b^{h}er-. The masculine genitive φέροντος reveals the full participial suffix -οντ-, implying the original stem *b^{h}eront-. Appending the feminine ending *-yh$_{2}$ would result in the process *b^{h}erontyh$_{2}$ > Proto-Greek *p^{h}erontsa > *p^{h}eronsa, and finally φέρουσα after the loss of the nasal in *ns and compensatory lengthening. This outcome emphasizes that the shift from *ty > σ generally occurred in any position.[20]

However, since the glide *y remained in the contemporaneous phonological inventory of Pre-Proto-Greek, and since the glide appeared in various derivational suffixes — especially in *-y^{e}‰- presents, first declensions in *-yă, and comparatives in *-yōn — many secondary forms still bore a strong resemblance to their stem. For example, the comparative *kresōn 'stronger' < *kretyōn transparently resembled the positive *kratus 'strong' < *krtus, as both maintained the basic underlying stem shape |krVC|. Similarly, *erésō 'I row,' beside ἐρέτης 'oarsman' and ἐρετμόν 'oar,' would have been intuited by speakers to represent *erétyō. In such morphologically transparent forms, widespread analogical restorations reintroduced the glide *y after segments assibilated in the First Greek Palatalization.[21] From *kretyōn and *erétyō, for example, arose *kretsōn and *erétsō.[22]

Following the analogical restoration of the glide *y in various positions, the Second Greek Palatalization assibilated all Pre-Greek consonants in *Cy clusters. There were three Proto-Greek outcomes, depending on the place and voicing of the palatalized consonants.

First, voiceless velars and dentals both resulted in Proto-Greek *čč. For example, the restored *-ty- in the comparative *kretyōn became Proto-Greek *kreččōn. Meanwhile, the aspirated *-k^{h}y- in *t^{h}ak^{h}yōn 'quicker,' comparative of ταχύς 'quick' < *d^{h}ngh-, and the plain *-ky- in *p^{h}ulakyō 'guard' merged in their outcome with *ty, becoming *t^{h}aččōn and

[20]Andrew L. Sihler, *New Comparative Grammar of Greek and Latin* (Oxford: Oxford University Press, 2008), 196.
[21]Sihler, *New Comparative Grammar of Greek and Latin*, 197.
[22]Sihler, *New Comparative Grammar of Greek and Latin*, 197–200.

*p^{h}ulačč̄ō, respectively. This voiceless affricate became Attic Greek -ττ-, hence θάττων and φυλάττω.[23]

Second, voiced (labio)velars and dentals also merged, but into the voiced *j̆j̆.[24] In this way, from Pre-Greek *pedyos arose Proto-Greek *pej̆j̆os. Similarly, PIE *h$_{x}$yaǵ-y^{e}⁄$_{o}$-, with the voiced velar cluster *-ǵy, resulted in the Proto-Greek *haj̆j̆-^{e}⁄$_{o}$-.[25] This voiced affricate became Attic Greek ζ, resulting in the adjective πέζος and the verb ἄζομαι 'I stand in awe.'[26] This created a merger with the result of an initial glide *y-. For example, the ζ- in the proper noun Ζεύς 'Zeus' developed from an initial *dy-, as evidenced by the Sanskrit cognate *dyáuḥ* 'heaven/day.'[27] On the other hand, the ζ- in ζυγόν resulted from a bare *y-, as above.

Finally, the cluster *p$^{(h)}$y partially assibilated to Proto-Greek *pč. For example, PIE *klep-y^{e}⁄$_{o}$- 'steal' yielded Proto-Greek klepč-^{e}⁄$_{o}$-,[28] with a root-final labial evidenced by the future κλέψω and the derived noun κλέπος, besides the Latin cognate *clepō* 'I steal.'[29] Additionally, the verb *t^{h}ap^{h}-y^{e}⁄$_{o}$- 'bury' became *t^{h}apč-^{e}⁄$_{o}$-. The related noun τάφος attests to a root-final aspirated *p^{h}, demonstrating the merger between the aspirated *p^{h}y and the unaspirated *py. The resulting *pč then developed into Attic πτ, forming the verbs κλέπτω and θάπτω.[30]

Additionally, before the Greek Palatalizations, Attic and the other South Greek dialects assibilated *t to σ before a syllabic *i. For example, the derivational suffix *-ti- resulted in Attic -σις, as seen in βάσις < *g^{w}m̥-ti- and πρόγνωσις < *-ǵnh$_{3}$-ti-. Notably, this affected a change in the 3rd pl. ending *-nti, which assibilated to *-nsi, then yielded -σι with compensatory lengthening of the preceding vowel. As a result, assibilated Attic verbs correspond

[23] Sihler, *New Comparative Grammar of Greek and Latin*, 197–99.
[24] Sihler, *New Comparative Grammar of Greek and Latin*, 198.
[25] Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. ἅγιος.
[26] Sihler, *New Comparative Grammar of Greek and Latin*, 200.
[27] Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. Ζεύς.
[28] Sihler, *New Comparative Grammar of Greek and Latin*, 202.
[29] Beekes and van Beek, *Etymological Dictionary of Greek*, s.v. κλέπτω.
[30] Sihler, *New Comparative Grammar of Greek and Latin*, 202.

to unassibilated Doric counterparts, as in φέρουσι and φέροντι.[31] However, a preceding *s prevented assibilation, leading to στι collocations in such forms as ἐστί and στίζω.

Syllabic Laryngeals and Resonants

The PIE syllabic resonants developed in one of two ways, depending on their manner of articulation. Here a distinction arises between the treatment of liquid consonants and that of nasals, laryngeals, or glides.

The nasals *m̥ and *n̥ developed to a simple α in all dialects of alphabetic Greek. This commonly occurs in the third declension accusative singular, as seen in πόδα < *pod-m̥, and in the alpha privative, as in ἄφθιτον < *n̥-d^{h}g^{wh}itom.[32] The syllabic laryngeals *h̥$_1$, *h̥$_2$, and *h̥$_3$ evolved similarly; however, in keeping with laryngeal coloring, the resulting vowel was *a^{x}. The triad *d^{h}eh$_1$-, *steh$_2$-, and *deh$_3$- once again exemplify this process well, here through their passive verbal adjectives: θετός 'placed' < *d^{h}h̥$_1$-tó-, στατός 'set' < *sth̥$_2$-tó-, and δοτός 'given' < *dh̥$_3$-tó-.[33] Pre-Greek speakers also vocalized word-initial laryngeals before a consonant,[34] and these too resulted in a^{x}: ἔρεβος 'darkness' < *h̥$_1$reg^{w}-, ἀνήρ 'man' < *h̥$_2$nér-, and ὄφελος 'help' < *h̥$_3$b^{h}el-.[35]

The glides *y and *w stood in allophony with their syllabic counterparts *i and *u, and they survived as such into Greek. Examples of syllabic *y occur in various ablauting forms, such as ἔλιπον 'I left behind,' aorist of λείπω < *leyk^{w}-. In a similar fashion, ablauting variants of a shared stem can reveal instances of the glide *w surviving as a syllabic nucleus into Greek. For example, cognates with ζυγόν 'yoke' include ζεῦγος 'pair, team' and ζεύγνυμι 'I join,' both in the full grade. As such, ζυγόν must descend from the ∅-grade, making the vowel υ the result of the syllabified glide *w.

[31] Fortson IV, *Indo-European Language and Culture*, 256.
[32] Fortson IV, *Indo-European Language and Culture*, 254.
[33] Fortson IV, *Indo-European Language and Culture*, 255.
[34] Fortson IV, *Indo-European Language and Culture*, 63.
[35] Fortson IV, *Indo-European Language and Culture*, 255.

In contrast, the syllabic liquids r̥ and l̥ gained an anaptyctic vowel.[36] Attic typically utilizes an alpha, as in καρδίᾱ 'heart' < *ḱr̥d- and πλατύς 'wide' < *pl̥th₂-u-, but various dialects instead preferred an omicron, as in Cypriot κόρζα 'heart.' Furthermore, as seen in καρδίᾱ and πλατύς, the placement of the anaptyctic vowel is not consistent, even within Attic-Ionic. Whereas Attic, for example, had in its lexicon καρδίᾱ, Homeric Greek had κραδίη, demonstrating the change *r̥ > ra rather than *r̥ > ar. The inconsistent mechanics of anaptyxis suggests that the syllabic liquids had survived into Proto-Greek.

The Sibilant *s

Sometime before the Mycenaean period, the fricative *s generally debuccalized when non-final to *h, which then elided non-initially. Intervocalic /h/ appears in Mycenaean inscriptions, as seen in KN 227 = Oe 127 pa-we-a$_2$ /parweha/, corresponding to φάρεα 'clothes,' a neuter -εσ- stem.[37] The character a$_2$ indicates the syllable /ha/,[38] demonstrating that the shift from *s to h had already been completed. There exists the alternate spelling pa-we-a in KN 219 = L 594 without any evident aspiration.[39] However, Mycenaean scribes did not typically indicate /h/, as evidenced in KN 212 = L 641 o- for /hō/ 'thus,' corresponding to Attic ὧδε 'id.,'[40] and KN 283 = So0442 a-mo-te for /harmote/ (dual) 'wheels.'[41] That the spelling pa-we-a$_2$ indicates aspiration is an exception to the rule, suggesting that /h/ underwent elision during the Mycenaean period.

Debuccalization also occurred in most clusters, turning *VRs and *VsR segments into *VRh and *VhR, respectively. However, in these instances, the preceding vowel underwent compensatory lengthening with the ultimate loss of the aspirate. For example, the verb φαίνω 'I show' from the stem φαν- takes the sigmatic aorist *ε-φαν-σα: here, the cluster -ν-σ-

[36] Fortson IV, *Indo-European Language and Culture*, 254.
[37] Ventris and Chadwick, *Documents in Mycenaean Greek*, 322.
[38] Ventris and Chadwick, *Documents in Mycenaean Greek*, 385.
[39] Ventris and Chadwick, *Documents in Mycenaean Greek*, 319.
[40] Ventris and Chadwick, *Documents in Mycenaean Greek*, 317.
[41] Ventris and Chadwick, *Documents in Mycenaean Greek*, 371.

debuccalizes to -ν-**h**-, then loses its aspirate, leaving the aorist ἔφηνα 'I showed' The verb στέλλω 'I send' from στελ- shows the same process, with the aorist *ε-στελ-σα appearing in Attic as ἔστειλα 'I showed' Accordingly, εἰμί 'am' from εσ- demonstrates the same process in *sC clusters, with Attic εἰμί 'I am' arising from *εσ-μι.

However, specific *s clusters resisted debuccalization. Clusters with a voiceless stop notably retained the fricative, as in ἐστί 'is,' σφέτερος 'their own,' and ἔπραξα 'I did,' the sigmatic aorist of πράττω from the stem πρακ-. Other verb forms, namely non-aorists, also retained the sigma. For example, the perfect middle πέφανσαι 'you (sg.) have appeared' retained the cluster -ν-σ- where ἔφηνα did not. Other sigmatic derivations, such as abstract nouns in -σις < *-ti- ,[42] also retain their sigmas: ἀπόφανσις 'declaration' and κάθαρσις 'cleansing,' for example.

In addition, there exist some unique cases. First, medial *-rs- clusters become Attic -ρρ-, as shown by the correspondence between Attic ἄρρην 'male' and Ionic ἄρσην 'id.' Next, geminate *ss resisted debuccalization but degeminated without compensatory lengthening.[43] The plural dative of -εσ- stems, for example, demonstrates the phenomenon well: Attic φάρεσιν 'clothes' corresponds to Mycenaean pa-we-si 'id.' in MY 228 = Oe111 + 136,[44] showing the outcome -εσιν from an earlier formation *es-sin.

The Attic-Ionic Vowel Shift

Late in its development, the Attic-Ionic dialect underwent a unique vowel shift which raised the long vowel ᾱ to η, resulting in numerous forms unique to this group, such as μήτηρ 'mother' and δῆμος 'deme,' corresponding to the typical Doric forms μᾱ́τηρ 'mother' and δᾶμος 'deme.' However, Attic then innovated conditioned reversals of this change after the vowels ε and ι, as well as following the consonant ρ. As such, where Ionic showed the forms νεηνίης 'young

[42] Smyth, *Greek grammar*, 865.1.
[43] Bubenik, "The Phonology of Greek," 649.
[44] Ventris and Chadwick, *Documents in Mycenaean Greek*, 322.

man,' ὥρη 'season' and ἱστορίη 'inquiry,' Attic showed the variants νεᾱνίᾱς 'young man,' ὥρᾱ 'season' and ἱστορίᾱ 'inquiry.' However, an intervening glide prevented this reversal, resulting in the Attic form κόρη 'girl' < *korwā.

Methodology

Data Collection

The data used in this study reside in the text archives of the Packard Humanities Institute (PHI) website. The archives contain a collection of Greek inscriptions as published in 746 books, journals, and epigraphic collections. One may find the PHI website here (packhum.org) and the Greek inscriptional archive here (inscriptions.packhum.org).

The Institute has organized its collection by region, containing inscriptions from Attica (IG I-III), the Peloponnesos (IG IV-[VI]), Central Greece (IG VII-IX), and beyond. Navigating through the page from Regions > Attica (IG I-III) > IG I^2 will present a list of inscriptions found in Attica and published in *Inscriptiones Graecae* (IG) volume one part two. Selecting the first entry, IG I^2 165, will present the inscription's contents. The header rests at the top of the page, with the main text below it.

Each inscription also has a unique identifier, which the author calls the PH number. This number appears at the bottom right of the page when viewing a text. Note that viewing an inscription's URL will reveal that the Institute has used the PH numbers as the primary means of accessing an inscription. For example, IG I^2 165 has the unique identifier PH1754. Clicking on this identifier will open the same inscription, but with a different URL. Compare the URL retrieved by navigating through the menu tree (1) to that retrieved by clicking on the PH number (2) below.

1. https://inscriptions.packhum.org/text/1754?&bookid=3&location=1701

2. https://inscriptions.packhum.org/text/1754

The first URL contains extraneous information at the end, mainly a tag called `bookid` and one called `location`, each with selections following the assignment operator `=`. However, the two URLs match perfectly until the extra identifying tags, and both end with that inscription's PH number. Replacing the number at the end of the URL with any other valid PH number will return a different inscription, opening the door to automation and allowing one to rapidly collect large volumes of inscriptional data.

To gather the data necessary for the study, the author has composed a web scraper: a file of computer code which systematically retrieves data from an online source. The author has elected to write this program in a language called R, which the R Foundation for Statistical Computing developed and maintains. As the name implies, the Foundation designed R as a system for quick and high-powered statistical analyses, resulting in a language with built-in tools for data management and testing which one might otherwise need to compose or load separately for other languages. As such, R has become a natural complement for linguists integrating large data sets or quantitative methods into their research.

The web scraper contains fifteen functions — discrete operations which take some input and, critically, return a single output — which R reads in the following order:

1. `Scrape()`
2. `MakePage()`
3. `ReadText()`
4. `CleanText()`
5. `ReadBook()`
6. `ReadNo()`
7. `ReadHeader()`

8. `CleanHeader()`
9. `TranslateRomanNumeral()`
10. `TranslateCentury()`
11. `CleanDates()`
12. `ReadDateAfter()`
13. `ReadDateBefore()`
14. `ReadLocation()`
15. `MakeEntry()`

The function `MakePage()` takes a PH number as an input, from which it generates a URL for the page of the number's corresponding inscription on the PHI website. The function then accesses the page through that link and retrieves its contents in a machine-readable format. It then returns these contents, i.e., it makes the contents into a valid variable which it outputs for use by later functions. `MakePage()` calls this output variable `page`.

Next in the chain comes `ReadText()`. This function takes the variable `page` as an input. From this input, the function generates a list of elements called the Document Object Model (DOM). One might best picture the DOM as a tree chart, which arranges every paragraph, button, or other element of a webpage into a series of stems and branches. Every point on this chart — called a "node" — has a unique identifier which web browsers use to apply various styles, such as fonts and colors. Since the industry has standardized DOM's, the function `ReadText()` can reproduce this list with full confidence that it will match that used by the PHI website. Considering this, the author has manually retrieved the relevant node identifiers from the site, one of which `ReadText()` uses to identify the main body text of the inscription in the `page`. The function retrieves this inscription body and returns it as the variable `text`.

The function `CleanText()` takes the `text` as an input, then removes any extraneous editorial marks. First, it targets numbers in Arabic numerals, which appear in the text as

line numbers and occasionally as indicators for the length of a textual corruption. However, for reasons likely pertaining to storage limitations, the PHI does not maintain dedicated sites for multiple copies of an inscription. This becomes a matter of some consequence when retrieving the data from IG VII, which includes data from the city and environs or Oropos. When digitizing their inscriptional corpus, the PHI included a copy of Vasileios Petrakos' *Hoi Epigraphes Tou Oropou*, which appropriately contains a much more thorough collection of Oropian inscriptions. Therefore, any inscription in the IG which also appears in the Epigraphes does not have a meaningful page among the other IG digitizations. Rather, the entry simply directs the reader to the appropriate Epigraphes entry. As a result, the function `CleanText()` must ignore any numbers occurring in these directions.

Then, after having removed any unnecessary numerals from the text the function deletes anything found between the square brackets [ ]. As this study relies on extant writings for its analysis, the inclusion of reconstructed text, whatever its quality, would necessarily amount to the inclusion of artificial data which may erroneously sway the results. `CleanText()` follows this by making its final formatting corrections. It removes the angled brackets < >, the pound sign #, and any sublinear dots before turning line breaks into single spaces and merging what words had originally split between two lines.

Finally, `CleanText()` makes changes to the characters in the text themselves to both maintain some fidelity to the original inscriptions and simplify later quantitative analyses. As the PHI copies contain only modernized transcriptions of the inscriptions, and not the unaccented 1-to-1 copy as is present in the print editions, some sounds can appear in several orthographic forms. For example, the vowel /a/ may take any of any forty-three shapes when accounting for capitalization (miniscule or majuscule), breathing (spiritus asper or spiritus lenis), accent (acute, grave, or circumflex), and historic presence of a diphthong (iota subscript or no iota subscript).

Table 4: Possible Combinations of Alpha with Polytonic Accents

α	ὰ	ά	Α	Ὰ	Ά
ά	ᾰ́	ᾱ́	Ά	ᾼ	Ᾱ
ὰ	ᾲ	ᾳ	Ὰ	ᾺΙ	ᾼ
ᾶ	ᾷ	ᾇ	—	ᾊ	ᾋ
ᾳ	ᾴ	ᾄ	Αι	ᾺΙ	ᾼ
ᾴ	ᾴ	ᾄ	—	ᾺΙ	ᾼ
ᾲ	ᾲ	ᾳ	—	ᾺΙ	ᾼ
ᾷ	ᾷ	ᾇ	—	ᾊ	ᾋ

These numerous glyphs do represent variance in suprasegmental features and historical pronunciation, as well as some contextual info such as changes in speaker or the presence of a proper noun, but they do little to inform the underlying quality of the vowel itself. In addition, the sheer number of glyphs mapped to each vowel would require unnecessarily complex search parameters to extract the same data from accented text as a much simpler search parameter would from an unaccented text. Although modern computer type does support decomposed characters which, for example, would represent <ᾇ> as four individual glyphs placed atop each other — <α>, <ι>, <’>, and <ˆ> — most systems would automatically convert them into a single precomposed glyph <ᾇ>, which it reads as one individual character distinct from all others. As a result, searching the data for <α> will only return <α>, not <ᾇ> or <ᾰ́>, and so on. Any search parameters used to parse an accented text would therefore need to account for every character combination, which quickly becomes excessive when searching for entire words. As a means of circumventing this, `CleanText()` finds these characters once at the very beginning and substitutes them for their unaccented counterparts, though it preserves majuscules and minuscules for ease of reading when veri-

fying search results. Without accents to contend with, R can more easily handle this case distinction. The function applies all these changes to the `text`, which it stores for later use.

Then the web scraper changes focus and begins capturing an inscription's identifying data. While a PH number provides sufficient labelling for a computer to work with, it offers little for the researcher themselves. Therefore, the scraper uses the functions `ReadBook()` and `ReadNumber()` to capture a more useful identifier from the `page` variable. As the names suggest, `ReadBook()` captures which volume of the IG contains an inscription, and `ReadNumber()` captures that inscriptions number within the volume. The scraper saves these as the variables `ig_book` and `ig_no` which it stores for later use.

With the text and identifiers sorted, the scraper can begin the seven-step process of extracting an inscription's approximate date of carving. The multi-decade publishing history of the IG had resulted in an unstandardized patchwork of various dating formats which, despite all presenting adequately the relevant chronological information, most thoroughly confound a computer. Of the seven, five functions serve only to help standardize the carving dates, whereas only two capture the relevant information. These functions are numbers seven through thirteen in the order of operations.

7. `ReadHeader()`
8. `CleanHeader()`
9. `TranslateRomanNumeral()`
10. `TranslateCentury()`
11. `CleanDates()`
12. `ReadDateAfter()`
13. `ReadDateBefore()`

The process relies on a line of text here referred to as the header, which contains descriptions of stoichedon, dates, locations, and cross references as available. As with the other inscriptional elements, the PHI has standardized the position of the header on a page, allow-

ing for the function `ReadHeader()` to extract and store it as the variable `header`. The function `CleanHeader()` takes the `header` as an input and cleans it in a similar way to `CleanText()`. It removes editorial marks – brackets, pound signs, and so on – and transforms any line breaks or tab stops into single spaces in order to ease processing later on. `ReadHeader()` also erases stoichedon information, which appears in a similar format to dates and may hinder proper date extraction.

After this initial cleaning, the scraper calls the function `TranslateRomanNumeral()`, which performs two major standardizing operations. First, it converts any centuries written in Roman numerals to Arabic numerals, which R can more readily interpret. Then, the function finds which Latin abbreviations appear in a standardized position, and so constitute a critical element through which the function identifies centuries and translates them into English. For example, the inscription IG I^3 401 has in its header the date "s. V a.". The function uses the abbreviation "s." for "saeculum" as a marker to indicate that the following text relays numerical information. It then grabs that text – "V" – and converts it into an Arabic numeral, resulting in the string "s. 5 a.". As the following function uses the abbreviation "c." for "century" to find its target strings, it becomes necessary to translate the "saeculum" abbreviation early. To do so, `TranslateRomanNumeral()` takes "s. 5 a." (or any other date of the same format) and converts it to "5th c. a.".

Then, with the centuries standardized, the scraper calls the function `TranslateCentury()`. The IG frequently gives dates as centuries or century ranges which, while plainly evident to a person, causes some difficulty for a computer. Therefore, the function finds centuries and converts them to `DDD-DDD` format. The operations in `TranslateCentury()` are context aware: if either the term "early" or "late" precedes the century, then the function will convert it to a fifty-year date range. As such, a date reading "early 4th c. a." would become "400-350 a."; a date reading "late 4th c. a." would accordingly become "350-301". If the phrase "mid."

precedes the century, then the function returns a date in the mid-century. If no phrase precedes it, then the function returns a date range covering the century's full duration.

As a final preparatory step, the function `CleanDates()` performs any remaining standardizations required for accurate data extraction. First, it translates any remaining Latin text into English; then, it reformats date ranges. The IG has used several date-range formats throughout its publishing history, the most relevant here being the "slashed" format `DDD/D` and the "dashed" format `DDD-D`. Both slashed and dashed dates may have one to three digits on the right side. In addition, dashed dates sometimes occur as long chains of dates in `DDD-DDD-DDD-DDD` format, as a consequence of how `TranslateCentury()` handles century ranges. `CleanDates()` works to standardize all of these in dashed format with two dates, `DDD-DDD`, each written with three digits. The function will only make an exception for dates within the first century, to which it will never add leading zeroes.

With the header cleaned and the dates captured, the scraper may gather the final piece of evidence. using the `header` as an input, the function `ReadLocation()` reads the place of discovery as available for an inscription. Whereas this study restricts itself to Athens and her closest neighbors, the editors of the IG had no such limitations in mind, and so their publications assemble by region. Consequently, the data set contains inscriptions from cities not relevant to the study. To account for this, `ReadLocation()` determines an inscription's place of origin for later filtering, which it returns as the variable `location`.

Now the scraper has eight variables: `ig_book`, '`ig_no`', '`phi_no`', '`header`', '`location`', '`date_before`', `date_after`, and `text`. The function `MakeEntry()` takes these variables as inputs and bundles them together as a variable type called a `list`. As the name implies, a `list` contains a series of values (called "components"). This has two major benefits: 1) now that a copy of the variables exist and are stored in a container which permanently associates them with one another, the scraper can reuse the variable names for other inscriptions without fear of loss or confusion; and 2) the components of the list appear in a standardized

order, allowing them to more easily integrate with a table of evidence. After generating a list, `MakeEntry()` returns it as the variable `entry`.

The very first function on the list, `Scrape()`, manages the entire process. It takes a PH number as an input, which it stores as the variable `phi_no`. It then manages the processes of scraping, cleaning, and reading. `Scrape()` provides every input to the other functions as it calls them, and it stores their outputs as named variables as they return them.

However, it must do so contextually. While every PH number is unique, and the numbers are sequential within a volume, they are not sequential between volumes. Consecutive volumes of the IG occasionally have large gaps in identifiers between them, and the unassigned PH numbers will crash the scraper if left unaddressed. To mitigate this problem, `Scrape()` will pause operations after `ReadText()` and take a simple measurement of the `text` length by counting the number of characters stored in it. Because the PHI has standardized their page structure so well, inputting an empty PH number into an address and trying to load it will always bring up the same error page. This page has no body text comparable to that of a valid inscription page, and so has no equivalent node identifier on the DOM. When `ReadText()` tries to call an identifier but cannot find one, it returns an empty variable with a length of zero.

This empty variable specifically causes crashes, as the function `ReadText()` — and any other function using regular expression, that is, any function which needs to perform a search — expects an input with a length greater than or equal to one. However, one may take a cue from these input requirements and define the validity of a page by the presence of text: no text means no inscription, and so no valid page. With this in mind, `Scrape()` uses the length of the text to determine a PH number's validity. If the logical phrase `if(length(text) > 0)` returns the value `1` — that is, `TRUE` —then the scraping may proceed. However, if the expression returns the value `0` — `FALSE` — then `Scrape()` assigns the value `NA` to all eight variables and passes them to `MakeEntry()`.

After giving its variables – whatever their value – to `MakeEntry()`, `Scrape()` has in its possession the `entry`. It returns this list as an output. `Scrape()` itself is called by an external loop, which passes numbers incrementally to it for use as PH numbers, and which adds this `entry` output into a table of data for testing.

Data Selection

The data required for the study appear in IG I-III (Attica) and IG VII (Megaris, Oropia, and Boiotia). To capture these, the author manually retrieved the PH number for the final inscription in IG VII (VII 4,269) and directed the scraper to retrieve everything up to and including it. This process returned a table with 147,791 rows, which the author saved as a CSV.

The table needed some tidying. To start, the data included 105,684 invalid PH numbers, the inclusion of which added an unnecessary level of burden on every operation. Once rid of them, the tale contained 42,107 inscriptions.

Then, the author removed any entries not from a volume of the IG. The table included entries from two extraneous books: the *Inscriptions de Délos* (ID) and the *Supplementum Epigraphicum Graecum* (SEG). Without these, the table had within it 23 volumes of the IG. The author filtered the irrelevant inscriptions in three steps. First, using the descriptions provided by the PHI, the author classified the volumes by region. Of the six in the table, the study required only two, reducing the table to 6 volumes. Then, with further reference to the PHI website, the author identified four subregions, with two falling outside the scope of the study. Once the author dropped these, the table contained 19,659 inscriptions from four volumes: IG I^2, IG I^3, IG II^2, and IG VII.

With the appropriate volumes having been selected, the task became to reduce the table down to inscriptions only from within the relevant time span. To facilitate this process, the author began by manually verifying each date extracted by the scraper. The code

had functioned reasonably well under most conditions, though a few date formats proved consistently elusive. First, 240 inscriptions included the label "post fin. s. D", which the scraper always read as an "s. D" date. For example, the header of IG II^2 5,323 (PH# 7,641) contains the date "post fin. s. IV a.", but the scraper assigned to it the date range of 400-301 BCE, having plainly interpreted the text as indicating a 4th century inscription. In this instance, the author has assigned the TPQ 300 BCE, with no TAQ; and has corrected the other instances accordingly.

The set also included 1,101 inscriptions with dates of the type "med. s. D a.", indicating a possible date range somewhere within the middle of a century. Whereas the function `TranslateCentury()` contained instructions for handling "init." and "fin." dates, the author included no such provisions for "med." dates: consequently, the first two formats returned 50-year date ranges, but the latter returned a single static date for both the TPQ and TAQ. IG II^2 1,185 (PH# 3,400), for example, included in its header the date "med. s. IV a.". The scraper, however, returned only the date 350 BCE. To correct for this oversight, the author has generated a date range by creating a TPQ 25 years before and TAQ 25 years after the date output by the scraper, resulting in the estimated date range for this inscription of 375-325 BCE.

Next, the author proceeded to remove inscriptions dated to unused eras. Of the 19,695 inscriptions yet remaining in the set, 7,944 contained in their header chronological information allowing for their categorical removal. To start, 2,464 had a date in the format "s. D p.", indicating inscriptions cut during the common era, while 147 contained the tag "AD". Then, the author found 384 inscriptions attributed to the "aet. Rom.", and 55 to the "Roman period." Having interpreted this period as beginning, in the context of central Greece, with Sulla's sack of Athens in 86 BCE, the author categorized these as 1st century inscriptions. Another 596 held the label "aet. imp.", 213 the label "Roman Imperial period", 58 "aet. Augusti", 74 "aet. Hadriani", and 41 the label "reign of X". These too the author categorized as

inscriptions from 1st c. BCE or later. Next, 23 inscriptions had the label "Christian". With the works of Saints Peter and Paul traditionally attributed to between the 1st c. BCE and the 1st c. CE, the author categorized these with the other 1st c. BCE inscriptions. Finally, the set included 775 inscriptions labeled as "s. I a." and 11 as "1st c. BC". Seeing as the study focuses on those inscriptions found between the 4th and 2nd centuries BCE, the author categorically removed all later inscriptions. Along with these, the author removed 3,112 inscriptions labeled as "undated". The resulting table had 11,715 inscriptions, the dates for which the author manually validated.

After validating, the author proceeded to select for data within the target 4th – 2nd c. BCE date range, however, the presence of cross-century date ranges complicated the process. Some have a relatively short range, like IG VII 2,534 (PH# 146,036), cut somewhere between 350 and 201 BCE, whereas others, such as IG VII 2,839 (PH# 146,353), from somewhere between 323 and 31 BCE, could have originated from any century in the target range or even shortly after. This raises the question of how to classify these inscriptions for analysis.

To solve this problem, the author used a simple two-step process. First, they reduced the set to any inscriptions with either a TPQ or TAQ within the 4th – 2nd c. BCE date range. This involved filtering by three columns created manually by the author during the validation stage: `tpq_cen`, `taq_cen`, and `tpq_bce`. The columns `tpq_cen` and `taq_cen` record the century within which the TPQ and TAQ fall, derived by rounding the appropriate date up to the nearest hundred. 400, then, stands in for the 4th c., 300 for the 3rd, and so on. The column `tpq_bce` (and the accompanying `taq_bce`) contains a simple `TRUE` or `FALSE`, recording whether the associated date falls before or within the common era. To perform the selection, the author first selected columns with either a TPQ or a TAQ within the selected range, and then further reduced this set by removing any non-BCE dates where `tpq_bce` equaled `FALSE`, returning a list of 7,904 inscriptions. 1,118 of the removed rows had no date at all, 1,656 fell

between the 6th and 5th c. BCE, 7 between the 7th and 8th c., and the remainder fell within or after the 1st c. CE .

As the second step, the author the author assigned a final century of analysis to each inscription. For the tautocenturial inscriptions, the process posed little difficulty: IG I^2 561 (PH# 1,760), for example, dated between 400 and 301 BCE, should be analyzed as a 4th c. BCE inscription. However, the matter becomes somewhat more complicated when dealing with inscriptions the likes of IG I^3 1,057 (PH# 1,198), which dated to somewhere between 500 and 301 BCE. With no further guidance from the PHI or the IG, the author interpreted this range as one assigning to each year therein an equiprobable chance of being the inscription's date of origin. To accommodate the study's century-by-century analysis, the author calculated the floored mean of each inscription's TPQ and TAQ, then assigned the inscriptions to that mean's century by rounding up to the nearest hundred in the exact same manner as with the columns `tpq_cen` and `taq_cen`. The author stored these results in a new column called `analysis_cen`. For IG I^3 1,057, the mean of the TPQ and TAQ is 400.5, which floors to 400 BCE. As such, the author has categorized the inscription as one from the 4th c. BCE. After assigning each inscription to its century of analysis in this manner, the author performed the final chronological selection, removing every inscription with an `analysis_cen` outside of the target range. The resulting table contained 7,364 inscriptions.

After finishing the chronological selection, the author then selected for location. To start, they manually validated the locations extracted by `ReadLocation()`, of which the table contained 26. As the study only targets seven city centers – Athens, Eleusis, Megara, Pagai, Aigosthena, Oropos, and Tanagra – the author removed all inscriptions categorized elsewhere, 361 in total. Unfortunately, the volume IG II^2 contained 6,276 inscriptions with no location of origin besides "Att(ica)", and IG I^2 another 8. Insofar as the study requires each inscription to correlate with a city, a limitation intended to help when creating isogloss maps, these inscriptions offered no practical use, and so the author removed them. The resulting table

included 716 rows of inscriptions. After one final cleaning to remove any Roman characters or Arabic numerals, the author unnested the inscriptions — that is, assigned each word to its own row, while retaining all other information about volume, chronology, location, and so on. The final data subset then contained 47,485 distinct tokens for analysis.

Table 5: Number of Inscriptions by City

location	n
Athens	295
Eleusis	129
Megara	34
Pagai	2
Aigosthena	17
Oropos	218
Tanagra	21

Testing

To test for linguistic variation between cities, the author used Fisher's Exact test to compare the proportion of occurrences of "Attic" tokens (meaning those tokens from Athens, and all matching non-Athenian tokens) and of "non-Attic" tokens counted between Athens and another target city within a given century. In order to maintain as many phonological conditions as possible during a test, the author selected a list of common, representative words from the inscriptions in Eduard Schwyzer's *Dialectorum Graecarum Exempla Epigraphica Potiora* (DGE). These words were then compared against their common, Attic-Ionic equivalent, and both forms were collected as tokens for testing.

The author chose Fisher's Exact test over the Chi-Squared test to account for the often fragmentary nature of the inscriptions and the disparity between the number of inscriptions from each city. Athens and Eleusis, taken together, have more inscriptions than all other locations combined in this data set; with the same pattern arising for analyzable tokens. For comparison, Pagai has only two inscriptions and 244 tokens. Besides this, many tokens proved unusable given the amount of fragmentation suffered. These factors together had raised the likelihood that fewer than 10 observations of a token may represent a city for any given trial, which would have invalidated the results of a Chi-Squared test. However, Fisher's Exact test, designed specifically for smaller pools of test data but similarly valid for larger sets, had no such limitation.

Yet it suffers one downside when compared to the Chi-Squared test. Namely, one cannot perform the basic test on tables of proportions greater than 2x2. That is, the test results would be invalid had the author performed it on a sample including three or more locations, or one including three or more tokens. The author, then, could not compare the observations across all locations at once, nor could they compare multiple dialectal forms at once. However, since the R programming language includes built-in functions for performing Fisher's Exact test, any negative consequences of these testing limitations – namely, the need to perform multiple tests in succession – are negated.

The test returns a single number called the p-value. This number is compared against an alpha value, which traditionally is, and in this study has been, operationalized as 0.05. The p-value represents the estimated uncertainty in a result by indicating the likelihood that any differences in the data result of random chance. A p-value of 0.07 indicates a 7% likelihood that the differences are random, whereas a p-value of 0.03 indicates only a 3% likelihood. The alpha value of 0.05 indicates that the author would accept a maximum 5% chance that the variations observed in the data were random.

The Isoglosses

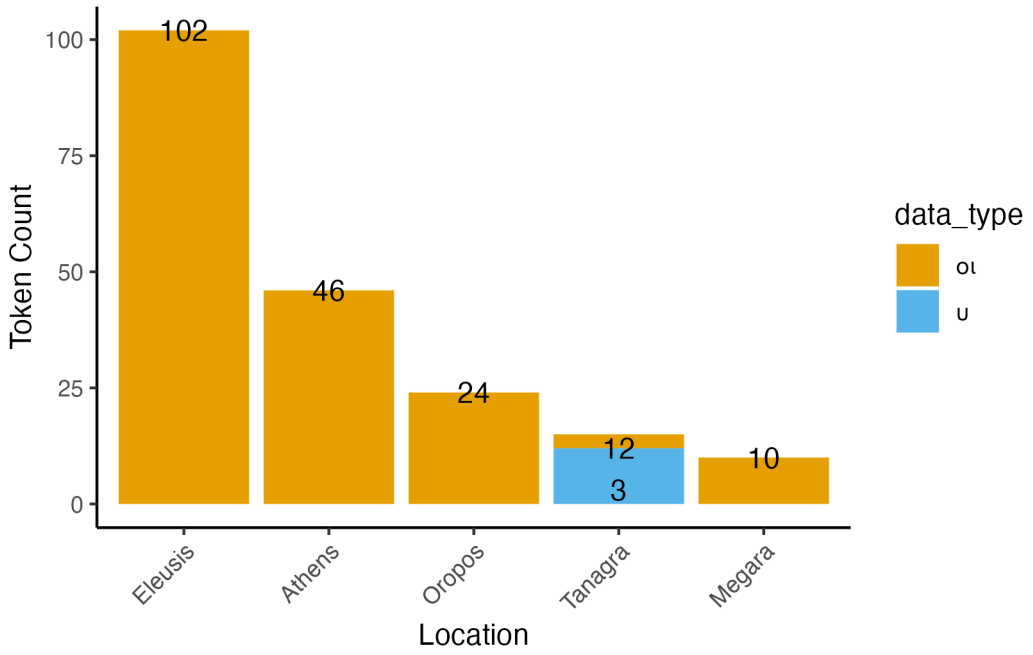
οι/υ

The οι/υ isogloss is represented by the first syllable of the noun (ϝ)οικία 'home', as well as the o-stem endings with the diphthong -οι- as seen on instances of the noun δῆμος/δᾶμος 'deme', the definite article ὁ, and the pronoun αὐτός. The inscriptions DGE 459.1-.3, all Tanagran proxeny inscriptions which conveyed legal privileges on their πρόξενοι 'public friends, foreign benefactors' and were carved on the same stone at various points in the 3rd cent. BCE, show cooccurrences of the monophthong υ and diphthong οι. DGE 459.1 contains the monophthongized ϝυκίας alongside the dative singular τοῖ δάμοι and dative plural αὐτοῖς, both of which occur again in DGE 459.3. Similarly, DGE 459.2 contains the singular τοῖ δάμοι alongside the singular αὐτοῖ. Furthermore, the roughly-contemporary Tanagran proxeny decrees of DGE 460.1 and .2 demonstrate complete monophthongization, with each containing instances of ϝυκίας, τῦ δάμυ, and αὐτῦς. The cooccurrence of the innovative monophthong υ and the diphthong οι brings into question the timing and completeness of the οι > υ shift, as well as its geographical extent. Therefore, the author collected instances of the relevant forms, then assigned each as belonging to either the οι- or υ-type.

4th cent. BCE

Of this list, 196 tokens originate in the 4th cent. BCE. These come primarily from Eleusis, with 102 tokens, followed by Athens with 46, then Oropos with 24, Tanagra with 15, and Megara with 10. A city-by-city examination of the distribution between οι- and υ-type data suggests that all target cities fell on the Athenian side of the οι/υ isogloss line except for Tanagra, where speakers monophthongized οι to υ while their neighbors retained the original diphthong.

Figure 1: Fourth Century BCE Token Counts by City

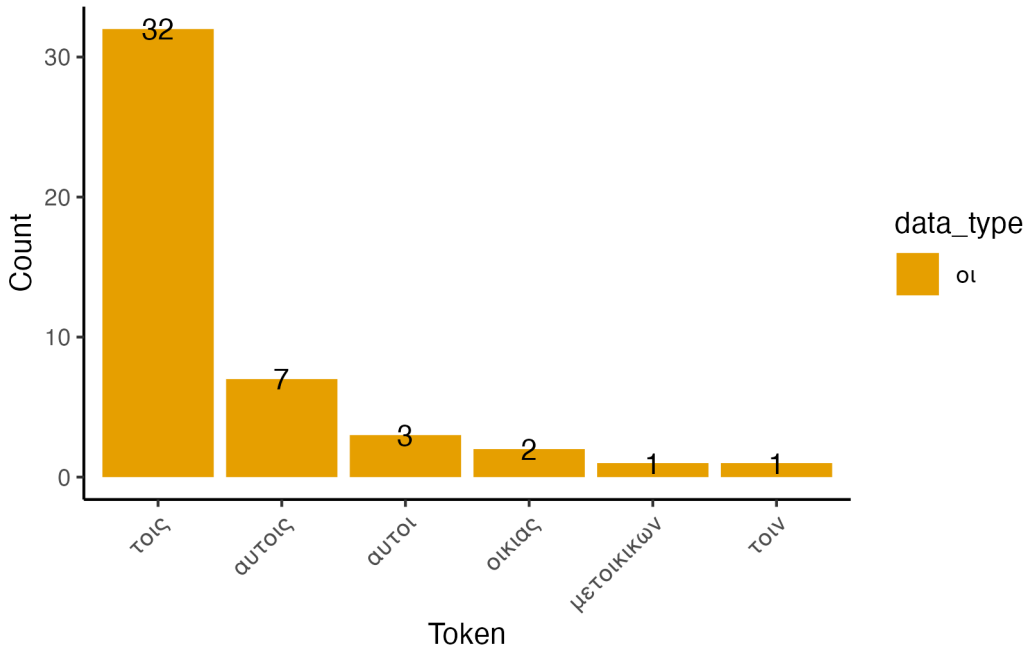


Athens

First, the 46 Athenian tokens point to consistent retention of the diphthong οι, in both root syllables and o-stem endings. The 2 instances of the genitive singular οἰκίας and the 1 compound genitive plural adjective μετοικικῶν 'expatriate' present the diphthong, demonstrating the retention in root syllables. Furthermore, the list shows consistent use of the

diphthong in o-stem endings. The 32 instances of the dative plural article τοῖς and the 1 dative/genitive dual τοῖν, alongside the 7 dative plural pronouns αὐτοῖς and the 3 nominatives αὐτοί show retention of the -οι- element in various o-stem endings. As such, the Athenian inscriptions point to a categorical conservation of the diphthong οι, establishing the baseline for comparing dialect forms across cities.

Figure 2: Fourth Century BCE Athenian Token Counts

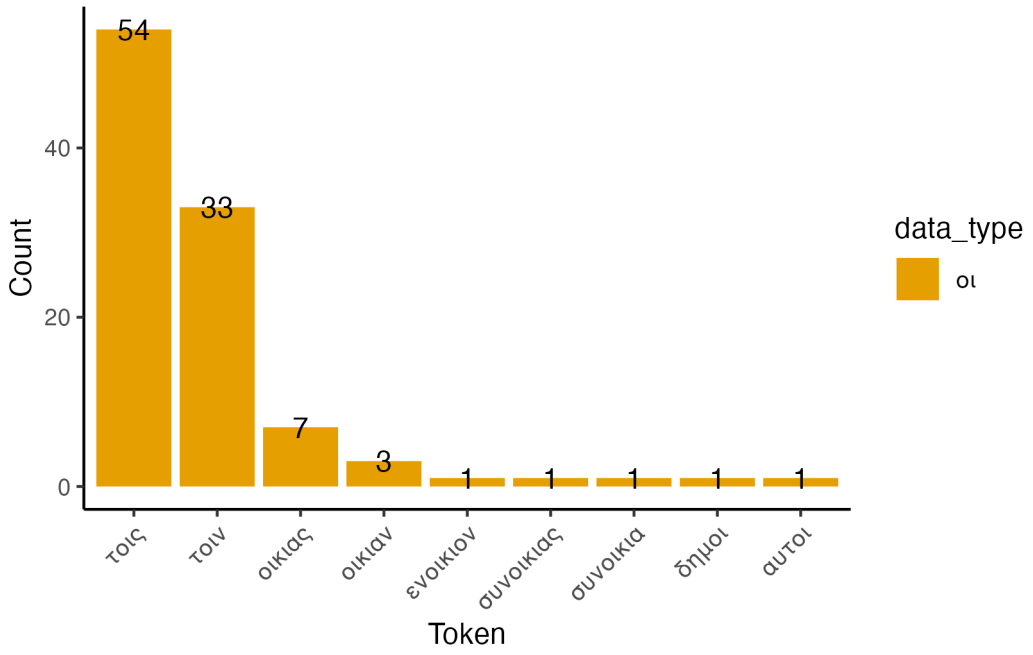


Eleusis

Next, unanimous retention in the 102 Eleusinean tokens suggest a general conservation of the diphthong οι throughout the city. These tokens include the 7 genitive singulars οἰκίας and 3 accusative singulars οἰκίαν, besides 1 each of the compound forms ἐνοίκιον 'allowance', συνοικίας 'settlement', and συνοικία. These tokens retain the root diphthong following the Athenian inscriptions. In addition, the list includes 54 occurrences of the dative plural τοῖς, 33 of the dative/genitive dual τοῖν, and 1 nominative plural αὐτοί, demonstrating the retention in o-stem endings.

Curiously, the scraper captured the dative singular δήμοι, with an incongruous short vowel -οι, from inscription IG II^2 1,186 (PH# 3,401). Yet, the inscription also contains several other vocalic misspellings, casting the diphthong's quality into doubt. Alongside the form δήμοι are the dative singulars τεῖ Κόρει 'for Kore' and τῶι Διονυσίωι 'for Dionysius', as well as the genitive singulars εὐσεβίας τῆς 'of his piety' and τοῦ κοινõ 'of the common', among others. The author's frequent alternation suggests that they conflated high-back and mid vowels on an orthographic level. Following this precedent, the token δήμοι has been interpreted as δήμωι and therefore removed from the list. With this extraneous dative removed, the Eleusinean tokens include only οι-type data, matching the Athenian inscriptions perfectly and indicating that Eleusis fell on the Athenian side of the οι/υ isogloss.

Figure 3: Fourth Century BCE Eleusinean Token Counts

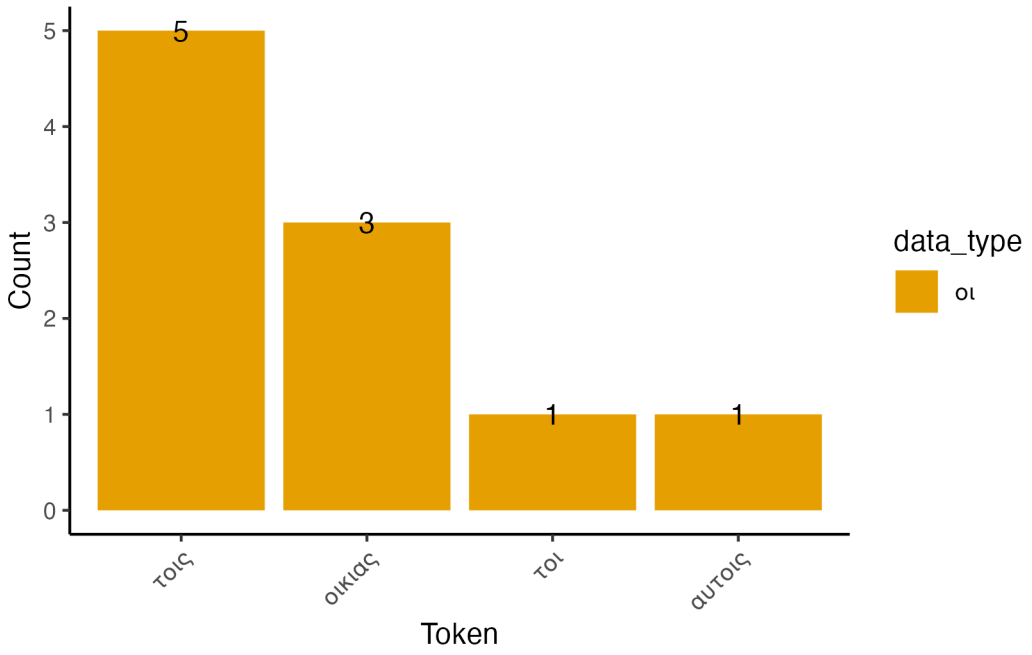


Megara

The 10 Megarian tokens also point to the conservation of the οι diphthong. This list contains 3 instances of the genitive singular οἰκίας, with intact root diphthongs, as well as 5 occurrences

of τοῖς, 1 of αὐτοῖς, and even 1 of τοί in IG VII 1 (PH# 143,477). However, while τοί stands out at a glance, context makes it clear that the article is a nominative plural variation which corresponds to the Attic οἱ. It appears in the phrase ἐπειὴ τοὶ Αἰγοσθενῖτα[ ]ἀνάγγελλον Ζωΐλογ Κελαίνου Βοιώτιον... 'inasmuch as the Aigosthenians proclaimed that the Boiotian Zoilon, son of Kelainos,...' where the verb ἀνάγγελλον requires either a first-person singular or third-person plural subject. As the inscription contains no first-person narrative, the verb can only belong to the third person, informing the reading of τοὶ Αἰγοσθενῖτα[ι] as a nominative plural. Therefore, the οι in τοί has been interpreted as genuine, and the token remained in the list. As a result, these ten tokens all show a conservation of the diphthong οι and thereby suggest that Megara also belonged on the Athenian side of the οι/υ isogloss line.

Figure 4: Fourth Century BCE Megarian Token Counts



Oropos

Furthermore, the 24 Oropian inscriptions demonstrate the same conservation. This list gained considerable length owing to the prevalence of dative singulars in -οι, which result

from the shortening of an earlier -ωι.[45] Representative of this change are the 11 instances of the singular dative definite article τοῖ in IG VII 235 (PH# 143,712), the genuineness of which derives from its consistency of use and the retention of ω in other contexts, as well as the nature of the author's infrequent mistakes regarding the vowel ο. First, throughout the inscription, 9 of the 11 articles follow the preposition ἐν, which requires that they represent the dative. Additionally, 8 of the 11 precede a dative noun with the same ending, as seen in the phrases ἐν τοῖ ἱεροῖ 'in the temple,' ἐν τοῖ κομητηρίοι 'in the cemetery,' and τοῖ βολομένοι 'for one willing.' This consistency with which the author used the short -οι suggests that the author knowingly used this spelling to indicate the ο-stem dative singular ending.

Next, persistent spellings with the expected ω in other contexts suggest that the author did distinguish between it and the short vowel ο on an orthographic level. For example, the author retained ω's in all nine instances of the genitive plural article τῶν, with no occurrences of a misspelled *τῦν. Additionally, clauses that require a genitive plural show consistent use of the plural marker -ων, as in μέχρι τριῶν δραχμέων'(a penalty of) up to three drachmas,' περὶ τῶν ... ἀδικιῶν 'concerning the wrongdoings,' and κατεύχεσθαι δὲ τῶν ἱερῶν 'praying over the temples.' The regularity of the author's spelling, with no conflation of ω and ο, indicates their consistent distinction between the two graphemes. As such, the likelihood that the ending -οι represents a constant misspelling of -ωι remains low.

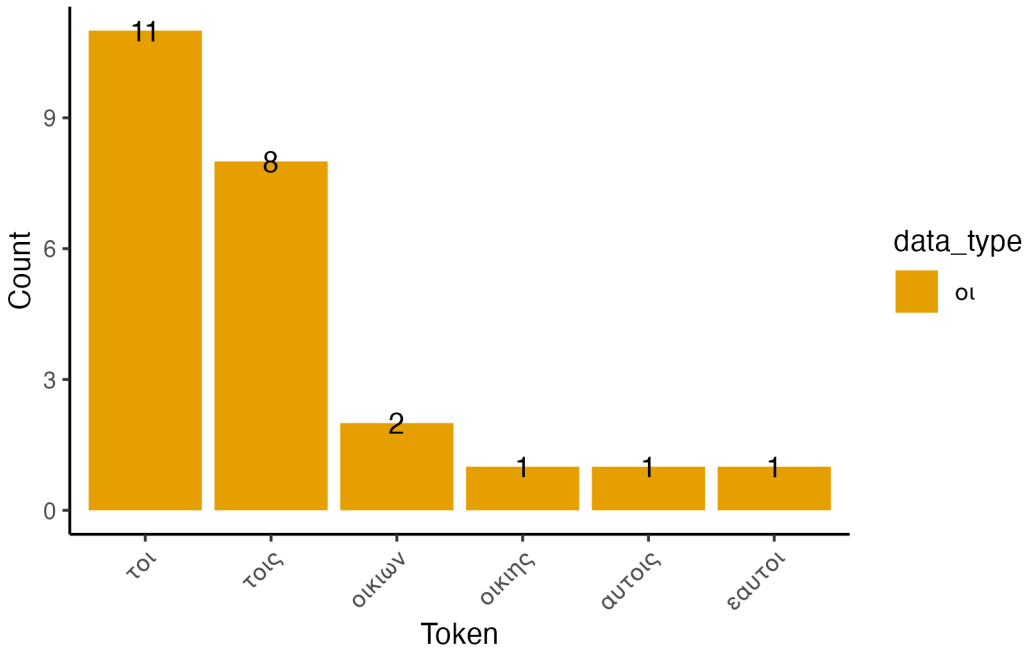
Moreover, mistaking the letter ο for ω would not fit with the orthographic character of the extant spelling variations in the inscription. The text contains three instances of an incorrect ο. The first two appear in the genitive singulars ἑκάστο 'of each' and τῦ ἱερέος 'of the temple,' in contrast with the correct spellings in τοῦ ἱεροῦ and ἑκάστου later in the text. The third appears in the adverb ἐντῦθα 'there,' and while the inscription does not contain any instances of ἐνταῦθα, the αυ diphthong does appear elsewhere in similar contexts, as in αὐθημερόν 'on the same day,' θησαυρόν 'treasure,' and even alongside the genitive singular

[45]Dosuna, "The Aeolic Dialects," 469.

ending in αὐτοῦ. In each instance, the error involves substituting a single ο for a digraph ending in an υ, further lowering the likelihood of the ending -οι representing a universal misspelling of -ωι.

Overall, given the author's consistent use of the dative singular -οι in place of -ωι with no evidence to the contrary, as well as no basis for suspecting that the author would mistakenly write ο for ω, the 11 instances of τοῖ have been retained in the data set. On the same grounds, one instance of ἑαυτοῖ has also remained. Besides these, the Oropian data contains 12 more usable tokens. These include 8 instances of the dative plural article τοῖς, 2 of the genitive plural οἰκιῶν, 1 genitive singular οἰκίης, and 1 dative plural αὐτοῖς. That the set contains no υ-type tokens suggests that Oropos fell on the Athenian side of the οι/υ isogloss line.

Figure 5: Fourth Century BCE Oropian Token Counts



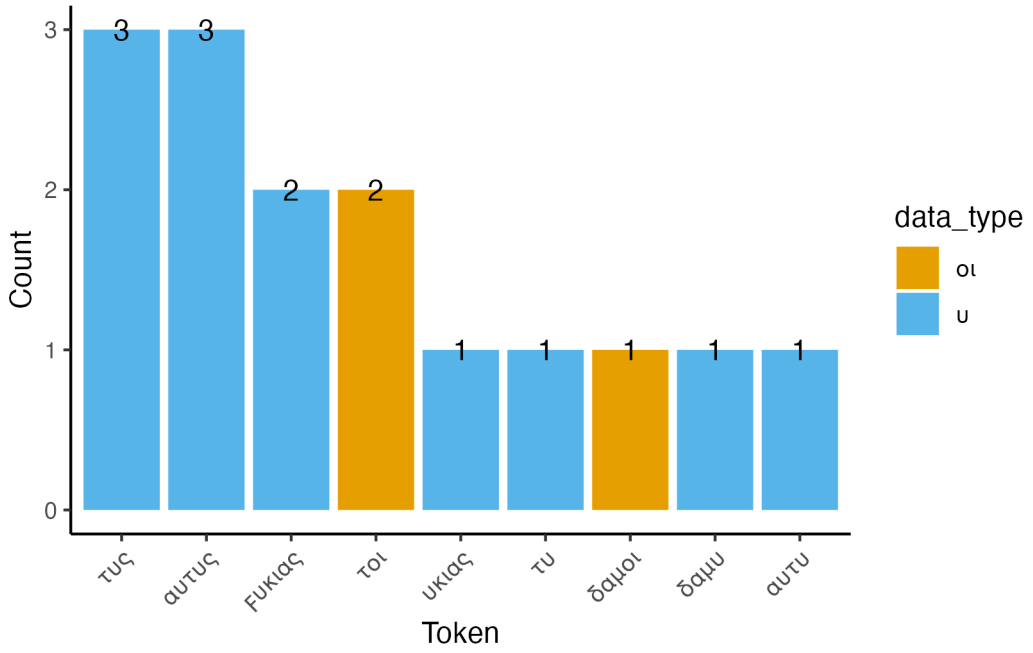
Tanagra

However, the 15 tokens collected from Tanagra indicate that the city belonged on the υ side of the οι/υ isogloss line. Of the data collected, 12 tokens contain the monophthong υ in place

of the diphthong οι. The definite article occurs 4 times in the dative, with 3 instances of the plural τῦς and 1 of the singular τῦ. The list further includes 3 of the dative plural pronoun αὐτῦς, 2 of the genitive singular ϝυκίας, and 1 each of the genitive singular ὐκίας, the dative singular δάμυ, and the dative singular αὐτῦ.

Alongside these forms, the data contains 3 tokens that retain the diphthong οι. 2 are the dative singular article τοῖ, and 1 is the noun δάμοι. However, the distribution of data types per city suggests a relationship between the origin of an inscription and the data type therein, with 93.87% of οι-type data originating from Athens and 100% of υ-type data originating from Tanagra.

Figure 6: Fourth Century BCE Tanagran Token Counts



To determine the presence of any relationship between a token's origin and its data type, the author performed Fisher's exact test with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 4th cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 4th cent. BCE.

The test results in a *p*-value of 2.612 x 10^{-10}, indicating a vanishingly slim chance that, based on the collected tokens, the distribution of variables by type between Athens and Tanagra arose from random chance. Therefore, the author rejects the null hypothesis and asserts that the occurrence of υ instead of οι is connected to the origin of an inscription within the data set. Tanagra, then, belonged opposite Athens on the υ side of the οι/υ isogloss line.

Furthermore, given that the υ-type data are found only in Tanagran inscriptions, the οι/υ isogloss line extended between the city and its neighbors. Whereas Athenians, Eleusineans, Megarians, and Oropians retained the οι diphthong into the 4th cent. BCE, the majority of Tanagrans adopted the innovative monophthong υ.

3rd cent. BCE

Of the data set collected for the οι/υ isoglosses, 503 tokens originated from the 3rd cent. BCE. This set includes evidence for all 7 cities, with 394 tokens found at Oropos, 54 at Eleusis, 27 at Tanagra, 11 at Aigosthena, 6 from Athens, 6 from Megara, and 5 from Pagai.

Athens

Athens in the 3rd cent. BCE is represented by only 6 tokens, partly due to the fragmentary nature of the inscriptions and the lack of any changes to create an innovation suitable for analysis. To start, a search of the inscriptions for pairs of brackets [ ] with `stringr::str_count()` shows 507 instances of text-initial fragmentation. Furthermore, similar searches for the single brackets [and] return 6 gaps at the end of a line and 1 at the beginning. The inscriptions also contain 101 long sections of missing text indicated by sequential dashes --. This fragmentation created large quantities of potentially unusable tokens, including at least 155 of only a single character in length from 3rd cent. Athens.

Figure 7: Third Century BCE Token Counts by City

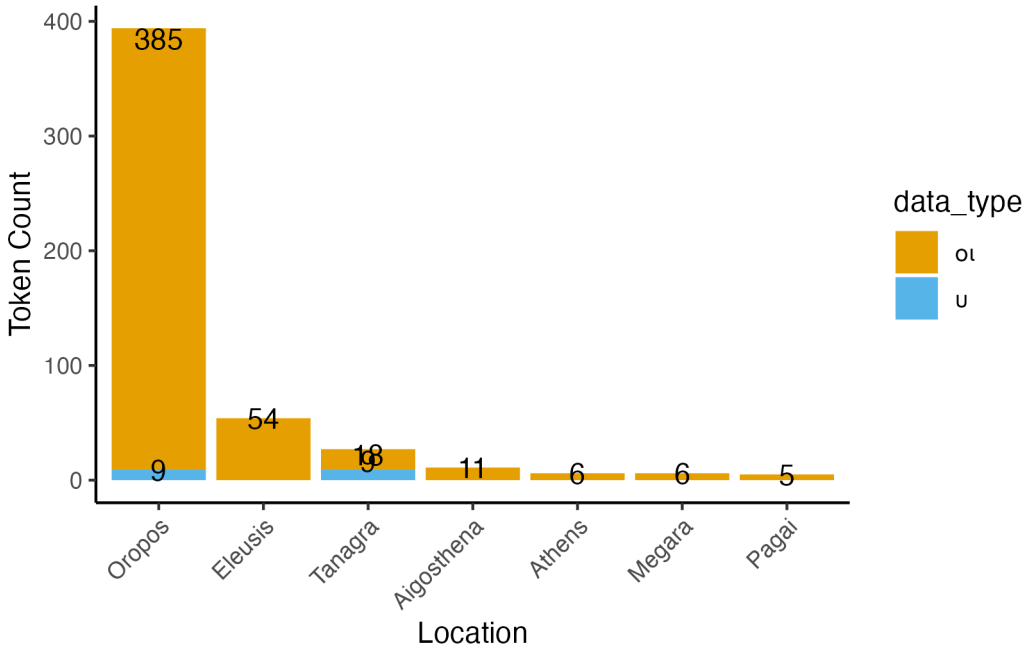
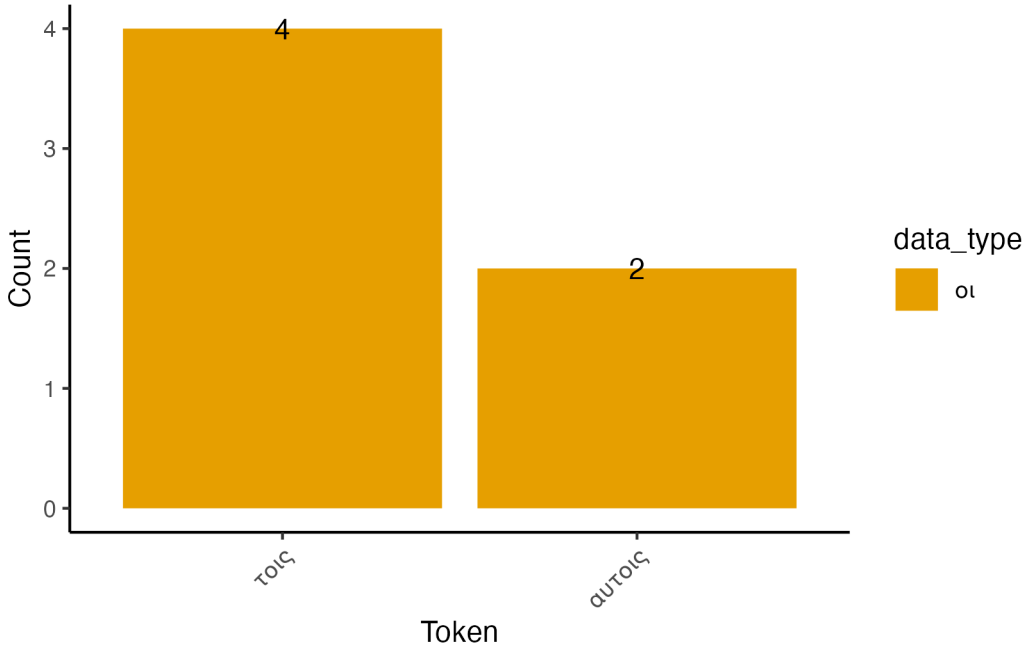


Figure 8: Third Century BCE Athenian Token Counts



Additionally, Attic Greek lacked any changes comparable to the Boiotian substitution of the short -οι for the dative singular ending -ωι, and the inscriptions thereby missed out on the increased token count seen in Oropos in the 4th cent. BCE. As a result, the Athenian data must rely on 6 tokens: 4 instances of the dative plural τοῖς and 2 of αὐτοῖς. These tokens characterize Athens as having retained the diphthong into the 3rd cent. and establish the city as the point of comparison for isogloss tests.

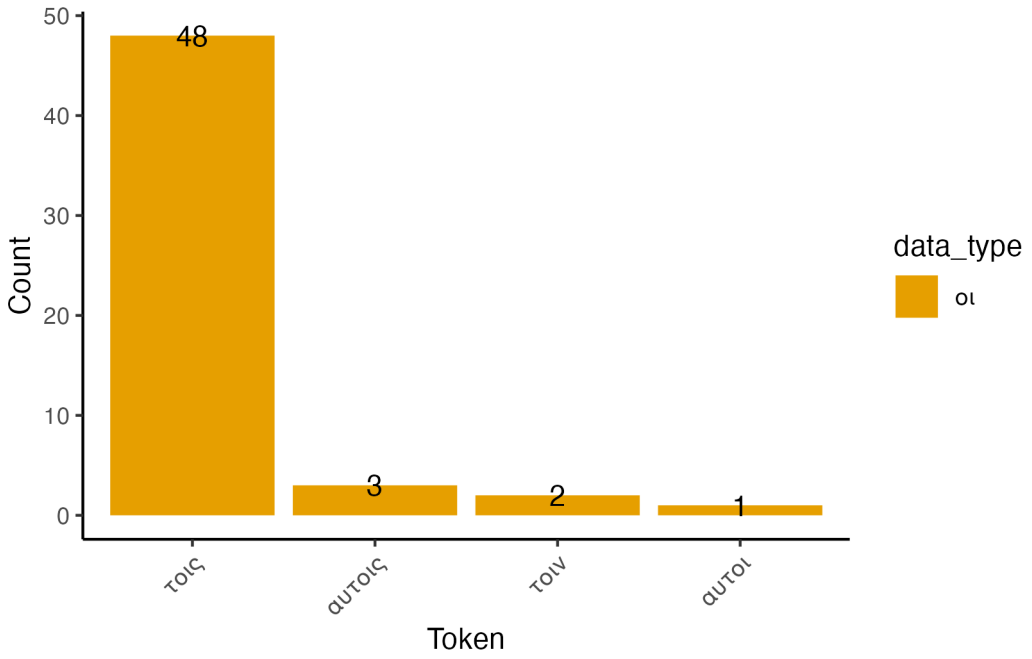
Eleusis

Next, the 54 Eleusinean tokens show that the city belonged on the Athenian side of the οι/υ isogloss line. 48 of these are occurrences of the dative plural article τοῖς, 2 are of the dative/genitive dual τοῖν, and 3 of the dative plural pronoun αὐτοῖς. IG II^2 1,218 (PH# 3,433) also provides one instance of the fragment αὐτοι(-). The word appears at the end of a line, raising the possibility that it continued at the start of the next. However, the entire left half of the inscription is missing, removing any direct evidence for the fragment's exact form. Still, particulars of compound formation and the shape of available o-stem endings point to 3 plausible options. First, the αὐτοι(-) likely did not begin a compound word: the combination αὐτ-C would have prompted the insertion of the connecting vowel -ο-, and the combination αὐτ-V could have introduced an -ι-, but neither instance would produce the segment -οι-.

However, the diphthong could appear in three declined forms. The nominative plural αὐτοί, the dative/genitive dual αὐτοῖν, and the dative plural αὐτοῖς could all introduce the -οι- segment in αὐτοι(-). Furthermore, though the exact context is lost, the fragment is directly preceded by the dative reflexive pronoun σφίσιν. This phrasing raises the likelihood that the fragment represents the dative plural αὐτοῖ[ς], implying that the -οι(-) should be interpreted as genuine. Given this, as well as the fact that the extant text does show the diphthong in its entirety, the token αὐτοι(-) has been retained in the data set. Therefore, the Eleusinean

data shows uniform retention of the diphthong οι, showing that the city belonged on the Athenian side of the οι/υ isogloss line during the 3rd cent. BCE.

Figure 9: Third Century BCE Eleusinean Token Counts



Megara

The Megarian data comprise 6 tokens that unanimously suggest the Megarians retained the οι diphthong. The list includes 4 occurrences of the dative plural article τοῖς, 1 of the pronoun αὐτοῖς, and 1 of the genitive singular noun οἰκίας. As each token contains the diphthong οι, and none the monophthong υ, the data suggest that Megara was situated on the Athenian side of the οι/υ isogloss line and that the speakers there retained the original diphthong through the 3rd cent. BCE.

Figure 10: Third Century BCE Megarian Token Counts

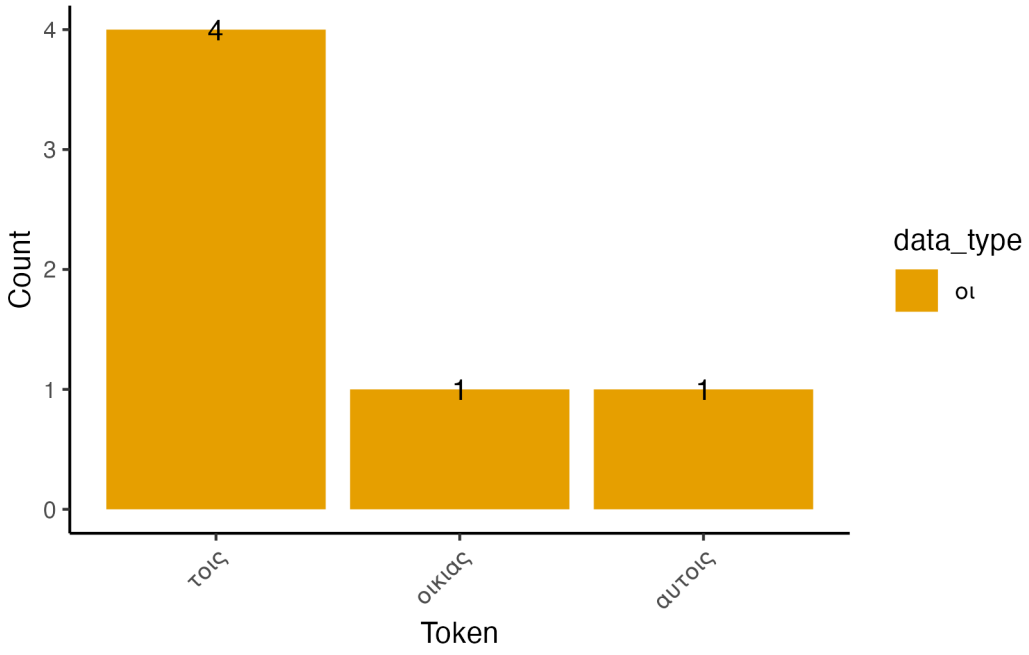
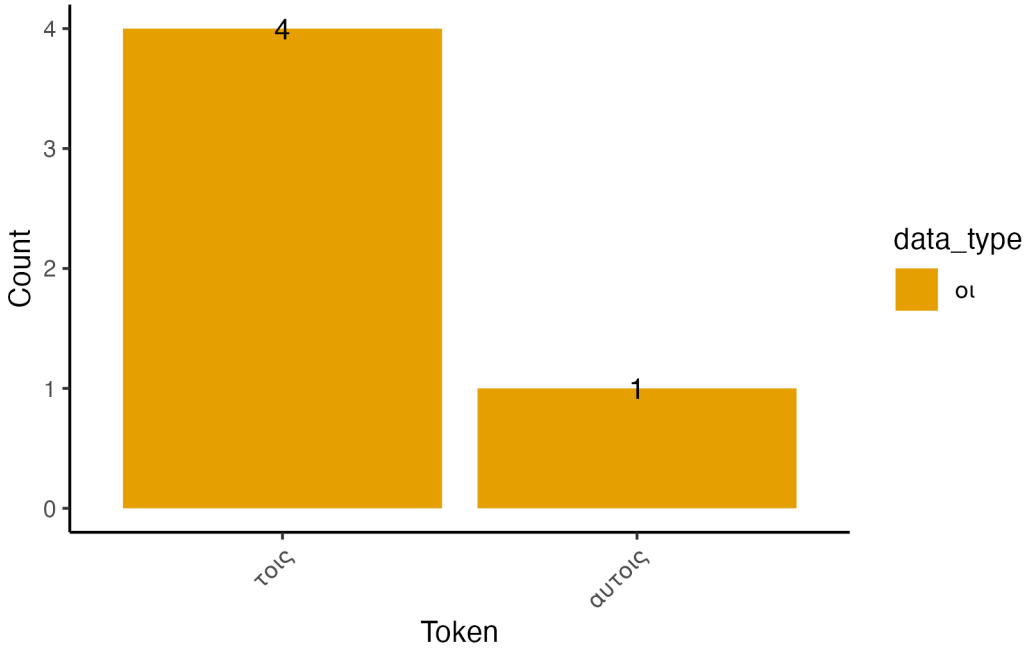


Figure 11: Third Century BCE Pagaian Token Counts



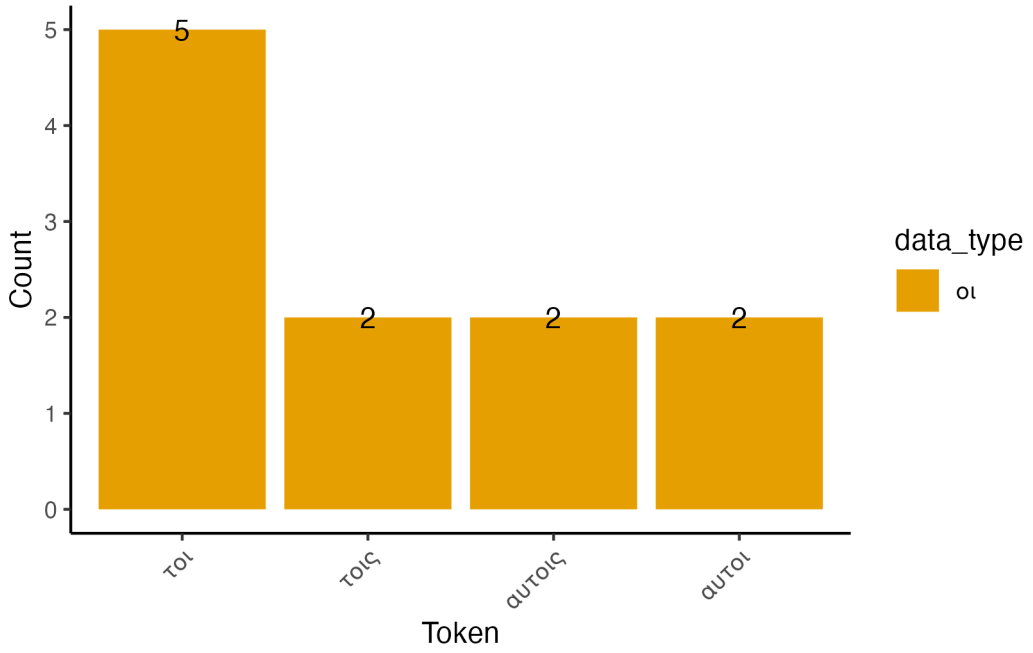
Pagai

Next, the 5 tokns from Pagai suggest that the city retained the οι diphthong. These include 4 instances of the dative plural τοῖς and 1 of αὐτοῖς. This lack of monophthongized υ-type tokens indicates that the city was also situated on the Athenian side of the οι/υ isogloss line.

Aigosthena

The 11 Aigosthenian tokens also suggest that the population retained the diphthong οι. The data includes 5 instances of the nominative plural τοί and 2 each of the dative plurals αὐτοῖς and τοῖς. Besides these, there are 6 dative singulars with the short ending -οι. IG VII 207 (PH# 143,684) shows 2 occurrences of τοῖ, 1 of δάμοι, and 1 of αύτοῖ, whereas IG VII 208 (PH# 143,685) includes 1 occurrence each of τοῖ and αύτοῖ. Overall, each of the 11 tokens shows the retention of the diphthong οι, indicating that Aigosthena belonged on the Athenian side of the οι/υ isogloss line during the 3rd cent. BCE.

Figure 12: Third Century BCE Aigosthenian Token Counts



Oropos

Similarly, the 394 Oropian tokens show the city's continued placement on the Athenian side of the οι/υ isogloss line. However, whereas the 4th cent. data previously showed uniform retention of the diphthong, the 3rd cent. data contain occasional instances of υ-type data alongside the more popular οι-type. Nevertheless, the data does not sufficiently indicate that the population of Oropos adopted the innovative monophthong.

The οι-type tokens comprise the vast majority of the evidence. This includes 169 instances of the dative plural τοῖς, 108 of the genitive singular οἰκίας, and 85 of the dative plural αὐτοῖς. Alongside these are 8 occurrences each of the dative singulars τοῖ and αὐτοῖ, as well as 4 of δάμοι, 2 of the genitive singular ϝοικίας, and 1 nominative singular οἰκία.

Contrary to these, the data also contains 3 instances of the dative singulars τῦ and δάμυ, as well as 1 each of the genitive singulars ϝυκίας, ὐκίας, and τῦς. When comparing Oropos and Athens, the υ-type data originate only from the former, while the οι-type data appear in inscriptions from both. This distribution raises the possibility of a relationship between the location of an inscription and the data type contained within it.

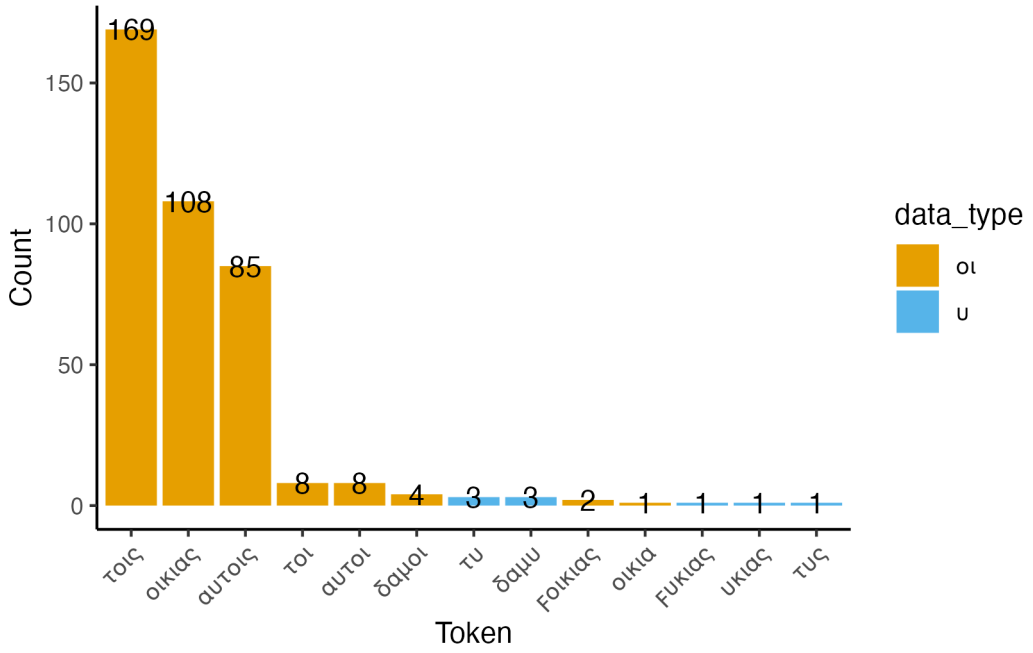
To test for the presence of such a relationship between a token's origin and its data type, the author performed Fisher's exact test with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Oropian data of the 3rd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Oropian data of the 3rd cent. BCE.

The test resulted in a p-value of 1, indicating a 100% chance that, when observing only the data collected for Athens and Oropos in the 3rd cent., the distribution arose by random chance. Therefore, the author fails to reject the null hypothesis and cannot assert that the occurrences of υ in place of οι are due to an inscription's origins in Oropos. Accordingly,

Figure 13: Third Century BCE Oropian Token Counts



Oropos belonged on the Athenian side of the οι/υ isogloss line, which indicates that the great majority of Oropians preferred forms with the inherited diphthong οι over those with the innovative monophthong υ.

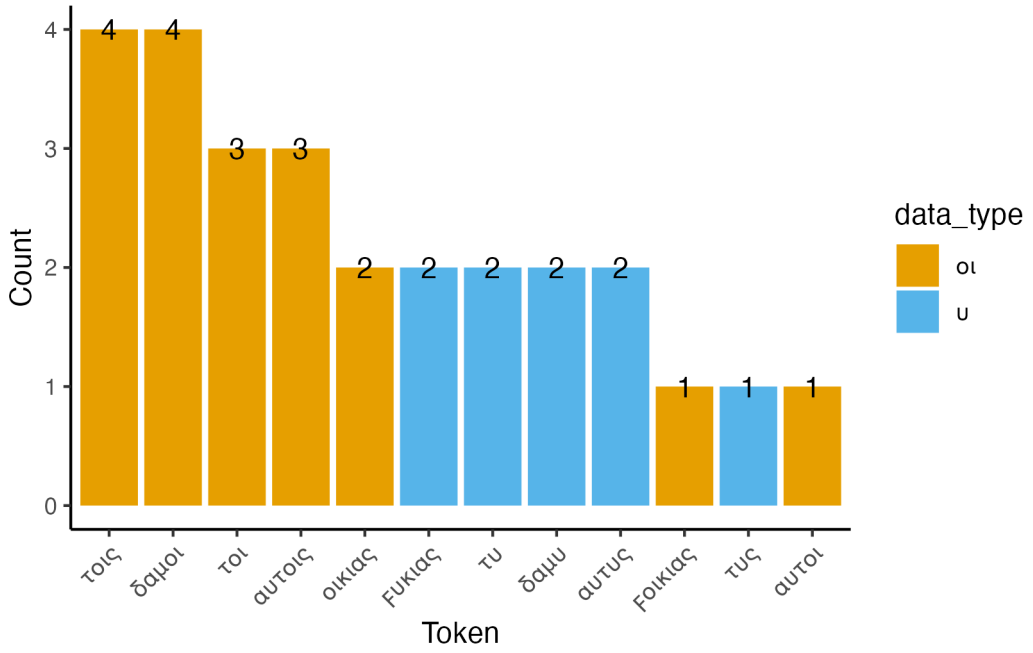
Tanagra

Last, and in a departure from the precedent of the previous century, 27 the Tanagran tokens from the 3rd cent. BCE suggest that the local population also preferred forms with the diphthong οι over those with υ. The set contains 18 tokens with the diphthong: 4 each of the dative plural article τοῖς and the singular δάμοι, as well as 3 of the article τοῖ and the pronoun αὐτοῖς. Also among the οι-type data are 2 instances of the genitive singular οἰκίας, 1 of ϝοικίας, and 1 of the dative singular αὐτοῖ.

Concurrent with these are 9 υ-type tokens. These include 2 instances of the genitive singular ϝυκίας and the dative plural αὐτῦς, as well as 2 each of the dative singulars τῦ and

δάμυ, found each time as a pair in the phrase δεδόχθη τῦ δάμυ 'be it resolved by the deme.' Finally, the data includes 1 dative plural τῦς.

Figure 14: Third Century BCE Tanagran Token Counts



As seen upon comparing the distribution of data types across the Attic and Tanagran data sets, most inscriptions originate from Tanagra, and a full third of the Tanagran tokens are of the υ-type. Therefore, the author performed Fisher's exact test with the following hypotheses to test whether the distribution indicates a relationship between between a token's origin and its data type.

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 3rd cent. BCE.

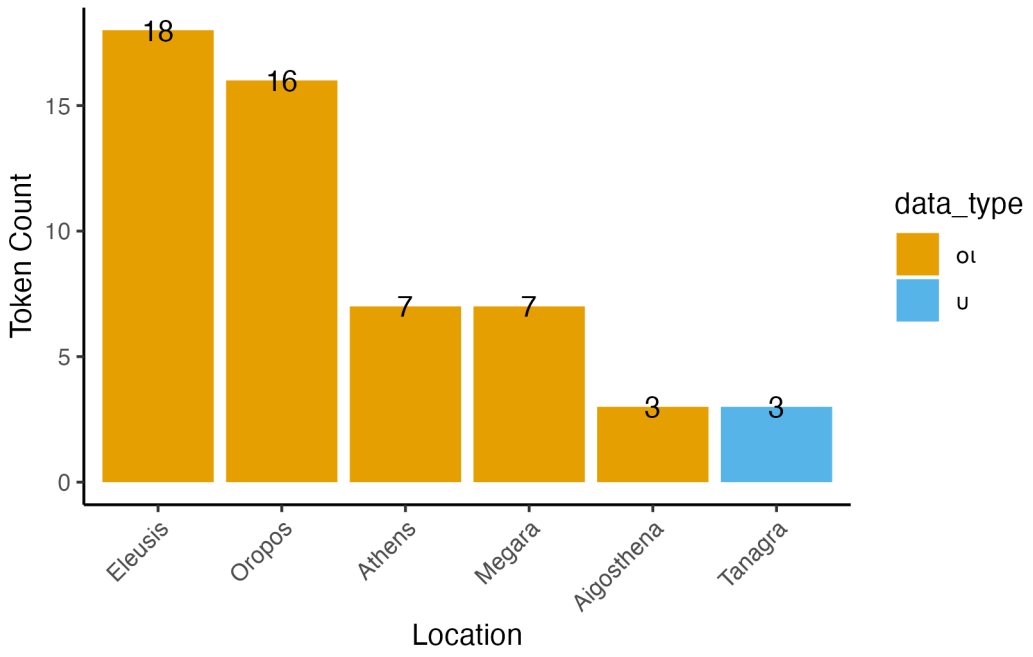
HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 3rd cent. BCE.

Surprisingly, the test returned a p-value of 0.1557, which indicates a 15.57% chance that the appearance of υ-type data is not due to an inscription's origins in Tanagra, according to

the tokens gathered for the 3rd cent. BCE. While these results represent a departure from the precedent set in the 4th cent., and though the p-value only surpasses the alpha value by little more than .10, the results nevertheless do not meet the 0.05 critical threshold. Therefore, the author fails to reject the null hypothesis and cannot assert that the extant ʊ-type tokens are representative of the broader city dialect. These results suggest that Tanagra may have belonged on the ɔɪ side of the ɔɪ/ʊ isogloss line during the 3rd cent. BCE. However, given the conclusions in previous literature and the results of the 2nd cent. BCE tests below, this outcome appears highly unlikely. This matter is discussed more thoroughly in the isogloss interpretations.

2nd cent. BCE

Figure 15: Second Century BCE Token Counts by City



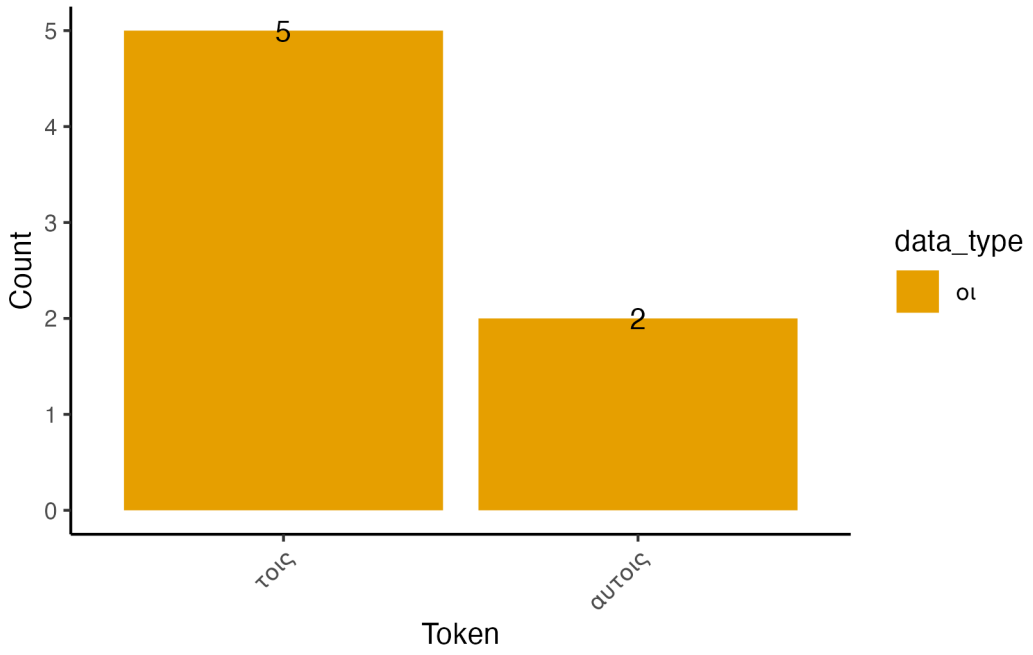
54 tokens across 5 cities evidence the ɔɪ/ʊ isogloss line of the 2nd cent. BCE. 18 tokens originate from Eleusis, 16 from Oropos, 7 from Athens, 7 from Megara, 3 from Aigosthena,

and 3 Tanagra. Note that while most cities retained the diphthong οι, the data once again indicates that Tanagra accepted the monophthongization during the 2nd cent. BCE.

Athens

The Athenian inscriptions are represented by 7 tokens, the makeup of which reflects those of the 3rd cent. The data contain all οι-type tokens, with 5 instances of the dative plural τοῖς and 2 of αὐτοῖς. With no extant υ-type tokens, the data characterizes Athens as having retained the οι diphthong into the 2nd cent. BCE and establishes the city as the main point of comparison for isogloss tests.

Figure 16: Second Century BCE Athenian Token Counts

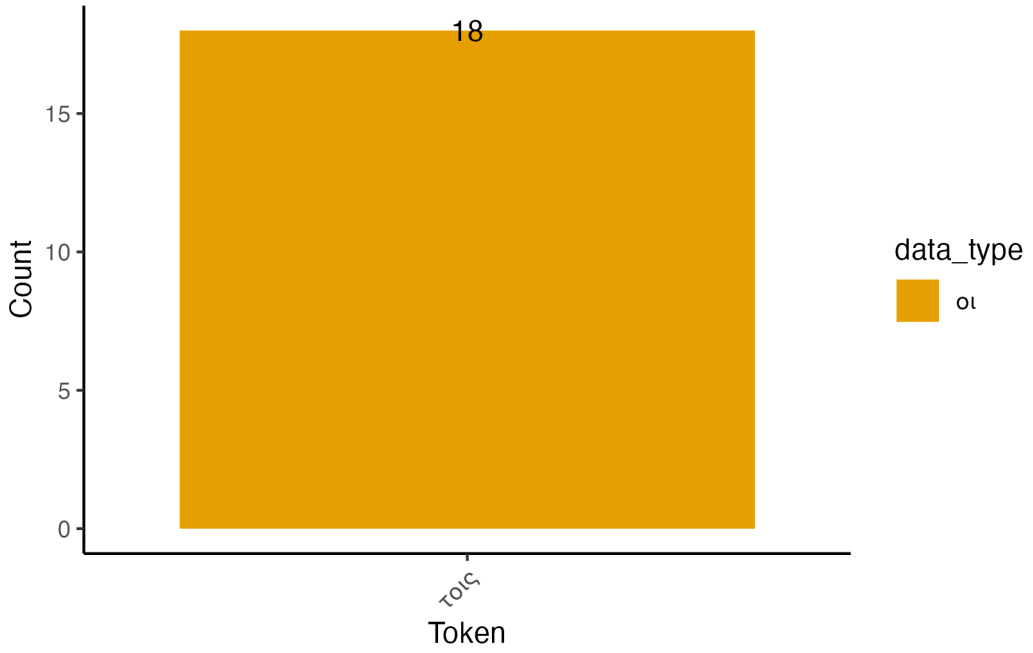


Eleusis

The Eleusinean data contain 18 tokens that indicate the city accorded with Athens and preserved the diphthong οι. The data exclusively contain occurrences of the plural article

τοῖς. As the city provides no contrary υ-type tokens, the data suggest that Eleusineans retained the οι diphthong through the 2nd cent. BCE.

Figure 17: Second Century BCE Eleusinean Token Counts



Megara

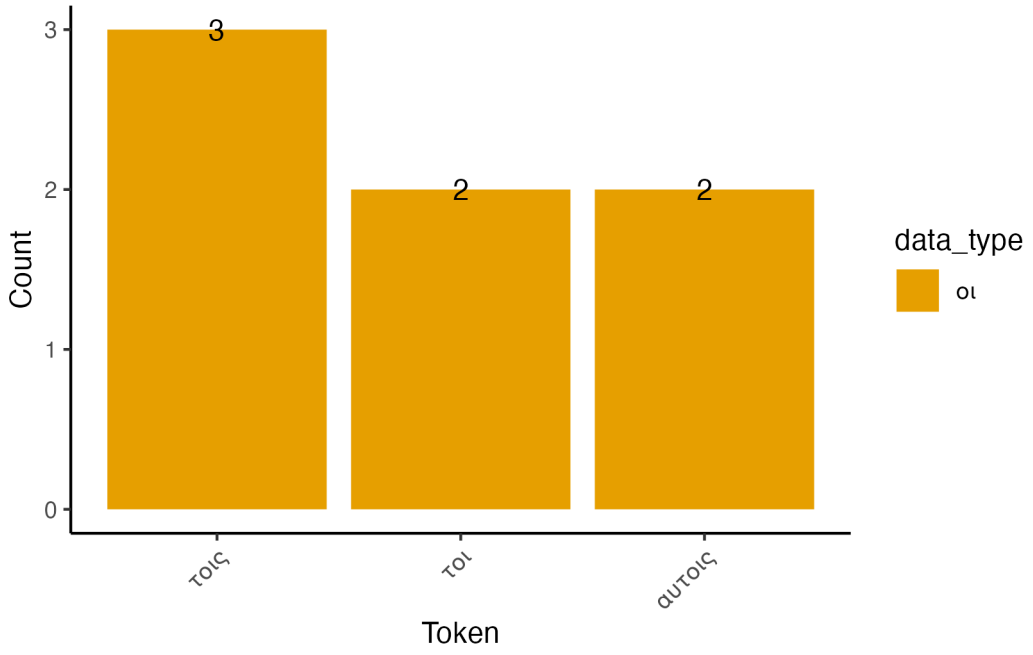
Similarly, the 7 tokens from Megara indicate that the city's population continued to preserve the diphthong through the 2nd cent. The data contain 3 instances of the dative plural τοῖς, 2 of αὐτοῖς, and 1 of the nominative plural τοί. The scraper also captured 1 instance of the fragment τοι[ ], which fell in with τοί during the data selection. However, the author has elected to retain the fragment.

The instance of τοι[ ] appears at the end of line 24 in IG VII 21 (PH# 143,497). However, the beginning of the following line is fully legible, reading ἄλλοις προξένοις καὶ εὐεργέταις 'other public friends and benefactors,' raising the possibility that τοι[ ] substantivizes the following ἄλλοις προξένοις, a likelihood improved by the lack of other dative plurals in the same or any adjacent clauses. Furthermore, the immediate context lacks any basis for the dative/genitive

dual τοῖ[ν], the nominative plural τοί[∅], or even the dative singular τοῖ[∅] as the inscription otherwise contains the long dative ending -ωι, seen in δάμωι and χρυσέωι στεφάνωι 'with a golden wreath.' As such, τοῖ[ς] remains the only likely reading. Given this, and, crucially, the fact that the fragment depicts the diphthong οι in its entirety, the author has maintained τοι[ ] in the data.

Overall, the 7 tokens from Megara all belong to the οι-type. Without any υ-type tokens to test against, the data suggest that Megara belonged on the Athenian side of the οι/υ isogloss during the 2nd cent. BCE.

Figure 18: Second Century BCE Megarian Token Counts



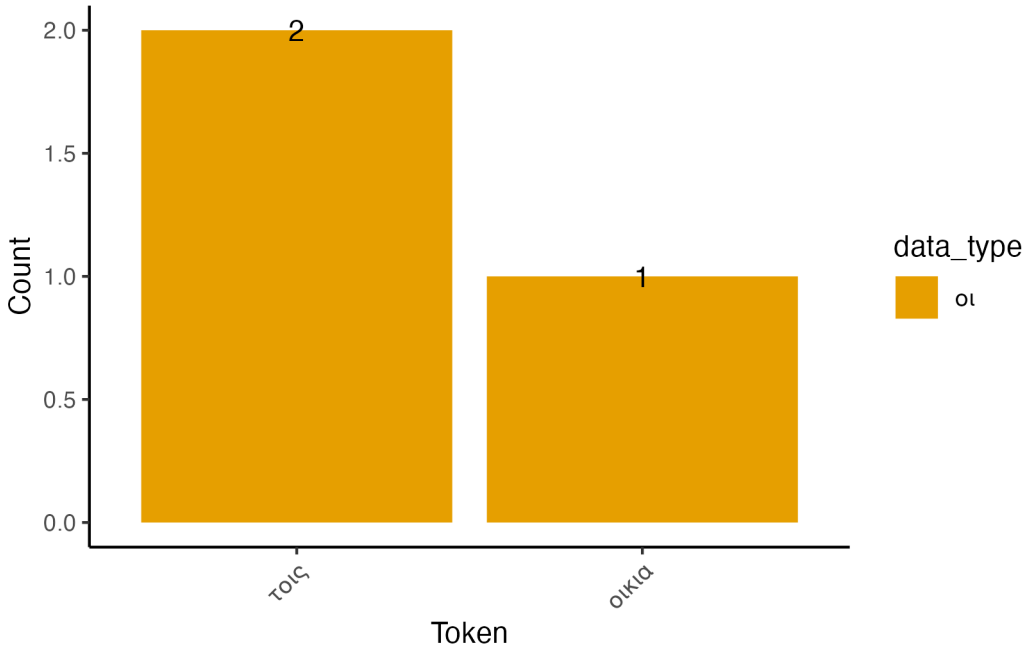
Aigosthena

The 3 Aigosthenian inscriptions suggest that the local speakers retained the οι diphthong. This data contains 2 certain occurrences of the dative plural τοῖς, as well as 1 fragment οἰκία[ ].

The fragment appears in IG VII 223 (PH# 143,700), the right edge of which has suffered significant damage, at the end of line 15. However, fully extant before this is the rest of an honorific formula: ἔγχτησιν γᾶς καὶ (οἰκία[ ]) 'the right to purchase land and (a house).'[46] This context leaves little doubt over the reading οἰκία[ς]. Given this, and since the fragment clearly shows the diphthong οι in its entirety, the instance of οἰκία[ ] has remained in the set.

With the fragment accounted for, the Aigosthenian tokens all belong to the οι-type. Therefore, the data indicate that the city belonged to the Athenian side of the οι/υ isogloss line during the 2nd cent. BCE.

Figure 19: Second Century BCE Aigosthenian Token Counts



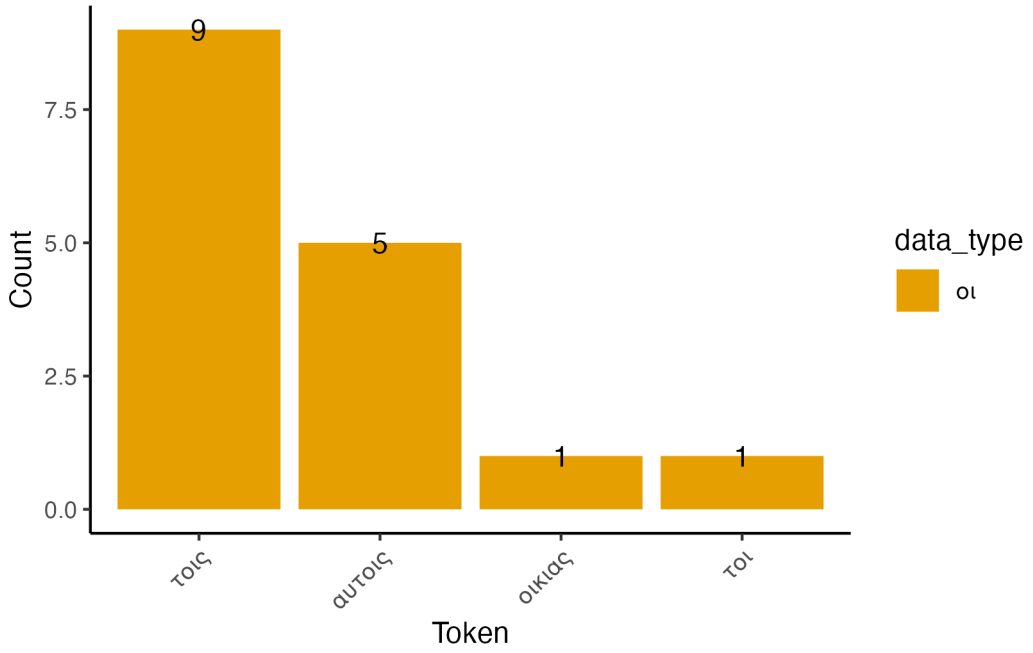
Oropos

The 16 Oropian tokens indicate retention of the diphthong οι. The set exclusively contains οι-type tokens, with 9 instances of the dative plural τοῖς, 5 of αὐτοῖς, and 1 occurrence each

[46] Bradley H. McLean, *An introduction to Greek epigraphy of the Hellenistic and Roman periods from Alexander the Great down to the reign of Constantine (323 B.C. - A.D. 337)* (Ann Arbor, Mich: University of Michigan Press, 2011), 235.

of the genitive singular οἰκίας and the nominative plural τοί. With no contrary υ-type tokens, the data suggest that Oropos belonged on the Athenian side of the οι/υ isogloss during the 2nd cent. BCE.

Figure 20: Second Century BCE Oropian Token Counts



Tanagra

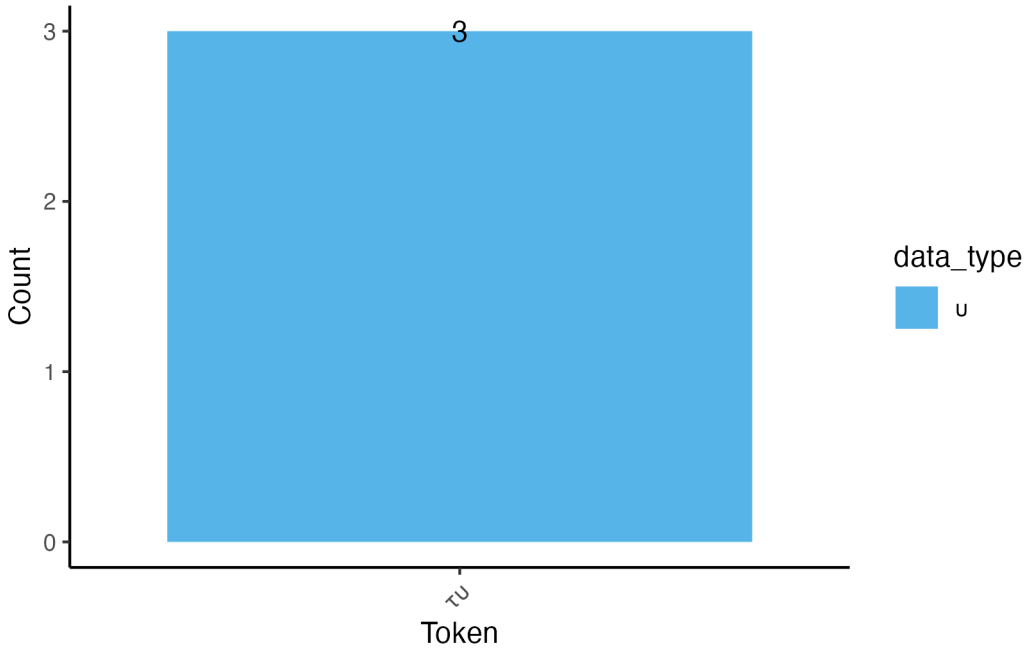
Contrary to all the neighboring cities and the precedent set by the 3rd cent. test results, the 3 Tanagran data suggest that the city generally accepted the monophthongization οι>υ during the 2nd cent. BCE. This data contains 3 instances of τύ as a nominative plural article, each in phrases indicating the performants of certain burial rites.

Table 6: Second Century BCE Instances of υ-Type Data in Tanagra

IG	PH	Tanagran	Attic	English
IG VII 685	PH# 144,164	τὺ Ἀθαναϊστή	οἱ Ἀθαναισταί	The Devotees of Athena
IG VII 686	PH# 144,165	τὺ Διωνυσιαστή	οἱ Διωνυσιασταί	The Devotees of Dionysus
IG VII 687	PH# 144,166	τὺ Ἀθαναϊστῆ	οἱ Ἀθαναισταί	The Devotees of Athena

Comparing the distribution of οι- and υ-type tokens between Athens and Tanagra shows that the υ-types originate exclusively from the latter, raising the possibility that an inscription's place of origin relates to the data type found therein.

Figure 21: Second Century BCE Tanagran Token Counts



To test for the presence of a relationship between a token's origin and its data type, the author performed Fisher's exact test with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 2nd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 2nd cent. BCE.

The test resulted in a p-value of 0.008=$\{3\}$, which indicates a less-than-1% chance that the distribution of data types is due to random chance, per the tokens collected. Therefore, the author rejects the null hypothesis and asserts that the occurrences of υ in place of οι are

due to an inscription's origins in Tanagra. As such, the city fell on the υ side of the οι/υ isogloss line during the 2nd cent. BCE.

Interpretations

All in all, the collected tokens point to a relatively stable οι/υ isogloss line in Central Greece within the period of interest, though the 4th cent. lacks any Aigosthenian or Pagaian data from which to draw a definitive isogloss line. However, the 3rd cent. includes Pagaian and Aigosthenian data, and the 2nd provides further tokens from Aigosthena, with both sets evidencing the isogloss line between the cities and Tanagra. In addition, the type of tokens from each city corresponds with that of the tokens from Megara in the applicable centuries, and the Megarian data indicate consistent retention of the οι diphthong across the period of interest. Two possibilities arise from this.

First, Pagai and Aigosthena belonged on the υ side of the isogloss line during the 4th cent. BCE. Sometime before the 3rd cent., Pagaians and Aigosthenians selected for the diphthong οι. Under this hypothesis, the data from the 3rd cent. depicts a shifting isogloss line as it spread through Megaris from the southwest to the northeast.

Second, Pagai and Aigosthena already belonged on the οι side of the isogloss line during the 4th cent. BCE. The data from the 3rd and 2nd cents. then evidence a continued retention of the diphthong.

The first possibility does not account for the Megarian data insofar as it assumes that the city was separated from Pagai and Aigosthena by the οι/υ isogloss line. Additionally, the first possibility requires the whole-cloth insertion of a data type not otherwise found within the relevant cities besides accompanying phonological changes.

However, in assuming that Megara was on the same side of the isogloss line, the second possibility is suggestive of the inter-city correspondence seen in later centuries. Given that Pagai and Aigosthena agreed with Megara concerning a preference for the diphthong οι in the

3rd cent., and Aigosthena continued to do so in the 2nd cent., the second theory can lean on the later relationship between the cities of Megaris and incorporate the tokens from Megara as suggestive of a broader, regional dialect feature. Furthermore, the second theory does not require the interpolation of a second data type and so frames the Pagaian and Aigosthenian data as a continuation of local dialects.

Given that the second possibility can integrate the Megarian data with less complication and avoids extra phonological changes by interpreting later data as evidence for the continued retention of the diphthong οι, it appears more likely than the complicated first possibility. Therefore, the author has placed the entirety of Megaris on the οι side of the οι/υ isogloss line during the 4th and 2nd centuries. Hypothetical portions of the isogloss line have been drawn with dashed lines (cf. figs. 22-24 below), while evidenced portions have been drawn with a solid line.

The 3rd cent., however, stands out as the only period with no cities firmly on the υ side of the οι/υ isogloss line. The 18 οι-type tokens from Tanagra seem to overshadow the 9 υ-type tokens and suggest some loss of local dialectal features following the 4th cent., while the lack of any οι-type data from the 2nd cent. would apparently indicate the reversal of that trend. Yet the quantity of 3rd cent. οι-type Tanagran tokens is itself noteworthy in the context of the broader data set. Whereas the 2nd and 4th cent. Tanagran data respectively have 0 and 3 οι-type tokens, the 3rd cent. data have 18. To determine whether this discrepancy in data-type distribution between locations and centuries is significant, the author performed 3 post hoc Fisher's exact tests. The first compares the οι-type token counts from Tanagra and Athens in the 4th and 2nd cents. BCE to establish a baseline of comparison between the two most similar counts. The second compares the οι-type token counts in the 2nd and 3rd cents., and the third compares those between the 3rd and 4th. The tests were performed with the following hypotheses:

H0 There is no relationship between the variables `location` and `analysis_cen` in the combined Athenian and Tanagran data of the target centuries.

HA There is a relationship between the variables `location` and `analysis_cen` in the combined Athenian and Tanagran data of the target centuries.

The first test returned a p-value of 1, indicating that the distribution of οι-type tokens is not significantly related to the centuries of origin. However, the second test resulted in a p-value of 0.0006526, while the third resulted in a p-value of 2.333×10^{-09}. In each instance, the p-value indicates that the distribution of οι-type tokens likely is significant to the centuries of origin. Since both tests that suggest a significant relationship include the 3rd cent. BCE, those relationships appear to revolve around the century's high Tanagran token count. This raises the suspicion that the οι-type Tanagran data are overrepresented in the 3rd cent., possibly explaining the small margin of failure, 0.10, for the original test between the Athenian and Tanagran data sets.

Given this possible overrepresentation of οι-type tokens, and considering that Tanagra in the 4th and 2nd centuries belonged on the υ side of the οι/υ isogloss, the author has placed this city in the same position during the 3rd cent. BCE. However, without further data or measurements as to the degree of such overrepresentation (and its potential effect), this placement is hypothetical and so represented with a dashed line on the map.

Figure 22: Fourth Century BCE Isogloss Line

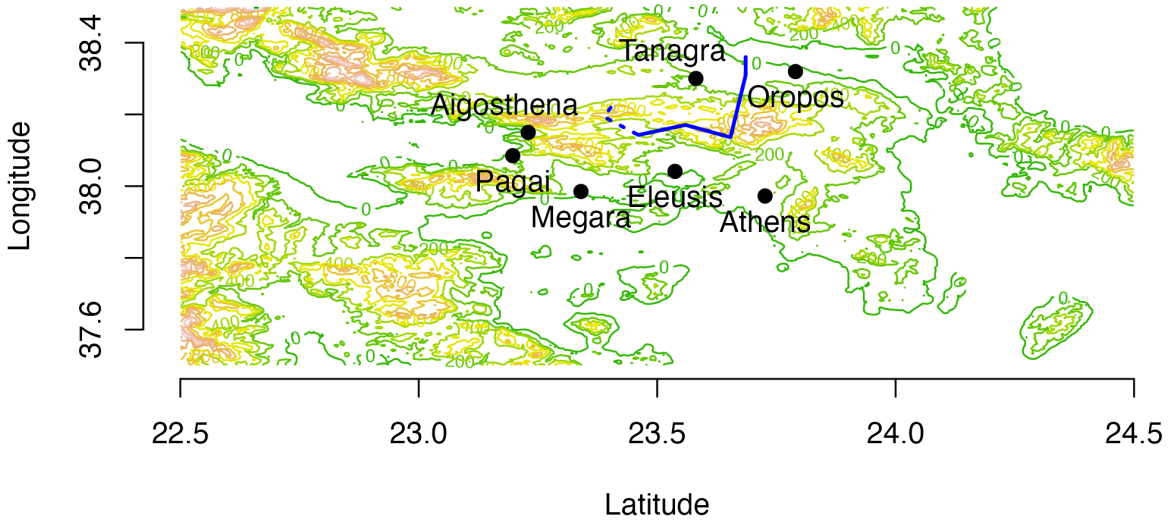


Figure 23: Third Century BCE Isogloss Line

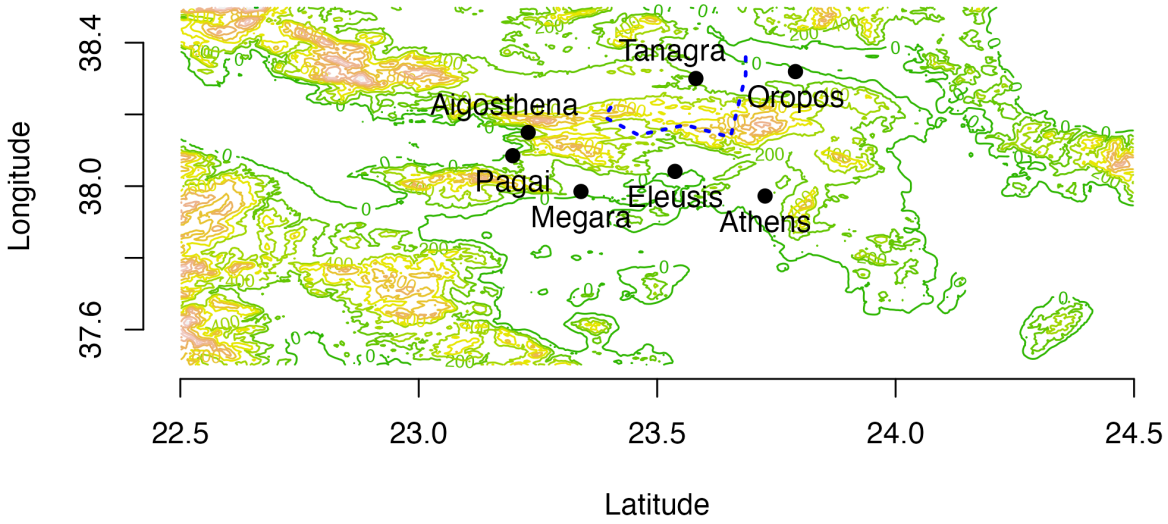
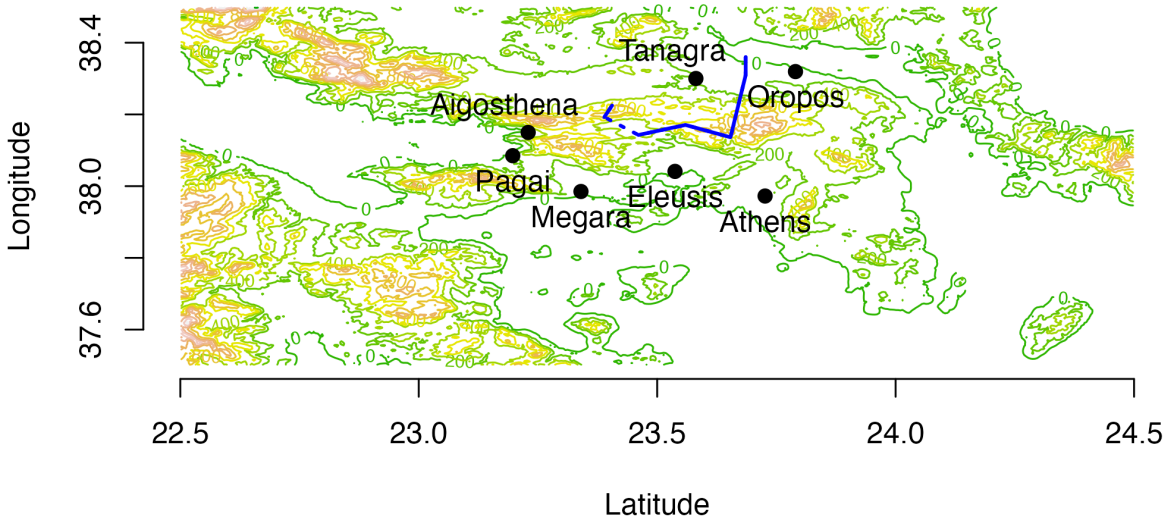


Figure 24: Second Century BCE Isogloss Line



η/ᾱ

The η/ᾱ isogloss is evidenced by the vowel of the root syllables in δῆμος 'people, assembly' and στήλη 'stele,' as well as the ā-stem endings in βουλή 'council' and γῆ 'land.'

First, the noun δᾶμος occurs 27 times in the exemplary corpus, often in resolution formulas indicating that a decree had passed all legal prerequisites for enactment, such as in DGE 459.2 δεδόχθη τοῖ δάμοι 'be it resolved by the people.'[47] Next, the noun στάλα appears 7 times, each in a formula determining the method of public presentation for a decree. For example, see the dative στάλαι in DGE 155: ἀναγραψάτω δὲ τὸ δόγμα τόδε ὁ γραμματεὺς τοῦ δάμου ἐν στάλαι λιθίναι καὶ ἀνθέτω εἰς τὸ Ὀλυμπιεῖον 'let the secretary of the people engrave this edict on a stone stele and set it up at the Olympieion.'

[47]McLean, *An introduction to Greek epigraphy of the Hellenistic and Roman periods from Alexander the Great down to the reign of Constantine (323 B.C. - A.D. 337)*, 231.

Additionally, the noun βουλά occurs 8 times in the exemplary data. For example, the genitive singular βουλᾶς appears in DGE 155 in an opening formula listing the standing city officials in order to date the decree: γραμματεὺς βουλᾶς καὶ δάμου Ἵππων Παγχάρεος 'Hippon son of Panchareus (was the) Secretary of the council and the assembly.' Finally, the noun γᾶ appears 15 times in the exemplary corpus, typically in proxeny decrees issuing rights and protections to public friends, as seen in DGE 460.1 γᾶς κὴ ϝυκίας ἔππασιν κὴ ϝισοτελίαν 'the right to purchase land and a house, as well as equality in taxes.'

However, the exemplary data also includes 1 occurrence of the η-type genitive γῆς in a similar formula from the 4th cent. Oropian inscription DGE 812: καὶ γῆς καὶ οἰκίης ἔνκτησιν αὐτῶι καὶ ἐκγόνοις 'the right to purchase land and a house for him and his descendants.' Additionally, the contemporary inscription DGE 811, also from Oropos, contains 3 instances of δῆμος and its derivatives, such as δημότης 'citizen' in the phrase ἂν δέ τις ἀδικεῖ ἐν τοῖ ἱεροῖ ἢ ξένος ἢ δημότης 'if one does wrong in the temple, be they either a foreigner or a citizen.' The presence of these η-type tokens brings into question the full geographical extent of the ᾱ>η vowel shift.

4th cent. BCE

The data from the 4th cent. BCE establishes the η/ᾱ isogloss as dividing Attica and Oropia from Megaris and Boiotia. The set contains 558 tokens from 5 cities: Athens (n=330), Eleusis (n=93), Oropos (n=64), Megara (n=61), and Tanagra (n=10). The η-type and ᾱ-type tokens belong almost exclusively on their associated side of the isogloss line, with only 4 ᾱ-type tokens appearing on the η side.

Athens

330 tokens represent the Athenian data. While the set does contain a small number of ᾱ-type tokens, the data overall indicates that the Athenian population preferred forms with the innovative raised η over those with ᾱ.

First, the set contains 219 tokens built from δῆμος. This list includes 54 instances of the dative singular δήμωι and 47 of the genitive δήμου, as well as 30 of the accusative δήμον and 27 of the nominative δῆμος. The set further includes 80 compound tokens built with the member δημ-.

Furthermore, the data contain 22 occurrences of στήλη. Among these are 8 instances of the genitive singular στήλης, as well as 5 each of the dative singular στήληι and the accusative στήλην, along with 2 of the accusative plural στήλας and 1 each of the dative στήλαις and the nominative στήλη.

Besides these, the data include 87 occurrences of βουλή: 30 being the genitive singular βουλῆς, 25 the nominative singular βουλή, 21 the dative βουλῆι, and 11 the accusative βουλήν. And finally, the set includes 2 instances of γῆ as the genitive singular γῆς.

Therefore, with only η-type tokens, the data characterize Athens as having accepted that ᾱ>η shift and establish the city as the point of comparison for testing the position of other cities relative to the η/ᾱ isogloss line.

Eleusis

The 93 tokens from Eleusis indicate that the city's population preferred forms with the raised η over the older ᾱ. The innovative η occurs 80 times in the root δημ-, including 13 instances of the nominative δῆμος, 11 of the dative plural δημόσιοις 'public,' and 9 of the genitive singular δήμου. The data also includes various derived forms, such as the proper noun Χαρίδημος 'Grace of the Deme' and Σωσίδημος 'Savior of the Deme,' as well as the participle δημαρχῶν

Figure 25: Fourth Century BCE Token Counts by City

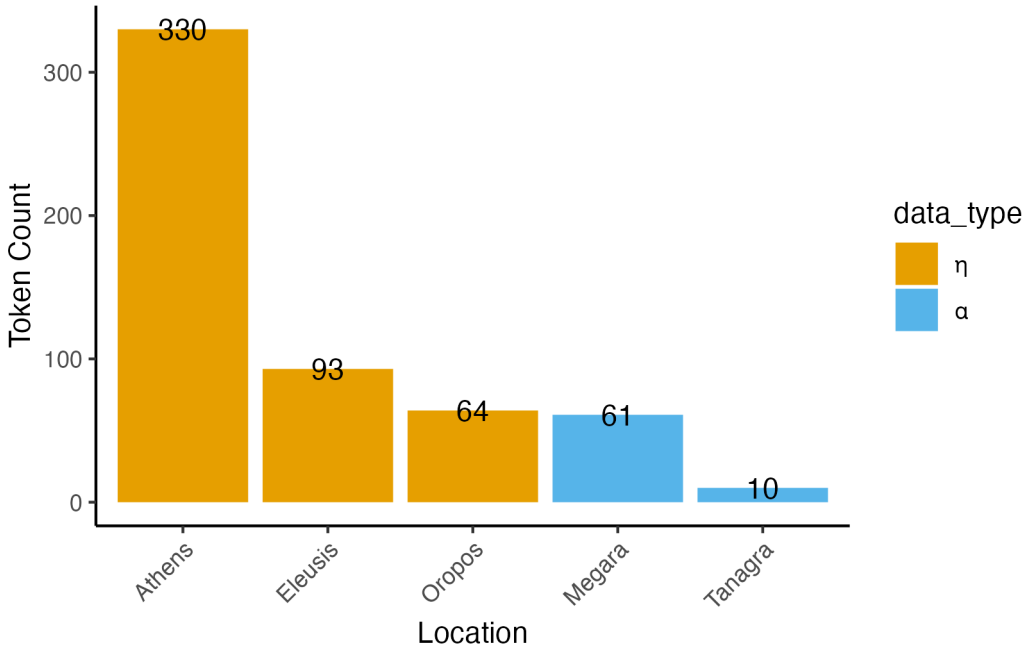


Figure 26: Selected Fourth Century BCE Athenian Token Counts

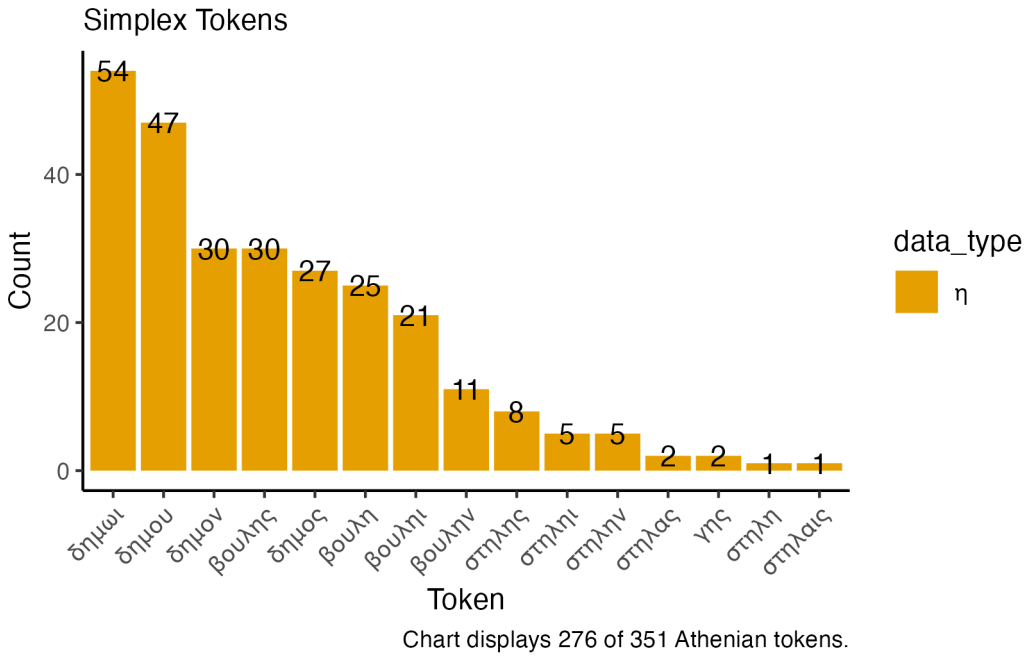
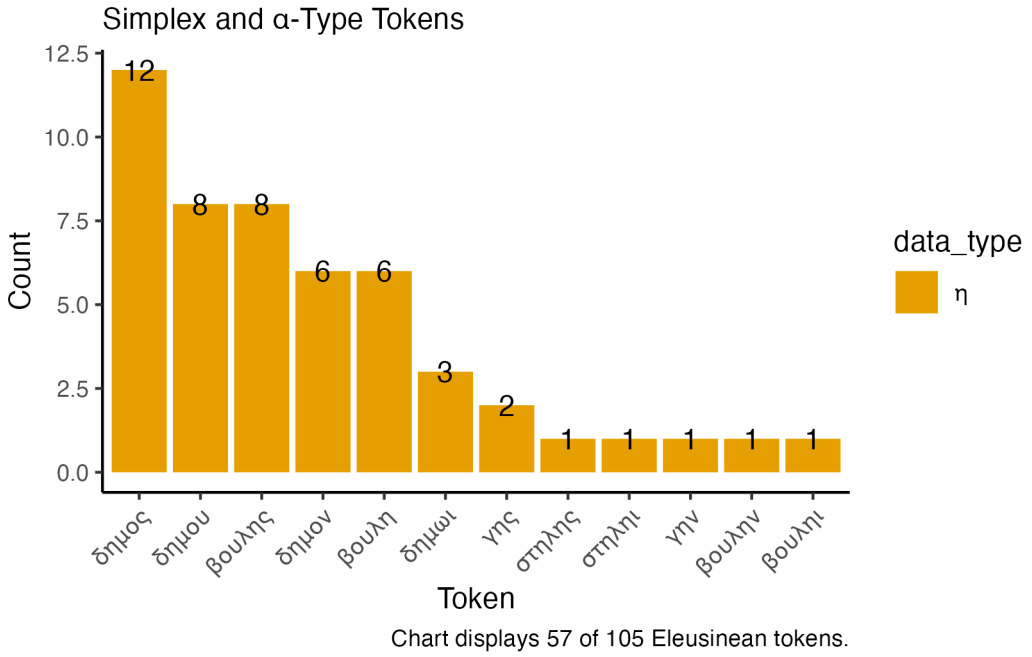


Figure 27: Selected Fourth Century BCE Eleusinean Token Counts



'being the Archon of the Deme.' Additionally, the root στηλ- occurs twice: once as the genitive singular στήλης and once as the dative singular στήληι.

Furthermore, endings with -η(-) occur 16 times appended with βουλή. This includes 8 instances of the genitive singular βουλῆς, 6 of the nominative βουλή, 1 of the accusative βουλήν, and 1 of the dative βουλῆι. And finally, the data contain 3 instances of -η(-) endings on the noun γῆ. This includes 2 occurrences of the genitive singular γῆς and 1 of the accusative singular γῆν.

With no ᾱ-type tokens in the set, the data categorize Eleusis as belonging to the Athenian side of the η/ᾱ isogloss line, indicating that the city's population participated in the Attic-Ionic vowel shift.

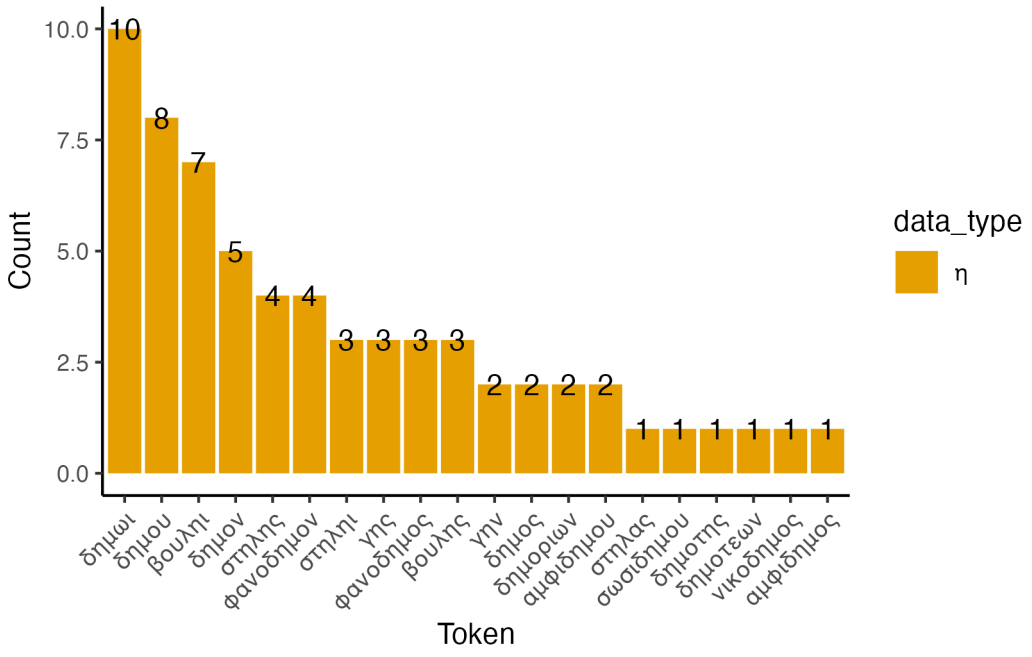
Oropos

The 64 Oropian tokens unanimously indicate that the city participated in the same vowel shift. The data include 49 instances of η within nouns. 41 appear in forms of δῆμος, primarily in the 10 occurrences of the dative singular δήμωι, 8 of the genitive δήμου, and 5 of the accusative δήμον. The last 8 appear in the word στήλη: 4 times in the genitive στήλης, 3 times in the dative στήληι, and once in the accusative plural στήλας.

In addition, the data include 15 η-type tokens with endings in -η(-): 10 forms of βουλή and 5 of γῆ. The βουλή tokens are comprised of 7 instances of the dative singular βουλῆι and 3 of the genitive βουλῆς, whereas γῆ tokens are comprised of 3 instances of the genitive γῆς and 2 of the accusative γῆν.

Overall, the 64 tokens from Oropos all belong to the η-type, indicating that the city belonged to the Athenian side of the η/ᾱ isogloss line during the 4th cent. BCE.

Figure 28: Fourth Century BCE Oropian Token Counts



Megara

The 61 tokens from Megara show that the local population did not participate in the ᾱ>η vowel shift. Every token shows the inherited long ᾱ in both root syllables and ā-stem endings.

First, the data contain 46 tokens with the root vowel ᾱ. Among these are 39 instances of δᾶμος, including, for example, the dative singular δάμωι (n=14) and the genitive δάμου (n=13). The stem also appears 7 times in proper nouns: 4 times in the nominative Δαμοτέλης 'Fulfillment of the Deme' and 3 times in the patronymic genitive Δαμοτέλεος 'Son of Damoteles.' In addition, the set includes 7 occurrences of the word στάλᾱ: 4 of the accusative στάλαν and 3 of the dative στάλαι.

Furthermore, the Megarian data include 15 tokens with endings in -ᾱ(-). The list is comprised of 7 instances of the dative singular βουλᾶι, 6 of the genitive βουλᾶς, and 2 of the genitive γᾶς.

Finally, the set contains no η-type tokens. Therefore, the data suggest uniform retention of the long ᾱ in Megara. To corroborate this, the author performed Fisher's exact test on the Athenian and Megarian data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Megarian data of the 4th cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Megarian data of the 4th cent. BCE.

The test resulted in a p-value of $< 2.2 \times 10^{-16}$. With such a small p-value, the author rejects the null hypothesis and asserts that, through the tokens collected, the data show a clear relationship between the origin of an inscription and the data type of the tokens therein. Therefore, Megara belonged on the ᾱ side of the η/ᾱ isogloss line during the 4th cent. BCE.

Figure 29: Fourth Century BCE Megarian Token Counts

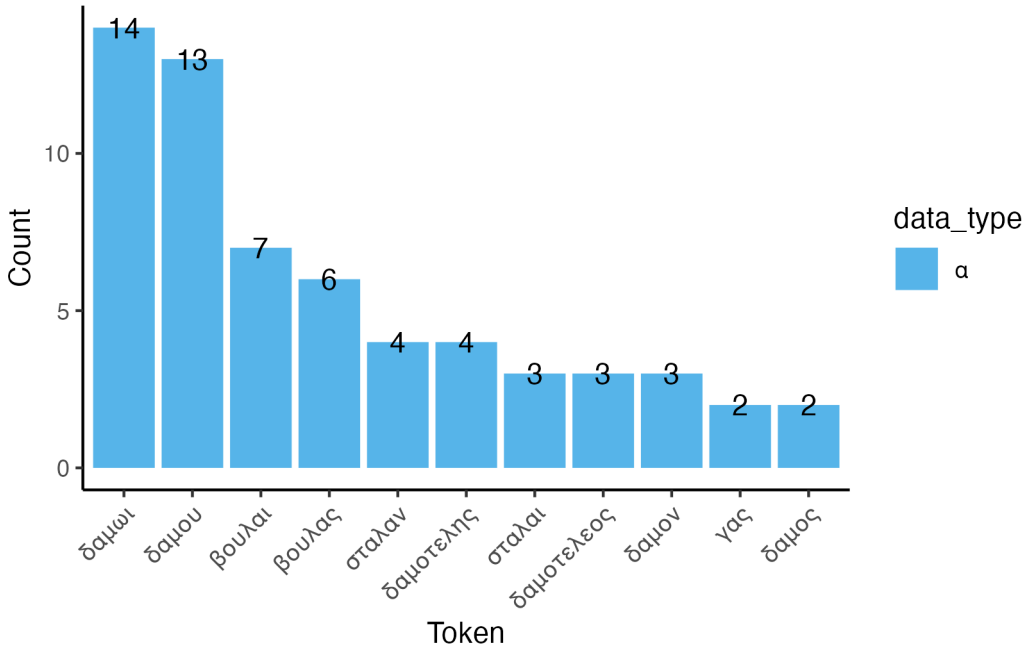
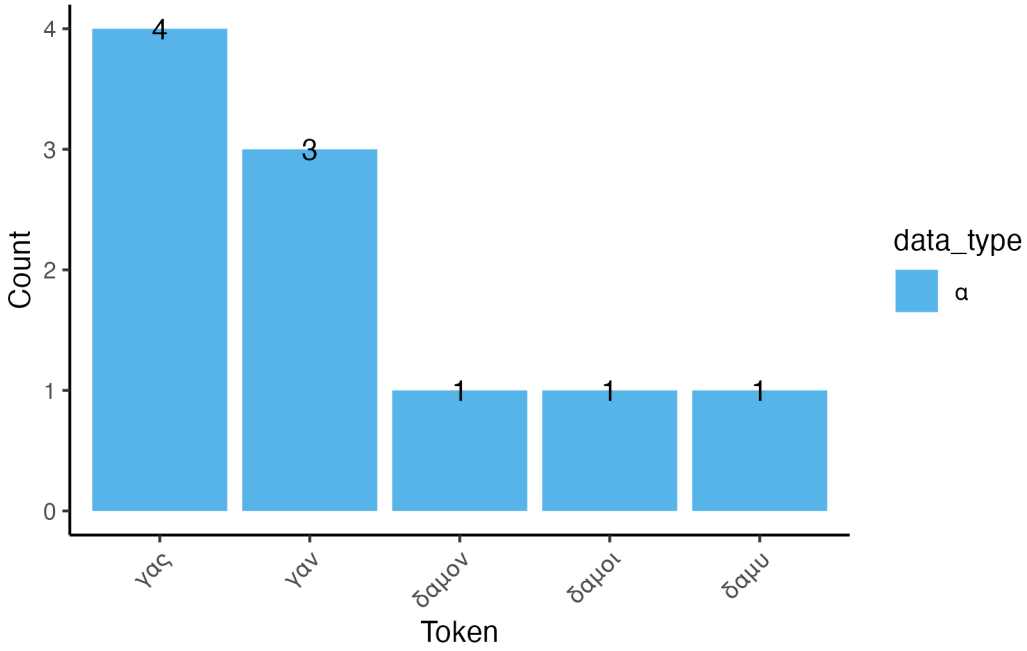


Figure 30: Fourth Century BCE Tanagran Token Counts



Tanagra

The 10 Tanagran inscriptions show that the city did not participate in the ᾱ>η vowel shift. First, The data include 3 instances of δᾶμος: once each as the accusative singular δᾶμον, the dative δάμοι, and the monophthongized dative δάμυ. Additionally, the data include 4 instances of the genitive singular γᾶς and 3 of the accusative γᾶν. Finally, the set includes no η-type tokens originating from Tanagra. As such, the data suggest city-wide retention of the long ᾱ. To corroborate this, the author performed Fisher's exact test on the Athenian and Tanagran data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 4th cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 4th cent. BCE.

The test resulted in a *p*-value of $< 2.2 \times 10^{-16}$. Therefore, the author rejects the null hypothesis and asserts that the data show a clear relationship between the origin of an inscription and the data type of the tokens therein. Therefore, Tanagra belonged on the Megarian side of the η/ᾱ isogloss line during the 4th cent. BCE.

3rd cent. BCE

The data for the 3rd cent. BCE shows that the η/ᾱ isogloss line remained in the same position as in the 4th cent. The set contains 615 tokens from across all 7 target cities: Oropos (n=424), Eleusis (n=67), Megara (n=55), Athens (n=40), Tanagra (n=18), Aigosthena (n=9), and Pagai (n=2). 30 ᾱ-type tokens appear between Oropos and Eleusis, but otherwise the η- and ᾱ-type tokens remain neatly on their respective sides of the isogloss line.

Figure 31: Third Century BCE Token Counts by City

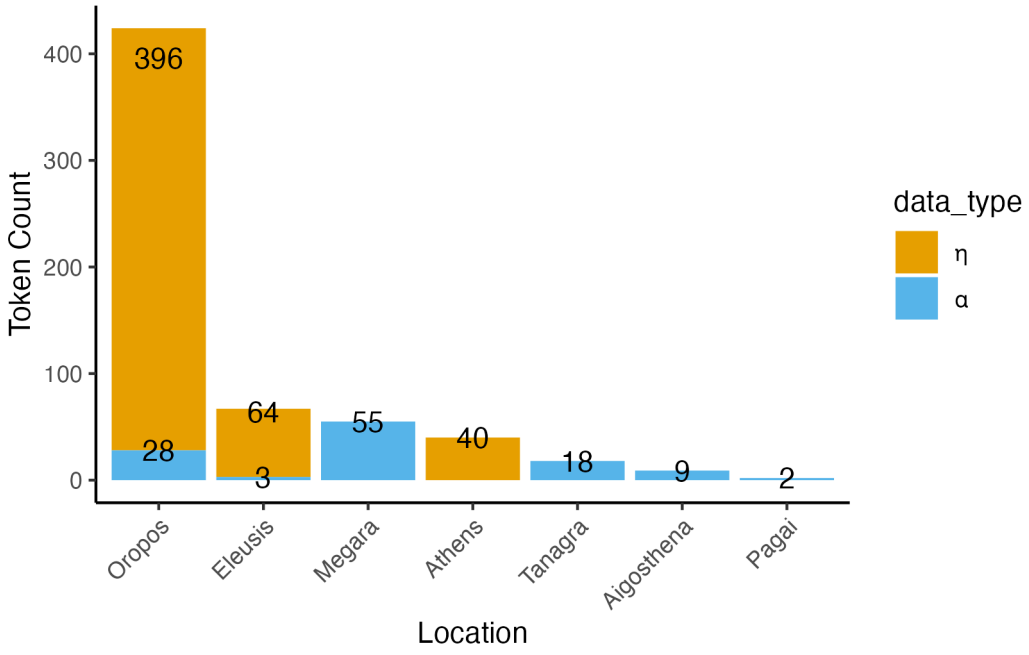
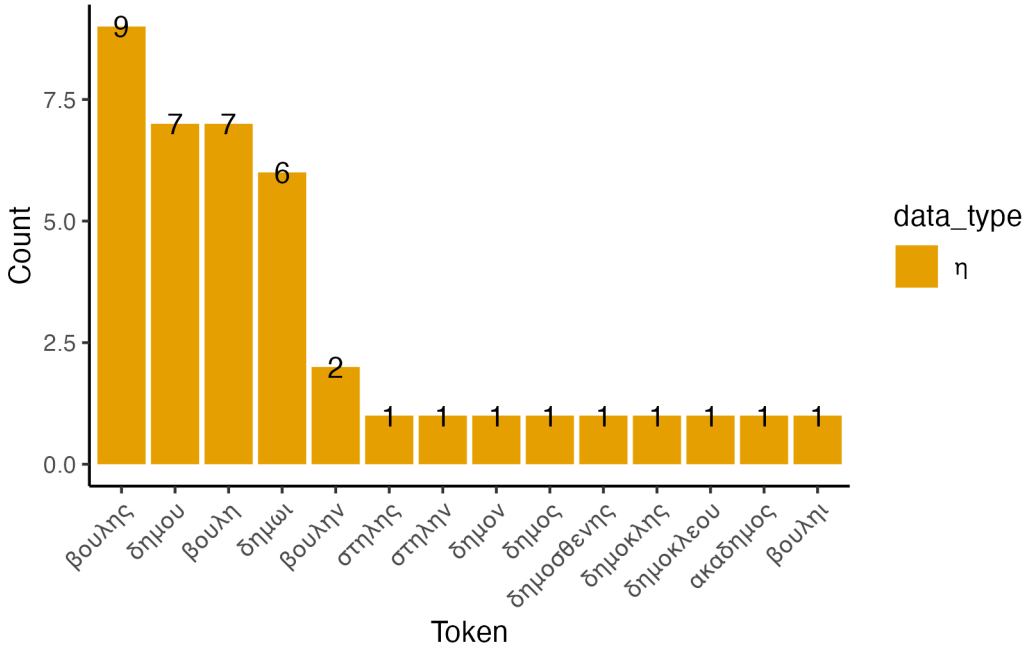


Figure 32: Third Century BCE Athenian Token Counts



Athens

The 40 Athenian tokens show unanimous adoption of the raised η instead of the long ᾱ in both root syllables and ā-stem singular endings. Without any ᾱ-type tokens, the data establish Athens as representing the η side of the η/ᾱ isogloss and as the main point of comparison for statistical tests.

First, the data include 21 root-syllable tokens: 19 instances of δῆμος and 2 of στήλη. This list includes 7 occurrences of the genitive singular δήμου and 6 of the dative δήμωι, along with 1 each of the nominative proper nouns Δημοσθένης 'Might of the Deme' and Δημοκλῆς 'Glory of the Deme,' each with the root vowel η. Furthermore, the 2 instances of στήλη, 1 genitive singular στήλης and 1 accusative στήλην, show the same vocalic quality, indicating that Athenians retained the raised vowel η in root syllables through the 3rd cent. BCE.

Next, the Athenian data include 19 ā-stem tokens, all in forms of βουλή. The list comprises 9 genitive singulars βουλῆς, 7 nominatives βουλή, 2 accusatives βουλήν, and 1 dative βουλῆι. As with the root-syllable tokens, each instance of βουλή shows the continued retention of the raised vowel η into the 2nd cent. BCE.

Finally, the Athenian set contains no ᾱ-type tokens. Therefore, the data categorize Athens as having retained the innovative vowel η and establish the city as the main point of comparison for later testing.

Eleusis

Notwithstanding the city's 3 ᾱ-type tokens, the 67 Eleusinean tokens show a general retention of the innovative η. Given that these tokens originate from the same inscription, which otherwise prefers η-type tokens, they cannot represent a city-wide dialect feature. Besides these, the set shows general retention of the raised η in root syllables and singular ā-stem endings.

First, the 3 ᾱ-type tokens cannot provide sufficient grounds to argue for any significant reversal to or adoption of ᾱ-type forms within Eleusis. These tokens come exclusively from IG II^2 1,299 (PH# 3,513): a long honorific praising 58 individuals, including, crucially, 23 foreigners in the city. The text of line 93 on column 1 explicitly mentions these men as foreigners: καὶ οἵδε ξένων συνανέθηκαν 'these men from among the foreigners helped in dedicating this.' Each Eleusinean ᾱ-type token appears in this list, along with an ethnic epithet denoting their home city. With each individual listed as a foreigner, both categorically before their list and specifically with their epithet, the spelling used for their names must represent the pronunciation used in their native dialect.

Furthermore, the inscription contains 14 other serviceable tokens. 1 is the η-type genitive singular στήλης, while the other 13 are forms of δῆμος. Every token collected from this inscription that occurs outside of a proper noun shows the raised vowel η, following all other Eleusinean inscriptions from this century. As the names contrast with the rest of the inscription in question, the long ᾱ cannot represent even a feature of the author's pronunciation. Therefore, these three ᾱ-type tokens cannot provide evidence for a city-wide shift toward ᾱ-type forms.

Table 7: Tokens from IG II^2 1,299 (PH# 3,513)

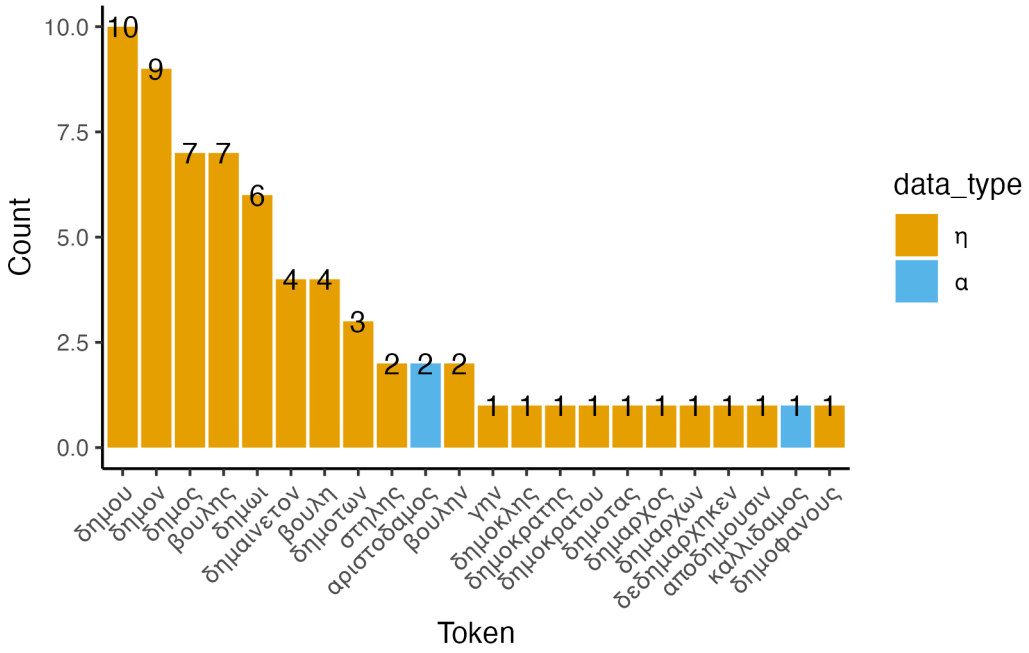
Token	Type	n
στηλης	η	1
δημου	η	4
δημον	η	3
δημος	η	4
δημωι	η	1
δημοκρατου	η	1
αριστοδαμος	ᾱ	2
καλλιδαμος	ᾱ	1

Besides the outlying ᾱ-type tokens, the data contain 48 occurrences of δῆμος along with 2 of στήλη, pointing to general retention of the raised vowel η in the local dialect. These tokens include 10 instances of the genitive singular δήμου and 9 of the accusative δῆμον, 2 of

the genitive στήλης, and various secondary forms such as the verb δεδημάρχηκεν 'has lead the city' and the name Δημοκλῆς 'Glory of the Deme.' Each instance of δῆμος and στήλη contain the raised vowel η, showing its retention through the 3rd cent. BCE.

Finally, the data include 14 instances of η in ā-stem endings. This includes the 1 accusative singular γῆν and 13 forms of βουλή. The list comprises 7 occurrences of the genitive singular βουλῆς, 4 of the nominative βουλή, and 2 of the accusative βουλήν. Each token includes the vowel η in place of ᾱ, further indicating its retention through the century. Therefore, the data show that Eleusis generally maintained the raised vowel and belonged on the Athenian side of the η/ᾱ isogloss line during the 3rd cent. BCE.

Figure 33: Third Century BCE Eleusinean Token Counts



Oropos

Notwithstanding 28 ᾱ-type tokens, the 424 Oropian tokens show a general retention of the raised η over the inherited long ᾱ. The widespread preference for the innovative η in both root

syllables and ā-stem endings shows that ᾱ-type inscriptions, though internally consistent, do not represent a city-wide isogloss.

The inscriptional data show a clear preference for the raised vowel η in the root syllables of δῆμος and στήλη. First, all 9 instances of στήλη contain the vowel η in place of ᾱ. This list comprises the 6 occurrences of the dative singular στήληι, 2 of the accusative στήλην, and 1 of the nominative στήλη. Furthermore, of the 163 occurrences of δῆμος, 147 contain the raised vowel, as seen in the dative singular δήμωι (n=113), the accusative δῆμον (n=5), and the nominative proper noun Ἐχέδημος (n=1). Meanwhile, the low vowel ᾱ appears in only 16 tokens. The dative singular δάμοι occurs 4 times, and the monophthongized dative δάμυ 3 times. However, the remaining 9 tokens are proper nouns, only 2 of which cooccur with other collected ᾱ-type tokens. These are the nominative Δαμόκριτος 'Chosen One of the Deme' in the phrase Δαμόκριτος Τιμογένιος Ὠρώπιος ἔλεξε 'the Oropian Damokritos Son of Timogenos declared it' from IG VII 393 (PH# 143,870) and the genitive Δαμοφίλω 'Friend of the Deme' in the formula Δαμοφίλω ἄρχοντος 'during the Archonship of Damophilo' from IG VII 352 (PH# 143,829).

This general distribution of ᾱ-type tokens in inscriptions otherwise preferring η-type forms suggests that the preference for the low vowel was not a general feature of the local dialect. Nevertheless, that these two inscriptions consistently prefer forms with the low vowel ᾱ and that IG VII 393 (PH# 143,870) mentions explicitly that the motion's mover was an Oropian raises the possibility that a significant portion of the local population did retain the low vowel, warranting further testing.

However, the extant forms of γῆ and βουλή also point to a more general preference for the raised vowel η. Of the 220 instances of γῆ, 208 show the raised vowel, as in the genitive singular γῆς (n=107) and the accusative γῆν (n=101). The list also includes 12 instances of γᾶ, 6 times each as the genitive singular γᾶς and the accusative γᾶν. Though they represent the decided minority of γῆ-type tokens, their presence also warrants statistical testing.

Furthermore, 31 of the 32 instances of βουλή show uniform retention of the raised vowel. This includes 27 instances of the dative singular βουλῆι and 2 of the accusative βουλήν. Note that this includes 2 aberrant forms captured as βουλη. The first, from the combined text IG VII 388 + 446 + 494 (PH# 143,865 + 143,923 + 143,971), appears in the phrase τῇ βουλῇ καὶ τῶι δάμωι, where the dative singular βουλῆι has been transcribed with an iota subscript rather than the PHI's typical adscript. Due to the scraper removing all subscripts, the form βουλῇ has been captured as βουλη. The second, from IG VII 405 (PH# 143,882), appears in the phrase ἐμ βουλῆ Θυΐο[. Unfortunately, the inscription is highly fragmentary and lacks any other examples of αι or η, leaving it unclear whether the dative represents βουλῆι, displaying the Attic-Ionic vowel shift with a simple misspelling, or a Boiotian monophthongization of the dative βουλᾶι.

However, the preceding line contains the genitive article τοῦ rather than the Boiotian τῶ seen in the Tanagran inscription DGE 462.A τῶ ἱαρῶ 'of the temple' and τῶ ἀρχιτέκτονος 'of the architect,' which appears alongside the monophthongized -η in τῆ ἀρχῆ 'for the office' and ἐν ἀνγραφῆ 'on the register.' Concurrent ου > ω and αι > η shifts also appear in the Oropian inscription DGE 449, from the same century, in the phrase τοῖς λοιποῖς προξένοις κὴ εὐεργέτηις τῶ κοινῶ Βοιωτῶν 'for the remaining public friends and benefactors of the league of Boiotians.' While the lack of a comparable τοῦ > τῶ shift in IG VII 405 (PH# 143,882) does not necessarily exclude the possibility that βουλῆ resulted from an older form βουλᾶι, the absence of this shift in the context of other coeval inscriptions from the region raises the likelihood that it represents a misspelling of βουλῆι. Therefore, the form has remained in the data as the second instance of βουλη.

With the 2 aberrant forms accounted for, the instances of βουλή all point to a general preference for the raised vowel η. Additionally, with the vast majority of occurrences of γῆ showing the same preference, the data suggest that the population of Oropos generally

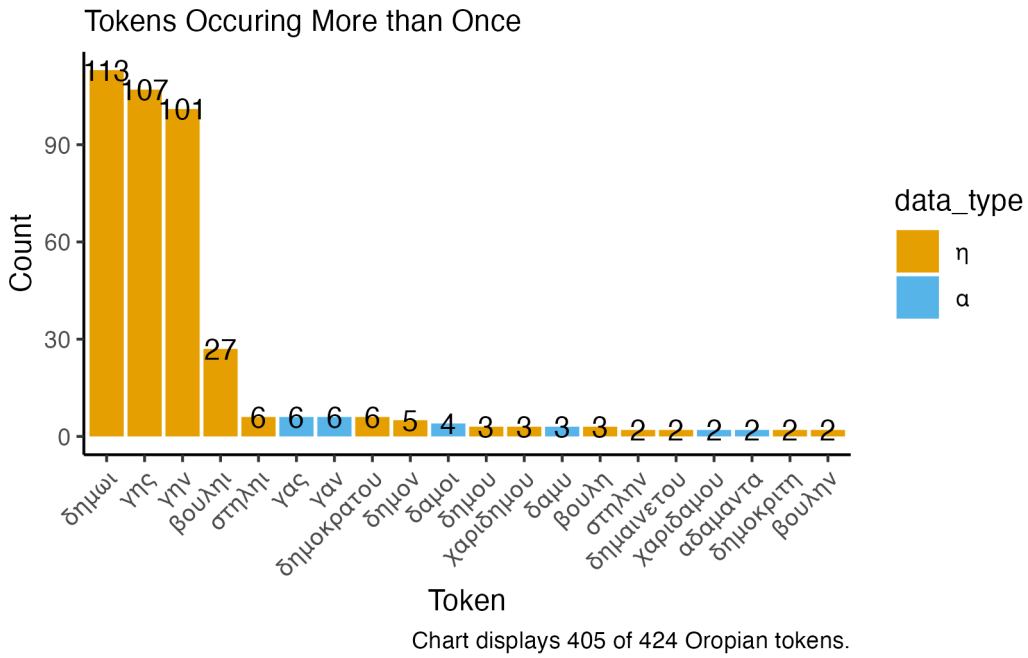
accepted the innovative η over the older long ᾱ. To corroborate this, the author performed Fisher's exact test on the Athenian and Oropian data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Oropian data of the 3rd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Oropian data of the 3rd cent. BCE.

The test resulted in a p-value of 0.156: therefore, the author fails to reject the null hypothesis and cannot assert that, per the data, the distribution of ᾱ-type tokens in Athenian and Oropian inscriptions results from a text's origin in either city. As such, the data indicates a general preference in the city for η-type forms, demonstrating that the city belonged on the Athenian side of the η/ᾱ isogloss line during the 3rd cent. BCE.

Figure 34: Selected Third Century BCE Oropian Token Counts



Megara

The 55 inscriptions from Megara universally show the inheritance of the long ᾱ, both in root syllables and in ā-stem endings. First, the word δᾶμος appears 35 times, primarily in the dative singular δάμωι (n=16) and the genitive δάμου (n=9), but also 10 times in derived forms. For example, the proper noun Εὔδαμος appears in 3 separate inscriptions, once in the nominative and twice in the genitive as Εὐδάμου, as does the nominative plural δαμιοργοί 'magistrates' preceding a list of dedicators setting up an offering to Aphrodite. Furthermore, the form στάλᾱ appears 6 times: 3 times in the accusative στάλαγ, with the final ν assimilated to a following velar consonant, twice in the plain accusative στάλαν, and once in the dative στάλαι. On each occasion, the root consistently retains the inherited long vowel ᾱ.

In addition, the word βουλά with a singular ā-stem ending occurs 14 times in the Megarian set. 12 instances are of the dative singular βουλᾶι, and 2 of the genitive βουλᾶς. Each contains an ā-stem ending with the inherited long ᾱ, showing the same retention of the inherited vowel within the city.

This local preference for ᾱ over η in both roots and ā-stem endings suggests that pronunciations with a long ᾱ were a general feature of the local dialect. To corroborate this, the author performed Fisher's exact test on the Athenian and Megarian data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Megarian data of the 3rd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Megarian data of the 3rd cent. BCE.

The test returned a p-value of 2.2×10^{-16}. Therefore, the author rejects the null hypothesis and asserts that the distribution of data types between inscriptions from Megara and Athens

Figure 35: Third Century BCE Megarian Token Counts

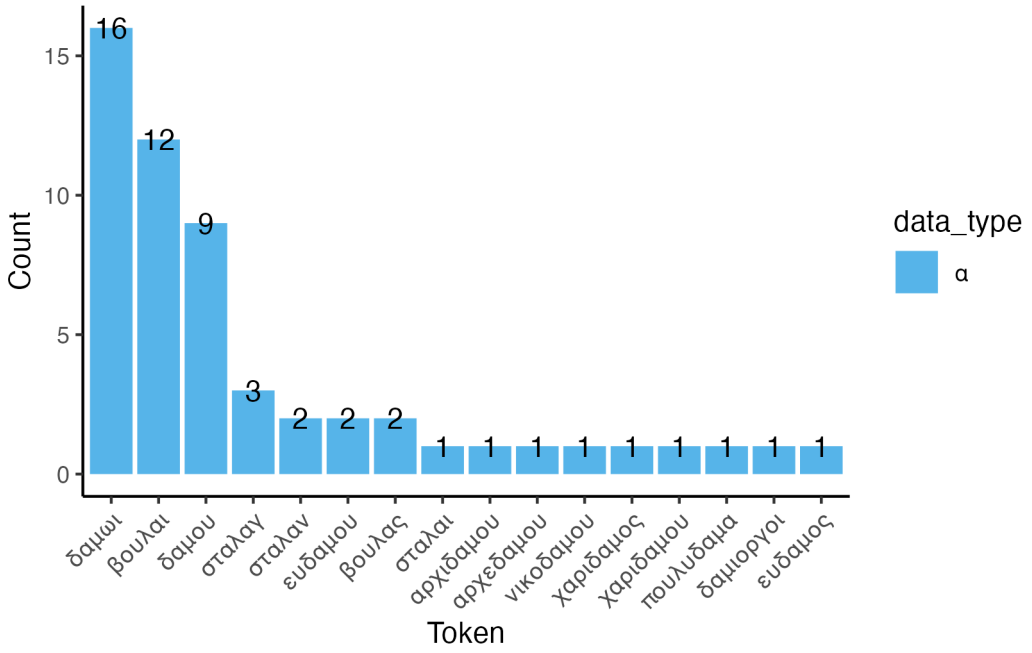


Table 8: Third Century BCE Tokens from Pagai

Inscription	PH#	Location	Analysis Cent.	Token	Data Type
IG VII 189	143,666	Pagai	3	στάλαν	α
IG VII 189	143,666	Pagai	3	Δαμοτίωνα	α

is related to the city of origin for such inscriptions. As such, the data indicate that Megara belonged on the ᾱ side of the η/ᾱ isogloss line during the 3rd cent. BCE.

Pagai

The data from Pagai include 2 tokens. These are the accusative singular στάλαν and the nominative Δαμοτίων 'Of the Deme.' In each instance, the root maintains the inherited long vowel ᾱ, suggesting a general preference for the long ᾱ over η in the city. To corroborate this, the author performed Fisher's exact test on the Athenian and Pagaian data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Pagaian data of the 3rd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Pagaian data of the 3rd cent. BCE.

The test resulted in a p-value of 0.001161. Therefore, the author rejects the null hypothesis and asserts that the distribution of data types among inscriptions between Athens and Pagai relates to an inscription's city of origin. For this reason, and given the lack of any η-type evidence from the city, the data indicate that Pagai belonged on the Megarian side of the η/ᾱ isogloss line during the 3rd cent. BCE

Aigosthena

Similarly, the 9 tokens from Aigosthena suggest a general retention of the low vowel ᾱ in root syllables and ā-stem endings. The set includes 6 instances of δᾶμος: 3 times in the dative singular δάμωι and once in the shortened dative δάμοι, as well as once each in the nominative Χαρίδαμος 'Grace of the Deme' and the genitive Δαμοκλέος 'Glory of the Deme.' Additionally, the set includes 2 occurrences of the accusative singular στάλαν and 1 of the accusative γᾶν.

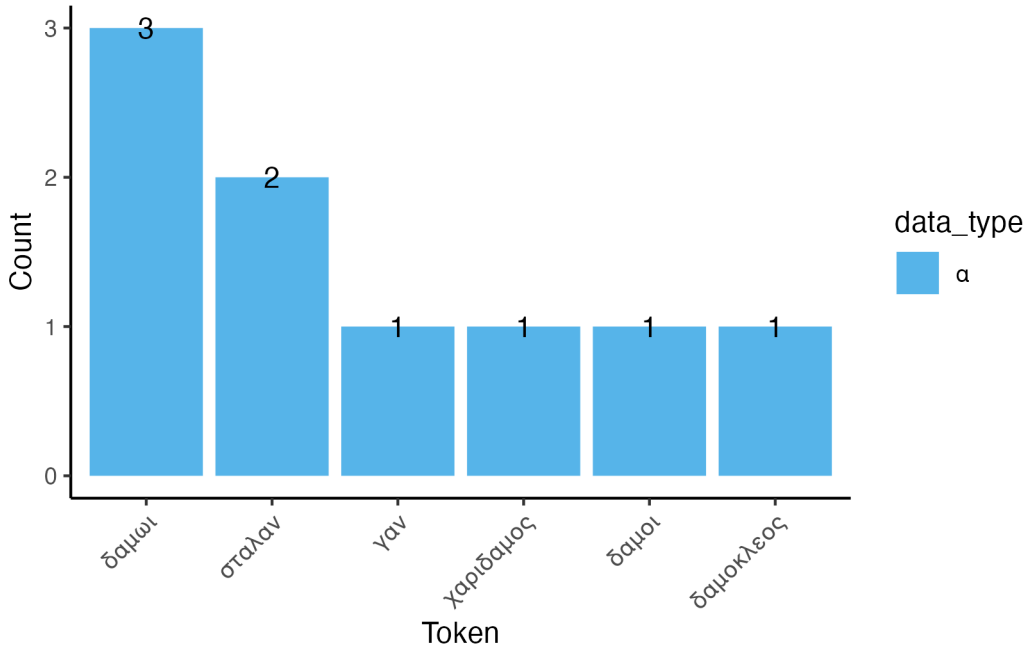
Overall, the Aigosthenian data exclusively contain the long vowel ᾱ in the targeted root and ending segments, suggesting general retention in the city. To corroborate this, the author performed Fisher's exact test on the Athenian and Aigosthenain data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Aigosthenian data of the 3rd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Aigosthenian data of the 3rd cent. BCE.

The test resulted in a p-value of 4.867 x 10^{-10} Therefore, the author rejects the null hypothesis and asserts that the distribution of data types between tokens from Athens and Aigosthena relates to the city of origin for an inscription. As such, per the collected data, Aigosthena belonged to the Megarian side of the η/ᾱ isogloss during the 3rd cent. BCE.

Figure 36: Third Century BCE Aigosthenian Token Counts



Tanagra

The 18 tokens from Tanagra indicate that the city's population retained the long vowel ᾱ in root syllables and in ā-stem endings. The set includes 7 occurrences of δᾶμος and 11 of γᾶ, demonstrating the retention in both contexts.

First, δᾶμος appears in the dative singular δάμοι (n=4), the dative monophthongized δάμυ (n=2), and the genitive proper noun Δαμοφίλω 'Friend of the Deme' (n=1). In each instance, the root contains the inherited long vowel ᾱ, suggesting general conservation in root syllables. Furthermore, the list contains 6 instances of the genitive singular γᾶς and 5 of the accusative γᾶν, suggesting the same conservation in ā-stem endings. To corroborate this, the author performed Fisher's exact test on the Athenian and Tanagran data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 3rd cent. BCE.

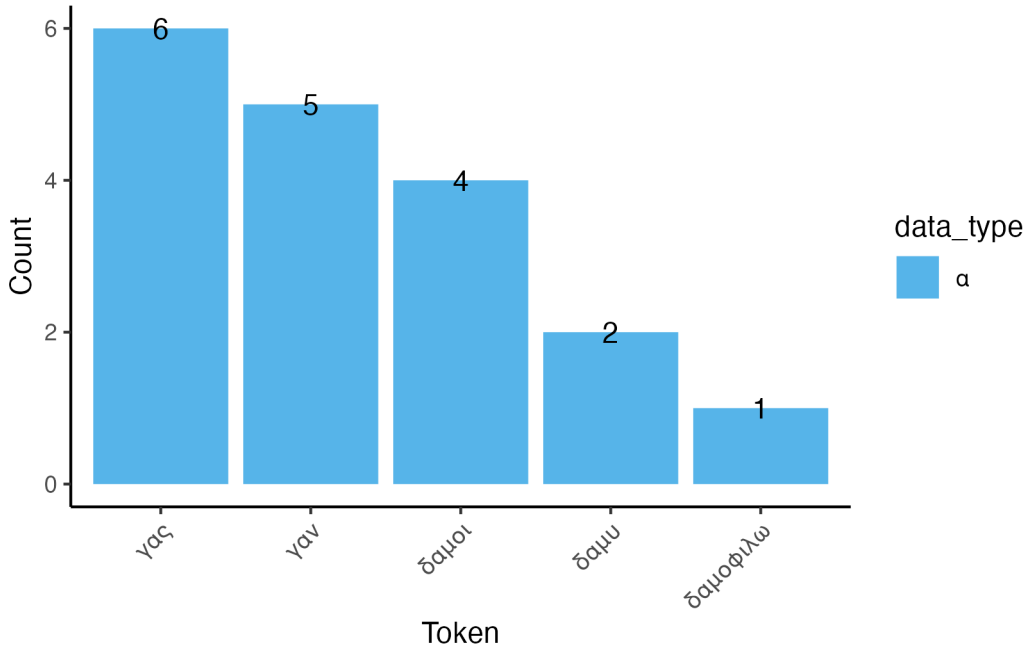
HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Tanagran data of the 3rd cent. BCE.

The test returned a *p*-value of 2.222 x 10^{-15}. Therefore, the author rejects the null hypothesis and asserts that the distribution of η-type and ᾱ-type tokens between Athens and Tanagra relates to the origins of the inscriptions collected. Following this, the data indicate that Tanagra belonged on the Megarian side of the η/ᾱ isogloss during the 3rd cent. BCE.

2nd cent. BCE

The data for the 2nd cent. BCE shows that the isogloss line remained stable in dividing Attica and Oropia from Megaris and the rest of Boiotia. The set contains 127 tokens from 5 cities: Athens (n=57), Oropos (n=31), Eleusis (n=22), Megara (n=13), and Aigosthena

Figure 37: Third Century BCE Tanagran Token Counts



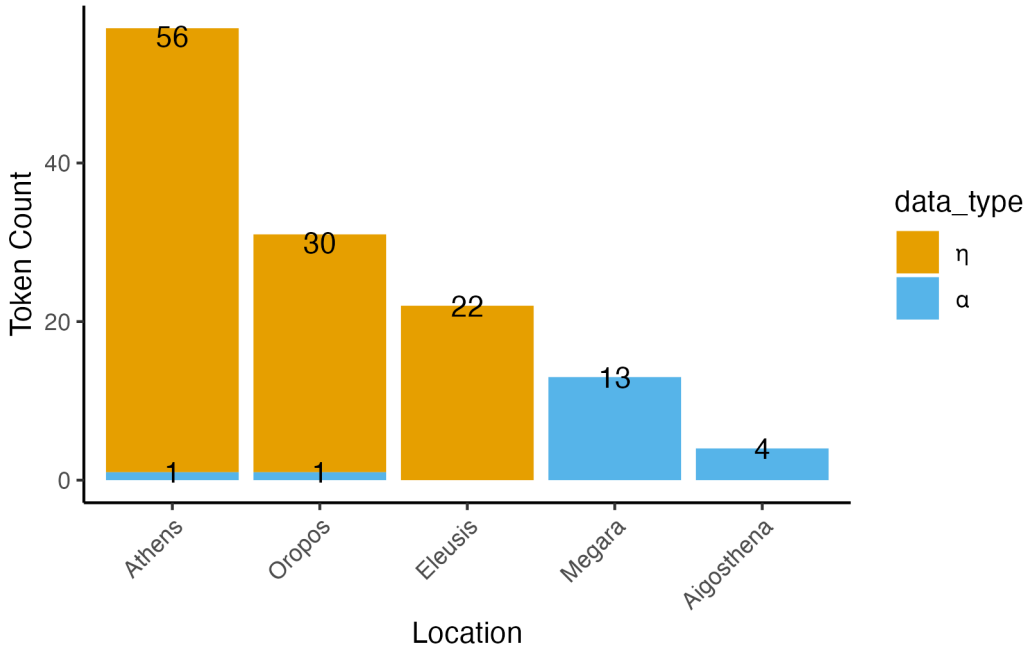
(n=4). The η- and ᾱ-type tokens divide with near exclusivity across the isogloss line, with only 3 ᾱ-type tokens appearing on the η side.

Athens

First, the 57 Athenian tokens indicate a general preference for the raised vowel η in both root syllables, as seen in forms of δῆμος and στήλη, as well as ā-stem endings, evidenced by forms of βουλή and γῆ.

The set from Athens contains 36 η-type instances of δῆμος and στήλη, which together show near exclusive use of the raised vowel. These include 13 instances of the genitive singular δήμου, 6 of the dative δήμωι and 4 of the accusative δῆμον alongside 5 of the genitive στήλης and 2 of the accusative στήλην. Although 1 ᾱ-type token appears in the set, it does not constitute sufficient evidence for a broader Athenian dialectal feature.

Figure 38: Second Century BCE Token Counts by City



The proper noun Δαμόκριτος 'Chosen One of the Deme' occurs in IG II^2 913 (PH# 3,133) and contains the low root vowel ᾱ. The name appears without any following patronym or epithet, denying us the ability to definitively classify the individual as a visitor, a resident expatriate, or even a native Athenian born to immigrant parents. Nevertheless, the form Δαμ- directly contradicts the remaining text, which elsewhere shows δῆμος (n=3) with the raised vowel. The genitive singular δήμου occurs twice, along with the name Δημοφάνης. While Δημοφάνης 'Image of the Deme' faces the same evidentiary issues as Δαμόκριτος, that the majority of δημ- tokens prefer the raised vowel over the low vowel suggests the author generally accepted the Attic-Ionic vowel shift. As such, the likelihood remains low that the low vowel in Δαμόκριτος represents a feature of the author's dialect.

Additionally, the data indicate the continued preference for the raised vowel in ā-stem endings. The set includes 20 instances of βουλή in 3 cases: 11 of the nominative βουλή, 7 of

the genitive βουλῆς, and 2 of the dative βουλῆι. The set contains no ᾱ-type ā-stem endings, showing a general retention of the raised vowel η.

Overall, the data contains only 1 ᾱ-type token against 56 η-types. The ᾱ-type token contradicts the general preference for η-types in the same inscription, suggesting a foreign affectation. With no inscriptions containing exclusively ᾱ-type data, the set indicates the continued preference for the raised vowel η over the low vowel ᾱ in Athens during the 2nd cent. BCE. As such, Athens remains the primary city of comparison for statistical tests.

Eleusis

The 22 Eleusinean tokens show the same preference for the raised vowel η over the low vowel ᾱ, both in the root syllables of δῆμος and στήλη, as well as the ā-stem endings of βουλή.

The data contain 17 occurrences δῆμος (n=14) and στήλη (n=3). Among these are 2 instances each of the genitive singular δήμου, the nominative δῆμος, and the proper noun Δήμαρχος 'Leader of the Deme.' In addition, the set includes 2 instances of the genitive singular στήλης and 1 of the accusative plural στήλας. These stems exclusively contain the raised vowel, indicating its retention in root syllables.

Furthermore, forms of βουλή appear 5 times in the set. This includes 2 instances of the nominative singular βουλή, 2 of the genitive βουλής, and 1 of the accusative βουλήν. These forms contain only the raised vowel, indicating its retention in ā-stem endings.

Finally, the data contain no Eleusinean ᾱ-type tokens. Therefore, they indicate a continued acceptance of the raised vowel η in the 2nd cent. BCE.

Oropos

The 31 Oropian tokens show a majority acceptance of the raised vowel η in both root syllables and ā-stem endings. Besides the majority of η-type occurrences of δῆμος and γῆ, the set

Figure 39: Second Century BCE Athenian Token Counts

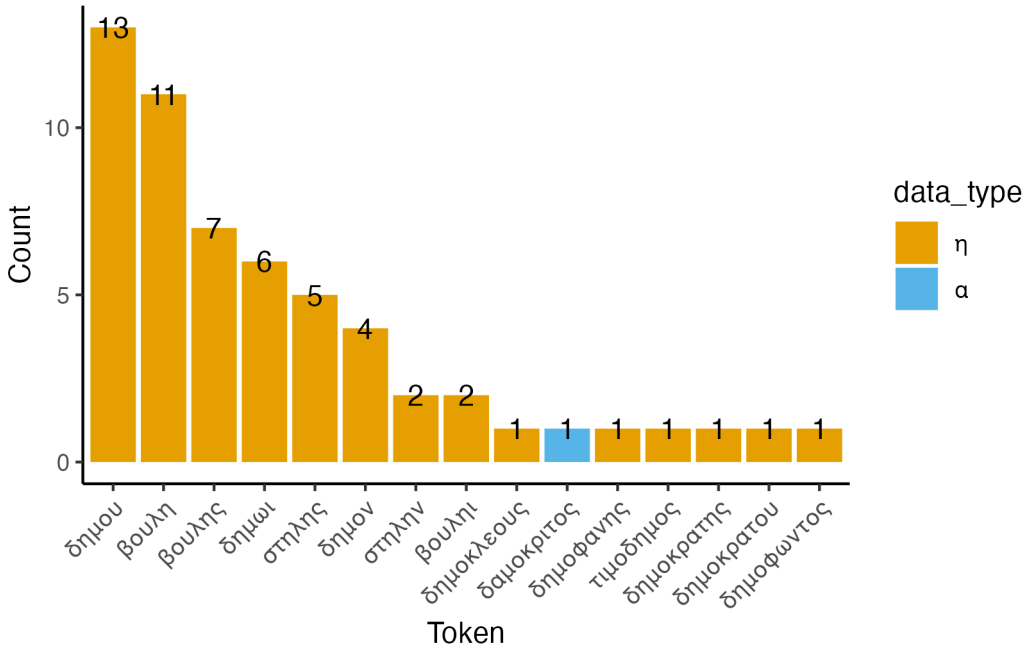
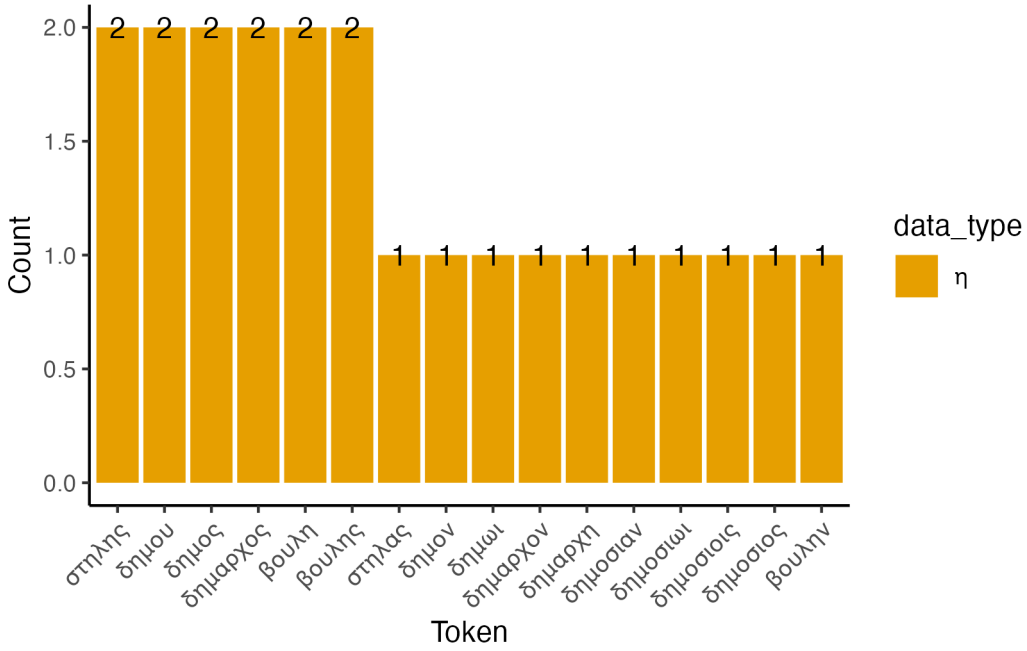


Figure 40: Second Century BCE Eleusinean Token Counts



contains 1 ᾱ-type token. However, this instance does not sufficiently evidence a general dialectal feature of the city.

The η-type tokens comprise 1 instance of the genitive singular γῆς along with 29 η-type occurrences of δῆμος. For example, the accusative singular δῆμον appears 7 times and the dative δήμωι 5 times, along with 3 instances of the genitive Ἀλεξιδήμου 'Defender of the Deme,' 2 of Εὐθυδήμου 'Whose Deme is Honest,' and another 2 of Δημογένου 'Kin of the Deme.' However, δᾶμος occurs once in the set in the proper noun Δαμάρχου from IG VII 3,498 (PH# 147,019), raising the possibility that it reflects a local dialectal variant. The text contains an inventory of silver dedications given to the sanctuary at Amphiaraos, such as ln. 14 σκάφιον Δημάρχου ϙ ζ '96 bowl(s) from Demarchos' and ln. 24 ἄλλος Δημαινέτου ρ '90 other (cups) from Demainetos.' As part of the formulaic opening, Δαμάρχου appears as a patronym in the phrase ἱεραρχούντων Ἱερoκλέους τοῦ Δαμάρχου ... 'during the high-priesthood of Hierokles son of Damarchos ...' This does not necessarily require that δᾶμος appeared in a local dialect; however, it places the ᾱ-type token within 1 generation of a standing Oropian religious official. As such, its appearance warrants further testing. In order to determine to what degree this form suggests local dialectal variation, the author performed Fisher's exact test on the Athenian and Oropian data with the following hypotheses:

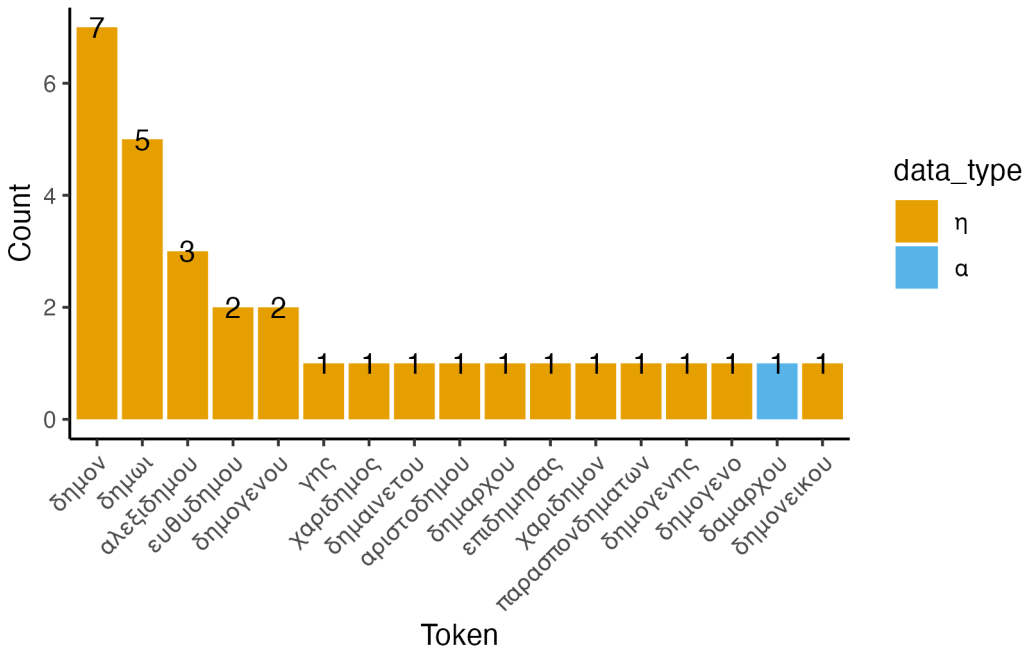
H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Oropian data of the 2nd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Oropian data of the 2nd cent. BCE.

The test resulted in a p-value of 1, indicating that the distribution of collected ᾱ-type and η-type tokens between Athens and Oropos does not relate to an inscription's city of origin. As such, the author fails to reject the null hypothesis and asserts that form Δαμάρχου does not sufficiently evidence a local dialect by its mere presence among the Oropian data.

Therefore, with no other ᾱ-type tokens collected, the data indicates that Oropos belonged on the Athenian side of the η/ᾱ isogloss line during the 2nd cent. BCE.

Figure 41: Second Century BCE Oropian Token Counts



Megara

The 13 Megarian tokens point to continued retention of the low vowel ᾱ in roots, via forms of δᾶμος (n=9) and στάλᾱ (n=2), as well as in ᾱ-stem endings, as seen in declensions of γᾶ (n=1) and βουλᾱ́ (n=1).

The set comprises 11 ᾱ-type occurrences of δᾶμος and στάλᾱ. These include 3 instances of the accusative singular δᾶμαν, 2 of the nominative δᾶμος, and 2 instances of the accusative singular στάλαν. Furthermore, the scraper did not collect any η-type occurrences of δῆμος or στήλη, indicating total retention of the low vowel ᾱ in roots. Additionally, the set contains 1 instance of each of the accusative singulars γᾶν and βουλᾱ́ν, suggesting the same retention in ᾱ-stem endings. The unanimity of ᾱ-type data in Megara compared to the vast majority of η-type data in Athens suggests a relationship between an inscription's city of origin and

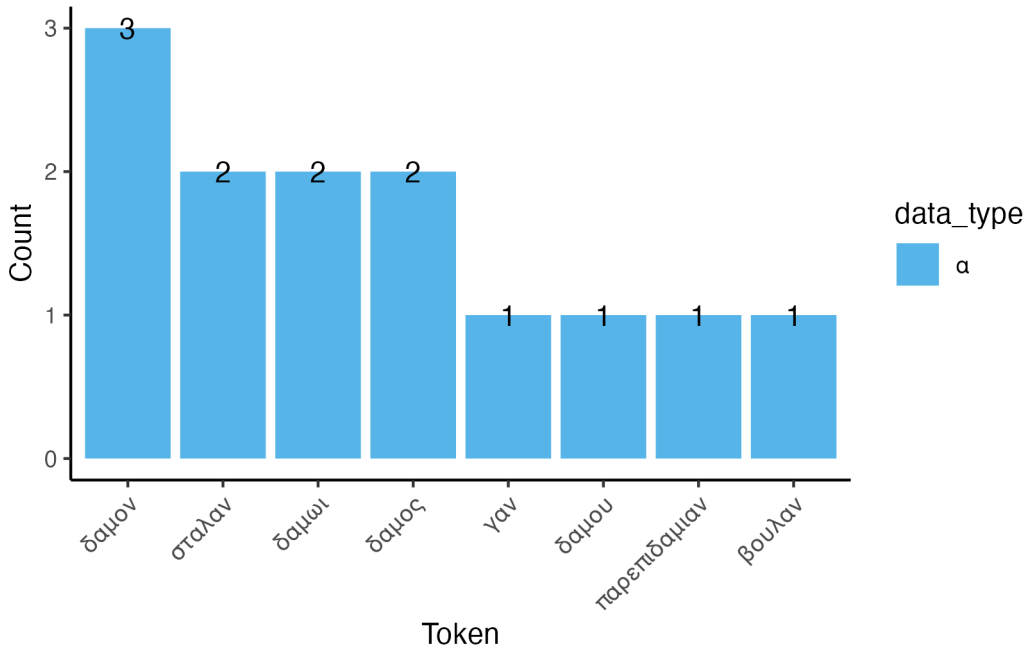
the type of tokens found therein. To test for a relationship between a token's origin and its data type, the author performed Fisher's exact test on the Athenian and Oropian data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Megarian data of the 2nd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Megarian data of the 2nd cent. BCE.

The test resulted in a p-value of 2.949 x 10^{-13}. Therefore, the author rejects the null hypothesis and asserts that the distribution of η-type and ᾱ-type tokens between Athens and Megara relates to the origins of the inscriptions collected. Accordingly, the data indicate that Megara belonged on the ᾱ side of the η/ᾱ isogloss line during the 2nd cent. BCE.

Figure 42: Second Century BCE Megarian Token Counts



Aigosthena

Finally, the 4 tokens from Aigosthena strongly suggest that the city retained the low vowel ᾱ in all positions. This set comprises 2 instances of the dative singular δάμωι, 1 of the accusative δᾶμον, and 1 of the genitive singular γᾶς. Furthermore, the lack of any η-type tokens, when compared to the majority of η-type tokens in Athens, suggests that an inscription's city of origin relates to the data type found therein.

To test for this relationship, the author performed Fisher's exact test on the Athenian and Oropian data with the following hypotheses:

H0 There is no relationship between the variables `location` and `data_type` in the combined Athenian and Aigosthenian data of the 2nd cent. BCE.

HA There is a relationship between the variables `location` and `data_type` in the combined Athenian and Aigosthenian data of the 2nd cent. BCE.

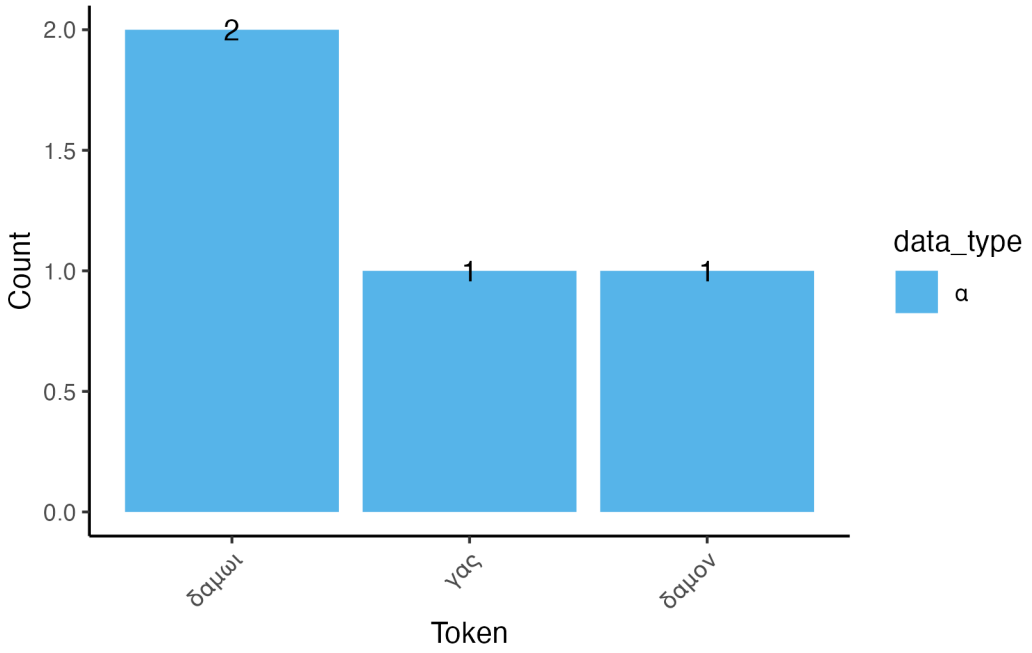
The test returned a *p*-value of 9.581 x 10^{-06}. Therefore, the author rejects the null hypothesis and asserts that the distribution of η-type and ᾱ-type tokens between Athens and Aigosthena relates to the origins of the inscriptions collected. Following this, the data collected indicate that Aigosthena belonged on the Megarian side of the η/ᾱ isogloss line during the 2nd cent. BCE.

Interpretations

Overall, the data present a stable isogloss line between the 4th and 2nd cents. BCE. However, evidentiary issues make it challenging to place Pagai, Aigosthena, and Tanagra with any exactness.

The 3rd cent. somewhat alleviates this problem for Pagai and Aigosthena. This century's data set contains observations from all 7 target cities, thereby distinguishing Eleusis, Athens,

Figure 43: Second Century BCE Aigosthenian Token Counts



and Oropos from the rest of central Greece. Given the similarities to the οι/υ isogloss – where the 3rd cent. also included evidence from every city, while the 4th lacked data from Aigosthena and Pagai, and where the Pagaian and Aigosthenian data corresponded with the Megarian data as available – the author has tentatively placed the two cities on the ᾱ side of the η/ᾱ isogloss line during the 4th and 2nd cents. BCE, with the corresponding segments drawn with a dashed line.

However, Tanagra in the 2nd cent. BCE presents further difficulties. In addition to the lack of any inscriptional evidence, this city is the only Boiotian settlement in this study, impeding any efforts to hypothesize on the local dialect's features based on contemporary data. For comparison, Pagai and Aigosthena were historically under the control of Megara, and so the persistence of Megarian Greek features in their local dialects (e.g., nominative articles in τοί without monophthongization of οι to υ, retention of the long low vowel ᾱ) indicates a shared Doric vernacular. As a result, the Megarian data can provide some insight into

the dialect of these cities when their inscriptions do not appear in the data set. However, though Oropos was within the same geographic region, and though it was separated from Athens by Mt. Parnes to the south, the collected data show a majority Attic-Ionic dialect spoken throughout the city between the 4th and 2nd cents. BCE. Given that no other city's population appeared to speak a Boiotian variety, the 2nd cent. data does not enable any cross-city comparison with Tanagra. Therefore, the placement of this city during the 2nd cent. BCE relies entirely on data from the 3rd and 4th cents., which suggest local retention of the long low vowel ᾱ. The line has been drawn accordingly, with the hypothetical boundaries marked off with a dashed line.

Figure 44: Fourth Century BCE Isogloss Line

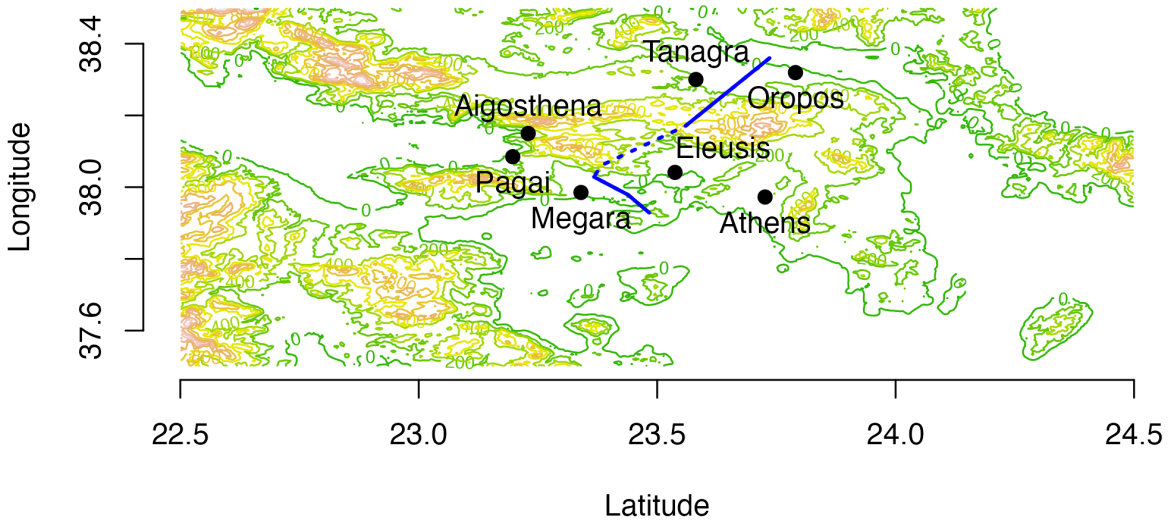


Figure 45: Third Century BCE Isogloss Line

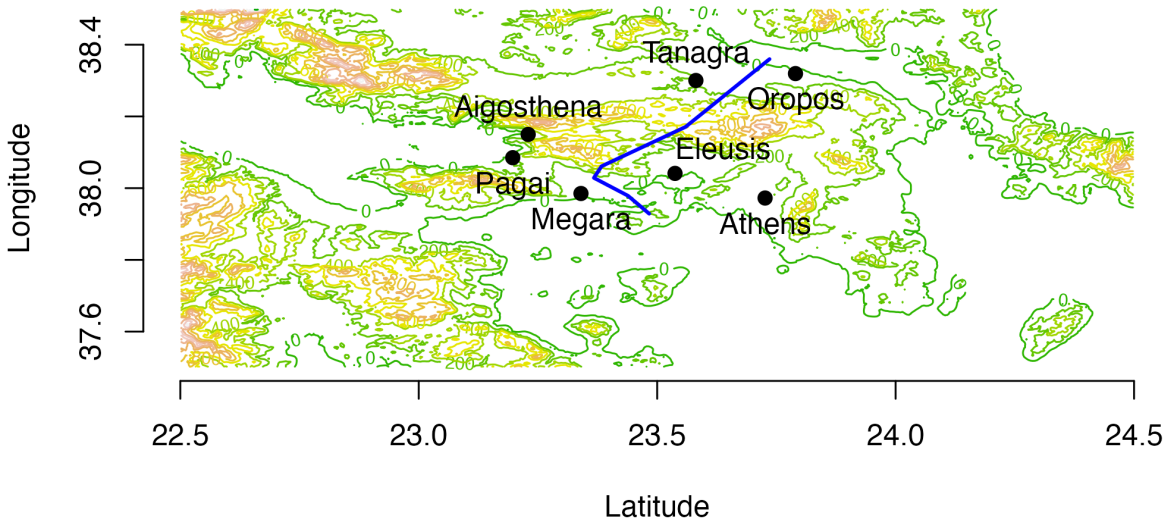
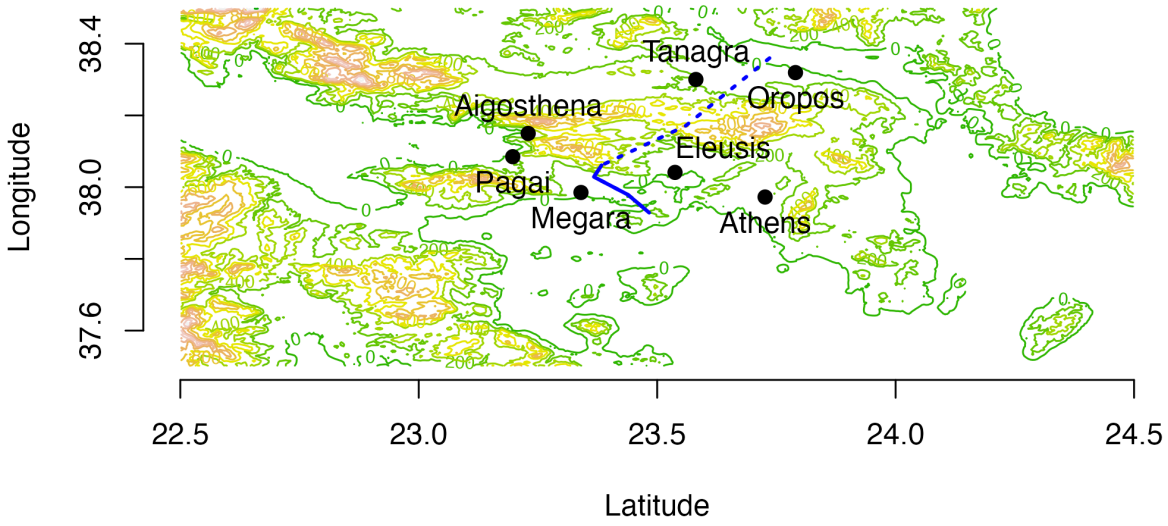


Figure 46: Second Century BCE Isogloss Line



Conclusions

As a whole, the data indicate a general stability to the οι/υ and η/ᾱ isoglosses between the 4th and 2nd centuries BCE. The evidence suggests that Tanagrans had largely monophthongized οι into υ by the 4th cent., then retained that feature through the 2nd. This change does not appear to a statistically significant degree in any of the other cities included in this survey, as shown through the use of Fisher's exact test whenever applicable. Therefore, the data characterizes the οι > υ monophthongization as a uniquely Boiotian feature within the region and periods of interest, largely in keeping with Dosuna's description of the dialect.[48]

The evidence also establishes the geographical extent of the Attic-Ionic ᾱ > η vowel shift on the mainland of central Greece. The shift stopped after Eleusis, never making gains throughout the Doric-speaking cities of Megara, Pagai, or Aigosthena. However, the shift did spread into Boiotia as far as Oropos. The data shows that the majority of Oropians not only resisted the οι > υ monophthongization but also accepted the ᾱ > η raising as far back as, or possibly before, the 4th cent. BCE, despite the city's membership in the Boiotian League – an association explicitly mentioned in 26 separate 3rd cent. Oropian inscriptions via the phrase κοινῶι Βοιωτῶν 'in/for the League of the Boiotians.' Nevertheless, the shift stopped with Oropos, with no evidence suggesting that it spread to Tanagra during the periods of interest. These findings agree with Panayotou's description of the dialect.[49]

[48]Dosuna, "The Aeolic Dialects," 469.

[49]A. Panayotou, "Ionic and Attic," in *A History of Ancient Greek from the Beginnings to Late Antiquity*, ed. A.-F. Christidis, trans. Chris Markham, 4th ed., vol. 1 (Cambridge, UK: Cambridge University Press, 2015), 410.

However, though these results are encouraging, the selection method for exemplary inscriptions lacked rigor. In order to ensure that the phonological context of a target segment remained intact, the author searched for evidence of a change within its environment: rather than testing any instance of η against any instance of ᾱ, the author built the data sets around complete words such as δᾶμος 'deme' or βουλή 'council.' To facilitate this, the author compiled a set of exemplary tokens appearing in a "non-Attic" form within the DGE, selecting for frequency under the assumption that they would remain proportionally common within the test data. Yet, given the strict measures taken when compiling the test data, as well as the heavy fragmentation of the collected inscriptions, the final subsets used for the inter-city tests were much smaller than anticipated. In addition to this, in selecting primarily for frequency, the author excluded usable data such as the o-stem endings in τοῖς ἄλλοις πρόξενοις 'for the other public friends' from DGE 161 = IG VII 208 and the ā-stem endings in ἀγαθᾶι τύχαι 'to good fortune' from DGE 154 = IG VII 1. Therefore, follow-up surveys should apply a more systematic method for determining which tokens to collect for testing. To use the singular ā-stem endings again: the ᾱ-type and η-type endings can be translated into Regular Expression as `[ηα][ςσιν]{0,1}$` then appended onto any stem. For example, searching for `^αγαθ[ηα][ςσιν]{0,1}$` would then return every instance of the noun ἀγαθή/ἀγαθά in the singular, regardless of case, while performing a more general search for `^w*[ηα][ςσιν]{0,1}$` would return any singular ā-stem noun in the corpus. The resulting data set would be more comprehensive, thereby better representing the evidence and improving the statistical power of the tests performed.

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Scraper.R

```
### PACKAGES ------------------------------------------------------
library(dplyr)    # . For %>%, filter(), etc
library(stringr)  # . For str_detect()
library(rvest)    # . Web Scraping Tools
library(ggplot2)  # . Data visualization
library(progress) # . For progress bars
library(stringi)  # . For getting UTF8 codes out of char.'s
library(tidytext) # . For unnest_tokens() and other text manipulation
library(readr)    # . For read_csv()


### DEFINING COMPONENTS FOR Scrape() ---------------------------------


# Make page object from PHI link
# Link generated iteratively with static base + PHI number
MakePage <- function(phi_no) {
  link <-
    paste('https://inscriptions.packhum.org/text/', phi_no, sep = "")
  page <- read_html(link)
  return(page)
```

```
}


# Read main body of text out of page
ReadText <- function(page) {
  text <-
    page %>% html_nodes('div.greek.text-nowrap.dblclk') %>% html_text()
  return(text)
}


# Clean text of editorial marks
CleanText <- function(text) {
  #text <- gsub("[\\d\\[\\]]", "", text, perl = T)


  # Removes numbers except for those in Oropus cross-listings
  text <- gsub("(?<!Oropou, no\\. )(\\d+)(?!(\\.|\\d))", "", text, perl = T)


  # Remove reconstructed writing in square brackets [ ]
  # First, capture any writing between closed brackets
  # (?<=\\[)  : Look behind for an opening square bracket
  # [^\\[\\]\\n] : Capture any character except for a square bracket or
  # a line break (necessary so that the line does not capture fragmented
  # text on the edge of the inscription medium)
  # +         : Do so for one or more character(s)
  # (?=\\])   : Look ahead for a closing square bracket
  text <- gsub("(?<=\\[)[^\\[\\]\\n]+(?=\\])", "...", text, perl = T)
```

```r
# Second, capture any writing at the end of a line after opening [
text <- gsub("(?<=\\[)[^\\[\\]\\n]+", "...", text, perl = T)

# Finally, any writing at the beginning of a line before closing ]
text <- gsub("[^\\[\\]\\n]+(?=\\])", "...", text, perl = T)



# Removes angled brackets
text <- gsub("[<>]", "", text, perl = T)

# Removes dashes followed by a new line
# IE correct words split across two lines
text <- gsub("(\\-\\n{1,})", "", text, perl = T)

# Captures new lines, replaces with spaces
text <- gsub("\\n{1,}", " ", text, perl = T)

# Contracts multiple spaces into one space
text <- gsub("\\s{1,}", " ", text, perl = T)

# Removes combining dot below
# ̣COMBINING DOT BELOW Unicode: U+0323, UTF-8: CC A3
text <- gsub("̣", "", text, perl = T)

# Removes #
text <- gsub("#", "", text, perl = T)
```

```
# Swaps the plank constant for "heta" (just h)
# ℎ PLANCK CONSTANT Unicode: U+210E, UTF-8: E2 84 8E
text <- gsub("ℎ", "h", text, perl = T)


# Alpha Upper
text <- gsub("(Ἀ|Ἁ|Ἂ|Ἃ|Ἄ|Ἅ|Ἆ|Ἇ|ᾈ|ᾉ|ᾊ|ᾋ|ᾌ|ᾍ|ᾎ|ᾏ|Ᾰ|Ᾱ|Ὰ|Ά|ᾼ|A)",
             "A",
             text,
             ignore.case = F)
# Alpha Lower
text <- gsub("(ἀ|ἁ|ἂ|ἃ|ἄ|ἅ|ἆ|ἇ|ᾀ|ᾁ|ᾂ|ᾃ|ᾄ|ᾅ|ᾆ|ᾇ|ᾰ|ᾱ|ὰ|ά|ᾳ|ᾴ|ᾶ|ᾷ|α)",
             "α",
             text,
             ignore.case = F)
# Eta Upper
text <- gsub("(Ἠ|Ἡ|Ἢ|Ἣ|Ἤ|Ἥ|Ἦ|Ἧ|ᾘ|ᾙ|ᾚ|ᾛ|ᾜ|ᾝ|ᾞ|ᾟ|Ὴ|Ή|ῌ|Η)",
             "Η",
             text,
             ignore.case = F)
# Eta Lower
text <- gsub("(ἠ|ἡ|ἢ|ἣ|ἤ|ἥ|ἦ|ἧ|ᾐ|ᾑ|ᾒ|ᾓ|ᾔ|ᾕ|ᾖ|ᾗ|ὴ|ή|ῂ|ῃ|ῄ|ῆ|ῇ|η)",
             "η",
             text,
             ignore.case = F)
#Iota Upper
```

```
text <- gsub("(Ἰ|Ἱ|Ί|Ὶ|Ἴ|Ἲ|Ἶ|Ἵ|Ἳ|Ἷ|Ί)",
             "Ι",
             text,
             ignore.case = F)
# Iota Lower
text <- gsub("(ἰ|ἱ|ί|ὶ|ῖ|ἴ|ἲ|ἶ|ἵ|ἳ|ἷ|ί)",
             "ι",
             text,
             ignore.case = F)
# Iota Diaeresis Upper
text <- gsub("(Ϊ)",
             "Ι",
             text,
             ignore.case = F)
# Iota Diaeresis Lower
text <- gsub("(ϊ|ΐ|ῒ|ΐ)",
             "ι",
             text,
             ignore.case = F)
# Omega Upper
text <- gsub("(Ὠ|Ὡ|Ώ|Ὼ|Ὤ|Ὢ|Ὦ|Ὥ|Ὣ|Ὧ|ῼ|ᾬ|ᾮ|ᾨ|Ώ)",
             "Ω",
             text,
             ignore.case = F)
# Omega Lower
text <- gsub("(ὠ|ὡ|ώ|ὼ|ῶ|ὤ|ὢ|ὦ|ὥ|ὣ|ὧ|ῳ|ῷ|ᾤ|ᾦ|ᾠ|ῴ|ώ)",
```

```
              "ω",
              text,
              ignore.case = F)
# Upsilon Upper
text <- gsub("(Ὑ|Ύ|Ὺ|Ὕ|Ὓ|Ὗ)",
              "Υ",
              text,
              ignore.case = F)
# Upsilon Lower
text <- gsub("(ὐ|ὑ|ύ|ὺ|ῦ|ὔ|ὒ|ὖ|ὕ|ὓ|ὗ)",
              "υ",
              text,
              ignore.case = F)
# Upsilon Diaeresis Upper
text <- gsub("(Ϋ|Ύ|Ϋ)",
              "Υ",
              text,
              ignore.case = F)
# Upsilon Diaeresis Lower
text <- gsub("(ΰ|ῢ|ϋ|ύ|ϋ)",
              "υ",
              text,
              ignore.case = F)
# Epsilon Upper
text <- gsub("(Ἐ|Ἑ|Έ|Ὲ|Ἔ|Ἒ|Ἕ|Ἓ|Έ)",
              "Ε",
              text,
              ignore.case = F)
```

```
            text,
            ignore.case = F)
# Epsilon Lower
text <- gsub("(ἐ|ἑ|έ|ὲ|ἔ|ἓ|ἕ|ἒ|έ)",
            "ε",
            text,
            ignore.case = F)
# Omicron Upper
text <- gsub("(Ὸ|Ὁ|Ό|Ὸ|Ὂ|Ὃ|Ὅ|Ὃ|Ό)",
            "O",
            text,
            ignore.case = F)
# Omicron Lower
text <- gsub("(ὀ|ὁ|ό|ὸ|ὅ|ὃ|ὅ|ὃ|ό)",
            "o",
            text,
            ignore.case = F)
# Rho Upper
text <- gsub("(Ῥ)",
            "P",
            text,
            ignore.case = F)
# Rho Lower
text <- gsub("(ῤ|ῥ)",
            "ρ",
            text,
```

```
                ignore.case = F)
  return(text)
}


# Read IG book out of page
ReadBook <- function(page) {
  ig_book <- page %>% html_nodes("span.fullref > a") %>% html_text()
  ig_book <- gsub("\\n", "", ig_book)
  return(ig_book)
}


# Read inscription number within IG book out of page
ReadNo <- function(page) {
  ig_no <- page %>% html_nodes("span.fullref > span") %>% html_text()
  #ig_no < gsub("\\n", "", ig_no)
  return(ig_no)
}


# Read remaining header data out of page
ReadHeader <- function(page) {
  header <- page %>% html_nodes('div.tildeinfo.light') %>% html_text()
  return(header)
}


# Clean header of editorial marks
## UPDATE NEEDED: SOME SUBSTITUTIONS FIT BETTER IN CleanDates
```

```r
CleanHeader <- function(header) {
  header <- gsub("[\\[\\]]", "", header, perl = T)
  header <- gsub("(\\-\\n{1,})", "", header, perl = T)
  header <- gsub("\\n{1,}", " ", header, perl = T)
  header <- gsub("\\s{1,}", " ", header, perl = T)
  # ̣COMBINING DOT BELOW Unicode: U+0323, UTF-8: CC A3
  header <- gsub("̣", "", header, perl = T)
  header <- gsub("#", "", header, perl = T)
  # ℎ PLANCK CONSTANT Unicode: U+210E, UTF-8: E2 84 8E
  header <- gsub("ℎ", "h", header, perl = T)
  # Remove question marks
  header <- gsub("\\?", "", header, perl = T)

  # not bef. > after
  header <- gsub("not bef.", "after", header, perl = T)

  # remove stoichedon data! It's interfering with the dates
  header <-
    gsub("(quasi-|non-|)stoich. \\d+-\\d+", "", header, perl = T)
  header <- gsub("(quasi-|non-|)stoich. \\d+", "", header, perl = T)
  return(header)
}

# Convert Roman Numerals into a format readable by TranslateCentury()
TranslateRomanNumeral <- function(header) {
  # Expand abbreviation "s." to "saeculum"
```

```
header <- gsub(
  "s\\.(?=\\s{1}(I|V))",
  "saeculum",
  header,
  ignore.case=FALSE,
  perl=TRUE
)

# Swap Latin abbreviation "med." to English "mid"
header <- gsub(
  "med\\.",
  "mid",
  header,
  ignore.case=FALSE,
  perl=TRUE
)

# Extract Roman Numeral after "saeculum" and before "a."
# UPDATE SEP 10: PUT \\w{1,4} IN CAPTURE GROUP
R <- str_extract(
  header,
  "(?<=saeculum\\s{1})(\\w{1,4})(?=\\s{1}a\\.)"
)

# Translate Roman Numeral to Arabic Numeral
N <- as.roman(R) %>% as.numeric()
```

```
# Substitute original Roman Numeral with new Arabic Numeral `N`
header <- gsub(
  "(?<=saeculum\\s{1})(\\w{1,4})(?=\\s{1}a\\.)",
  N,
  header,
  ignore.case=FALSE,
  perl=TRUE
)

# Translate "saeculum N a." to "nth c. a."
# First three lines for specific suffixes 'st, 'nd, and 'rd
# as used after 1, 2, and 3

# 1st c. a.
header <- gsub(
  "saeculum 1 a.",
  "1st c. a.",
  header)

# 2nd c. a.
header <- gsub(
  "saeculum 2 a.",
  "2nd c. a.",
  header)
```

```
  # 3rd c. a.
  header <- gsub(
    "saeculum 3 a.",
    "3rd c. a.",
    header)

  # Nth. c. a.
  header <- gsub(
    "saeculum (\\d{1}) a.",
    "\\1th c. a.",
    header)

  return(header)
}

# Translate century format to date format
TranslateCentury <- function(header) {
  if (grepl("(\\d+)(?=\\w{2} c\\.)", header, perl = T)) {
    cen_start <- str_extract(header, "(\\d+)(?=\\w{2} c\\.)")
    cen_start <- paste(cen_start, "00", sep = "") %>%
      as.integer()

    cen_end <- cen_start - 99

    if (grepl("(?<=early )(\\d+)(?=\\w{2} c\\.)", header, perl = T)) {
      header <-
```

```
    gsub("(?>early|mid|late) (\\d+)(?>\\w{2} c\\.)",
         cen_start,
         header,
         perl = T)
  return(header)
} else if (grepl("(?<=late )(\\d+)(?=\\w{2} c\\.)", header, perl = T)) {
  cen_start <- cen_start - 99
  header <-
    gsub("(?>early|mid|late) (\\d+)(?>\\w{2} c\\.)",
         cen_start,
         header,
         perl = T)
  return(header)
  #return(cen_start)
} else if (grepl("(?<=mid )(\\d+)(?=\\w{2} c\\.)", header, perl = T)) {
  cen_start <- cen_start - 50
  header <-
    gsub("(?>early|mid|late) (\\d+)(?>\\w{2} c\\.)",
         cen_start,
         header,
         perl = T)
  return(header)
  #return(cen_start)
} else {
  cen <- paste(cen_start, cen_end, sep = "-")
  header <- gsub("(\\d+)(?>\\w{2} c\\.)", cen, header, perl = T)
```

```
      return(header)
    }
  } else {
    return(header)
  }

}

# Standardize date format
CleanDates <- function(header) {
  header <- gsub("ante",
                 "before",
                 header,
                 ignore.case = T,
                 perl = T)
  header <- gsub("post",
                 "after",
                 header,
                 ignore.case = T,
                 perl = T)

  # Standardize c. and ca.
  header <-
    gsub("\\s{1}c\\.",
         " ca\\.",
         header,
```

```
        ignore.case = T,
        perl = T)

# Standardize a. "ante (Christum natum)" to BC
header <-
  gsub("\\s{1}a\\.",
        " BC",
        header,
        ignore.case = T,
        perl = T)

# Fixing slashes (hopefully once and for all)

# DDD/DD -> DDD-DDD
header <- gsub("(\\d)(\\d)(\\d)/(\\d)(\\d)",
               "\\1\\2\\3-\\1\\4\\5",
               header,
               perl = T)

# DDD/D -> DDD-DDD
header <- gsub("(\\d)(\\d)(\\d)/(\\d)",
               "\\1\\2\\3-\\1\\2\\4",
               header,
               perl = T)

# DDD-DDD-DDD-DDD (from DDD/D-DDD/D) -> DDD-DDD
```

```
  header <- gsub("(\\d{3})-\\d{3}-\\d{3}-(\\d{3})",
                 "\\1-\\2",
                 header,
                 perl = T)

  return(header)
}


# Grab TPQ
ReadDateAfter <- function(header) {
  if (grepl("(?<![\\.\\,\\d\\(])\\d{1,3}-\\d{1,3}", header, perl = T)) {
    # DDD-DDD
    date_after <- str_extract(header, "(?<![\\.\\,\\d\\(\\;])\\d{1,3}(?=-)") #
  } else if (grepl("(?<=after )\\d+", header, perl = T)) {
    # after DDD
    date_after <- str_extract(header, "(?<=after )\\d+")
  }  else if (grepl("(?<=- )(\\d+)(?= BC)", header, perl = T)) {
    # ???
    date_after <- str_extract(header, "(?<=- )(\\d+)(?= BC)")
  } else if (grepl("(?<=— )(\\d+)(?= BC)", header, perl = T)) {
    # DDD BC
    date_after <- str_extract(header, "(?<=— )(\\d+)(?= BC)")
  } else if (grepl("(?<=ca\\. )(\\d+)(?= BC)", header, perl = T)) {
    # ca. DDD BC
    date_after <- str_extract(header, "(?<=ca\\. )(\\d+)(?= BC)")
  } else {
```

```
    date_after <- NA
  }
  return(date_after)
}


# Grab TAQ
ReadDateBefore <- function(header) {
  if (grepl("(?<![\\.\\,\\d\\)])\\d+-\\d+", header, perl = T)) {          #
    # DDD-DDD                                                             #
    date_before <- str_extract(header, "(?<=-)\\d{1,3}(?![\\.\\,\\d\\\\;)])")#
  } else if (grepl("(?<=before )\\d+", header, perl = T)) {
    # before TTT
    date_before <- str_extract(header, "(?<=before )\\d+")
  } else if (grepl("(?<=- )(\\d+)(?= BC)", header, perl = T)) {
    # ???
    date_before <- str_extract(header, "(?<=- )(\\d+)(?= BC)")
  } else if (grepl("(?<=— )(\\d+)(?= BC)", header, perl = T)) {
    # TTT BC/AD
    date_before <- str_extract(header, "(?<=— )(\\d+)(?= BC)")
  } else if (grepl("(?<=ca\\. )(\\d+)(?= BC)", header, perl = T)) {
    # ca. TTT
    date_before <- str_extract(header, "(?<=ca\\. )(\\d+)(?= BC)")
  } else {
    date_before <- NA
  }
  return(date_before)
```

```
}


# Find target cities
ReadLocation <- function(header) {
  # Cities to target for
  # Kerameikos (suburb) is added to Athens
  cities <-
  "(Megara|Pagai|Aigosthena|Oropus|Tanagra|Eleusis|Athens|Kerameikos)"


  # Expand Ath. to Athens
  header <- gsub("Ath.",
                 "Athens",
                 header,
                 ignore.case = T,
                 perl = T)


  location <- str_extract(header, cities)


  return(location)
}


# Take outputs returned from all the above and create a vector "entry"
MakeEntry <-
  function(ig_book,
           ig_no,
           phi_no,
```

```
            header,
            location,
            date_after,
            date_before,
            text) {
    entry <-
      c(ig_book,
        ig_no,
        phi_no,
        header,
        location,
        date_after,
        date_before,
        text)
    return(as.list(entry))
  }


### Scrape() ----------------------------------------------------------
Scrape <- function(phi_no = 1) {
  # Make page for scraping
  page <- MakePage(phi_no)

  # Scrape relevant data
  text <- ReadText(page)

  # Check for test length
```

```
# If text length > 0, then there is actually an inscription to use
# Otherwise, the PHI number is empty, and NAs are substituted
if (length(text) > 0) {
  text <- CleanText(text)

  # Scrape identifying materials
  ig_book <- ReadBook(page)
  ig_no <- ReadNo(page)

  # Location and Dates
  header <- ReadHeader(page)
  header <- CleanHeader(header)
  header <- TranslateRomanNumeral(header)
  header <- TranslateCentury(header)
  header <- CleanDates(header)
  date_after <- ReadDateAfter(header)
  date_before <- ReadDateBefore(header)
  location <- ReadLocation(header)

  # Fast swap for unmodified header
  header <- ReadHeader(page)

  entry <- MakeEntry(ig_book,
                     ig_no,
                     phi_no,
                     header,
```

```
                        location,
                        date_after,
                        date_before,
                        text)
  } else {
    ig_book = NA
    ig_no = NA
    phi_no = NA
    header = NA
    location = NA
    date_after = NA
    date_before = NA
    text = NA

    entry <- MakeEntry(ig_book,
                        ig_no,
                        phi_no,
                        header,
                        location,
                        date_after,
                        date_before,
                        text)
  }

  return(entry)
}
```

Selections from Schwyzer, Eduard: *Dialectorum Graecarum Exempla Epigraphica Potiora*

Tituli Megarici

DGE 155

Megaris in muro Olympiei. Lapis. III in. Proxenia. Ross BerlBer 1844, 160 sq. DI 3005. IG VII 8.

DGE 155 ἐπιδὴ Ἀγαθοκλῆς Ἀρχιδάμου [1]| Βοιώτιος εὔνους ἐὼν διατελεῖ [2]| καὶ εὐεργέτας τοῦ δάμου τοῦ [3]| Μεγαρέων, ἀγαθᾶι τύχαι δεδόχθαι τᾶι βουλᾶι καὶ τῶι δάμωι· [4]| πρόξενον αὐτὸν εἶμεγ καὶ ἐκ [5]| γόνους αὐτοῦ τᾶς πόλιος τᾶς [6]| Μεγαρέωγ κὰτ τὸν νόμον· εἶμεν [7]| δὲ αὐτῶι καὶ οἰκίας ἔμπασιν καὶ προεδρίαν ἐμ πᾶσι τοῖς ἀγῶ [8]| σιν οἷς ἁ πόλις τίθητι· ἀγγραψά [9]| τω δὲ τὸ δόγμα τόδε ὁ γραμματεὺς τοῦ δάμου ἐν στάλαι λιθί [10]| ναι καὶ ἀνθέτω εἰς τὸ Ὀλυμπιεῖον. βασιλεὺς Πασιάδας· ἐστρατά [11]| γουν Διονύσιος Πυρρίδα, Δαμέ [12]| ας Ματροκλέος, ἀντίφλιλος Σμά [13]| χου, Μνασίθεος Πασίωνος, Ἑρκίων [14]| Τέλητος· γραμματεὺς βουλᾶς καὶ δάμου Ἵππων Παγχάρεος.

Tituli Tanagraei

DGE 459

Basis quadrata marmoris caerulei. III ex. Proxeniae. Rober H 11, 97/103. DI 936/8. IG VIII 505/7. Mi 223 (3). DittOr 80 (3)

DGE 459.1 Εἰρίαο ἄρχοντος μεινὸς Δαματρίω νιομεινίη, ἐπεψάφιδδε ¹| Γυνόππαστος Ἀμινίωνος, Ἐπιχαρίδας Φύλλιος ἔλεξε, δε ²| δόχθη τοῖ δάμοι· πρόξενον εἶμεν κὴ εὐεργέταν τᾶς πόλιος ³| Ταναγρήων πέλοπα Δεξίαο Νιαπολίταν αὐτὸν κὴ ἐσγόνως, ⁴| κὴ εἶμεν αὐτοῖς γᾶς κὴ ϝυκίας ἔππασιν κὴ ἀσφάλιαν κὴ ϝισοτέλιαν [κὴ] ⁵| ἀσουλίαν κὴ πολέμω κὴ ἰράνας ἰώσας κὴ κατὰ γᾶν κὴ κατὰ θάλατταν ⁶| [κ]ὴ τᾶλλα πάντα καθάπερ τοῖς ἄλλοις προξένοις κὴ εὐεργέτης.

DGE 459.2 Ξεναρίστω ἄρχοντος μεινὸς Ἀλαλκομενίω πετράδι ἀπιόντος, ¹| ἐπεψάφιδδε Ἀχηός, Ἀπολλόδωρος Καφισίαο ἔλεξε, δεδόχθη ²| τοῖ δάμοι· πρόξενον εἶμεν κὴ εὐεργέταν τᾶς πόλιος Ταναγρήων ³| Ἀντίγονον Ἀσκλαπιάδαο Μακεδόνα αὐτὸν κὴ ἐσγόνως, κὴ εἶμ[εν] ⁴| αὐτοῖ γᾶς κὴ ϝοικίας ἔππασιν κὴ ἀσφάλιαν κὴ ἀσουλίαν κὴ πολέμω ⁵| κὴ ἰράνας ἰώσας κὴ κατὰ γᾶν κὴ κατὰ θάλατταν κὴ τᾶλλα πάντα ⁶| καθάπερ τοῖς ἄλλοις προξένοις κὴ εὐεργέτης.

DGE 459.3 Εὐξιθίω ἄρχοντος μεινὸς Δαματρίω ὀγδόη ἱσταμένω, ἐπεψάφιδδε καφισίας, ¹| Μειλίων Ἀφροδίτω ἔλεξε, δεδόχθη τὶ δάμοι· πρόξενον εἶμεν κὴ εὐεργέταν ²| τᾶς πόλιος Ταναγρήων Σωσίβιον Διοσκουρίδαο Ἀλεξανδρεῖα αὐτὸν κὴ ἐσγόν[ως] ³| κὴ εἶμεν αὐτοῖς γᾶς κὴ οἰκίας ἔππασιν κὴ ϝισοτέλιαν κὴ ἀσφάλιαν κὴ ἀσουλία[ν] ⁴| κὴ πολέμω κὴ ἰράνας ἰώσας κὴ κατὰ γᾶν κὴ κατὰ θάλατταν [κὴ] τᾶλλα πά[ντα] ⁵| καθάπερ τοῖς ἄλλοις προξένοις κὴ εὐεργέτης.

Sosibius Ptolemaei IV Philopatoris (222/205) familiaris; cf. nr. 525.

DGE 460

In eodem lapide quo nr. 457. III ex. Proxeniae. Κουμανούδης Ἀθήν. 4, 210sq. Di 951/2. IG VII 517/8. Mi 224 (2).

DGE 460.1 Ἀριστοκλίδαο ἄρχοντος μεινὸς Θουίω νευμεινίη, [1] κατὰ δὲ τὸν θιὸν Ὁμολωΐω ἑσκηδεκάτη, ἐπεψάφιδδε Ἀγάθαρ[2]χος, Εὔνοστος Μελίτωνος ἔλεξε· δεδόχθη τῦ δάμυ· πρό[3] ξενον εἶμεν κὴ εὐεργέταν τᾶς πόλιος Ταναγρήων Διω[4]νούσιον Θιοφίδιος Δαματρεῖα αὐτὸν κὴ ἐσγόνως κὴ εἶμεν [5] αὐτῦς γᾶς κὴ ϝυκίας ἔππασιν κὴ ϝισοτέλιαν κὴ [6] ἀσφάλιαν κὴ ἀσουλίαν κὴ πολέμω κὴ ἰράνας ἰώ[7]σας κὴ κατὰ γᾶν κὴ κατὰ θάλατταν, κὴ τὰ ἄλλα [8] πάντα καθάπερ τῦς ἄλλυς προξένυς κὴ εὐεργέτης.

DGE 460.2 Νικίαο ἄρχοντος μεινὸς Ἀλαλκομένου ἔκ[τη] ἀπιόντος, [1] ἐπεξάφιδδε Εὐκτείμων, Θιόπομπος Εὐνόμω ἔλεξε, δε[2] δόχθη τῦ δάμυ· προξένως εἶμεν κὴ εὐεργέτας τᾶς πόλιος [3] <ιος> Ταναγρήων Φιλοκράτην Ζωΐλω. Θηραμένην Δαματρίω, Ἀπολλοφάνην Ἀθανοδότω Ἀντιοχεῖας τῶν πὸδ Δάφνῃ, αὐτὼς [4] κὴ ἐσγόνως, κὴ εἶμεν αὐτῦς γᾶς κὴ ϝυκίας ἔππασιν κὴ [5] ϝισοτέλιαν κὴ ἀσφάλιαν κὴ ἀσουλίαν κὴ πολέμω [6] κὴ ἰράνας ἰώσας κὴ κατὰ γᾶν κὴ κατὰ θάλατταν, κὴ τὰ [7] ἄλλα πάντα καθάπερ τῦς ἄλλυς προξένυς κὴ εὐεργέτης.

Tituli Eretriae et Oropi, Styrorum, Orei

DGE 811

In Amphiaraio Oropiroum. Tabula marmoris albi. 387/77 (cf. DS)? paulo ante 338? Wilh. Lex sacra. Β Λεονάρδος EA 1885, 93/8. 1917, 231/6 (accuratissime delineavit et explicavit.) IG VII 235. Ho 3, 25. Mi 698. DS 589 ^{3}1004. DI 5339. LS 2, 65. So 57. Bu 14. Cf. v. Wilamowitz H 21, 91/115; B Keil H 25, 599/606 (de dial. Orop.; cf. nr. 449).

DGE 811 θεοί. [1] τὸν ἱερέα τοῦ Ἀμφιαράου φοιτᾶν εἰς τὸ ἱερό[2]ν, ἐπειδὰν χειμὼν παρέλθει, μέχρι ἀρότου ὥρ[3]ης, μὴ πλέον διαλείποντα ἢ τρεῖς ἡμέρας καὶ μένειν ἐν τοῖ ἱεροῖ μὴ ἔλαττον ἢ δέκα ἡμέρα

[4]ς τοῦ μηνὸς ἑκ(ά)στο̄. : καὶ ἐπαναγκάζειν τὸ ν [5]εωκόρον τοῦ τε ἱεροῦ ἐπιμελεῖσθαι κατὰ τὸ [6]ν νόμον καὶ τῶν ἀφικνε̄μένων εἰς τὸ ἱερόν. [7] ἂν δέ τις ἀδικεῖ ἐν τοῖ ἱεροῖ ξένος ἢ δημότης, ζημιούτω ὁ ἱερεὺς μέχρι πέντε δραχμέων [8] χυρίως καὶ ἐνέχυρα λαμβανέτω τοῦ ἐζημιωμ [9]ένου· ἂν δ" ἐκτίνει τὸ ἀργύριον, παρεόντος τῶ [10] ἱερέος ἐμβαλέτω εἰς τὸν θησαυρόν. ⋮ δικάζει [11]ν δὲ τὸν ἱερέα, ἄν τις ἰδίει ἀδικηθεῖ ἢ τῶν ξένων ἢ τῶν δημοτέων ἐν τοῖ ἱεροῖ, μέχρι τριῶν [12] δραχμέων, τὰ δὲ μέζονα, ἡχοῖ ἑκάστοις αἱ δίκ [13]αι ἐν τοῖς νόμοις εἰρῆται, ἐντῶθα γινέσθων [14] προσκαλεῖσθαι δὲ καὶ αὐθημερὸν περὶ τῶν ἐ [15]ν τοῖ ἱεροῖ ἀιδίων· ἂν δὲ ὁ ἀντίδικος μὴ συνχωρεῖ, εἰς τὴν ὑστέρην ἡ δίκη τελείσθω. ⋮ ἐπαρ [16]χὴν δὲ διδοῦν τὸμ μέλλοντα θεραπεύεσθαι ὑ [17]πὸ τοῦ θεοῦ μὴ ἔλαττον ἐννέ" ὀβολοὺς δοκίμου ἀργ [18]υρίου καὶ ἐμβάλλειν εἰς τὸν θησαυρὸν παρε [19]όντος τοῦ νεωκόρου. κατεύχεσθαι δὲ τῶν ἱερῶν καὶ ἐπ [20]ὶ τὸν βωμὸν ἐπιτιθεῖν, ὅταν παρεῖ, τὸν ἱερέα, [21] ὅταν δὲ μὴ παρεῖ, τὸν θύοντα, καὶ τεῖ θυσίει α [22]ὐτὸν ἑαυτοῖ κατεύχεσθαι ἕκαστον, τῶν δὲ δη [23]μορίων τὸν ἱερέα. τῶν δὲ θυομένων ἐν τοῖ ἱεροῖ πάντων τὸ δέρμα. θύειν δὲ ἐξ [24]εῖν ἅπαν ὅτι ἂν βόληται ἕκαστος· τῶν δὲ κρεῶ [25]ν μὴ εἶναι ἐκφορὴν ἔξω τοῦ τεμένεος. τοῖ δὲ [26] ἱερεῖ διδοῦν τὸς θύοντας ἀπὸ τοῦ ἱερή υ ἑκ [27]άστο̄ τὸν ὦμον, πλὴν ὅταν ἡ ἑορτὴ εἶ· τότε δὲ ἀπὸ τῶ δημορίων λαμβανέτω ὦμον ἀφ" ἑκάστου [28] τοῦ ἱερήου. ἐγκαθεύδειν δὲ τὸν δειόμενο [29]ν [30] — [31] πειθόμ [32]ενον τοῖς νόμοις. τὸ ὄνομα τοῦ ἐγκαθεύδοντος, ὅταν ἐμβάλλει τὸ ἀργύριον, γράφεσθαι τ [33]ὸν νεωκόρον καὶ αὐτοῦ καὶ τῆς πόλεος καὶ ἐκ [34]τιθεῖν ἐν τοῖ ἱεροῖ γράφοντα ἐν πετεύροι σ [35]κοπεῖν τοῖ βολομένοι. ἐν δὲ τοῖ κοιμητηρίο [36]ι καθεύδειν χωρὶς μὲν τὸς ἄνδρας, χωρὶς δὲ τὰς γυναῖκας, τοὺς μὲν ἄνδρας ἐν τοπι πρὸ ἡ [37] [ō]ς τοῦ β[ω]μοῦ, τὰς [δ]ὲ γυναῖκας ἐ τοῖ πρὸ h(ε)σπέ [38] [ρης – – τὸ κοιμ]ητήριον τοὺς ἐν [39] καθεύδοντας – – τὸν δὲ θεὸν – – –.

Omissa rasurae (vss. 6. 22. 24sq. 30. 37sq.), spatia (nihil ad rem pertinentia), reliquiae vss. 49/56. vs. 6 (α): σ in l. 8 ἀφικνε̄μ. Boeotorum more. DS, ἀφικνε(ο)μ. priores. 13 ἐμβαλέτω defendit Wilhelm ÖJ 14, 248, -(λ)λ- priores; cf. ἐμβάλωντι nr. 74, 87; ἐπιβαλὸν nr. 353 A 27sq. et alia apud Leon. 1917. 16 ἑκάστοις: generis masc.; cf. Wilhelm WienBer 179, 6, 6/8. 17 ἐντῶθα: cf. κατὰ τοῦτα nr. 808, 42. 19 ἀδικίων So. DS^3, -ιῶν priores. 22 ἐννέ" ὀβολοὺς Leon. 1917, ἐννεοβόλου priores; ἐνν. o. δοκί- in rasura. 25 κατεύχ.: κατάρχεσθαι coniecit

Stengel H 43, 464. 31 βόληται: cf. nr. 808, 31; βολόμενον est in vs. 56. 32 εἶναι sed ἐξεῖν 30sq., εἶν in tit. Olynthio DI 5285 (e. gr. A 3sq. συμμάχους εἶν ἀλλήλοισι κατὰ πάντας ἀνθρώπου[ς] | ἔτεα πεντήκοντα, B 7sq. καὶ τῶν ἄλλων ἐξαγωγὴν δὲ εἶν καὶ δι <α>|αγωγήν; 389/83[a]) in tit. Chio Delphis reperto DS[3] 402, 37 τὴν δὲ προγ]ραφὴν εἶν εἰς φυλακήν (a. 276; cf. Wilhelm WienAnz 1922, 7sq.). 46 H (i.e. hε sec. Wil.) l. Quominus tit. V saeculo addicatur, litteratura impedimento est. Wilh.

DGE 812

In Amphiario Oropium. Tabula marmoris candidi. Ante 338. Proxenia. Β Λεονάρδος EA 1891, 107sq. IG VII 4250. Mi 202. DS 124 [3]258. DI 5338.

DGE 812 θεός. [1] Δρίμων ἔλεξε· ἔδοξε [2] τεῖ ἐκκλησίει· ἀγαθεῖ τύχει, [3] Ἀμύνταν Ἀντιόχου Μακε[4]δόνα πρόξενον εἶν Ὠρωπί[5]ων καὶ εὐεργέτην· ἀτέλειαν [6] δὲ εἶν καὶ ἀσυλίαν καὶ πολέμου [7] καὶ εἰρήνης καὶ γῆς καὶ οἰκίης [8] ἔνκτησιν αὐτῶι καὶ ἐκγόνοις.

vs. 2 ἔλεξε: boeot. pro εἶπε; Oropus a. 366/38 foederis erat Boeotici (IG). 3 ἐκκλ.: deest rhotacismus sicut ἔνκτησιν vs. 9. (IG). 4 Amyntas a. 333 mortuus est (IG). 5 εἶν: cf. ad nr. 811, 32.

DGE 812[a] θεοί. [1] Σωφίλου ἱερέος, [2] Ἀντιφάνης ἔλεξεν. [3] δεδόχθαι τεῖ ἐκκλησίε[ι] Μικυθίωνα Σφαγγειλαῖο[ν] [4] εὐεργέτην ἀναγράψαι [5] Ὠρωπίων αὐτὸν καὶ ἐκγό[6]νους, εἶναι δὲ καὶ ἀσυλίη[ν] [7] καὶ ἀτέλειαν καὶ πολέμου ἐόντος καὶ εἰρήνης [8] καὶ αὐτοῖ καὶ ἐκγόνοις.

vs. 5 Σφ. i. e. Συαγγελέα (Συάγγελα Cariae oppidum, postea Θεάγγελα vocatum).