Evidence for vowel nasalization in early Greek

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Abstract

The initial syllable of Attic-Ionic ὦμος 'shoulder', ὦνος 'purchase', and κῶμος 'revelry' contained the low-mid vowel /ɔː/. However, in these words a high-mid /oː/ would normally be expected. In the present paper, it is argued that Gk. *[oː] was nasalized and subsequently lowered to *[ɔ̃ː] under certain circumstances. Nasal vowels frequently show height alternations. The long vowel system of Attic-Ionic contained both /oː/ and /ɔː/, and in languages with two mid vowel heights neutralization of mid vowels in nasal contexts is very common.

1 Introduction

In most Greek dialects, the sequences *-sR- and *-Rs- were eliminated with loss of the sibilant and compensatory lengthening (CL) of the preceding vowel.[1] In Attic-Ionic and elsewhere, in words involving *ĕ or *ŏ, the result of this process was -/eːR/- and -/oːR/-, with a high-mid vowel.[2] Compare Att.-Ion. χείρ /kʰeːr/ 'hand' < *kʰesr-, εἴληφα /eːlɛːpʰa/ 'take' (prf.) < *sesl-, οὐρά̄ /oːraː/ 'tail' < *orsā̆,

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[1] In some cases, *-rs- and *-ls- remained intact (see Batisti 2017).

[2] Unless otherwise stated, the phonemic and phonetic transcriptions of Greek words that are

κουρεύς /koːreu̯s/ 'barber' < *korseu̯s, οὔατα /oːata/ 'ears' < *ōu̯ata < *ou̯s-. The result of vowel contraction and later processes of CL was likewise /eː/ and /oː/ in Attic-Ionic, depending on the vowels involved (see Lejeune 1972: 222–223 & 260–261).[3]

Some words containing *-ms- and *-sn- go against the above generalizations. These are ὦμος /ɔːmos/ 'shoulder' (Hom.+) < late PGk. *omsos (cf. Ved. áṁsa- 'shoulder'), ὦνος/ὠνή /ɔːnos ɔːnɛː/ 'purchase, price' (Hom.+) < *u̯osnos, *u̯osnā (cf. Ved. vasná- n. 'price'), and κῶμος /kɔːmos/ 'song of praise, revelry' (h.Hom.+) < late PGk. *komsos (cf. Ved. śáṁsa- 'praise').[4] The problem with these words is that the resulting vowel is not /oː/, as one would expect, but a low-mid /ɔː/ (= ω).[5]

While all three words have reliable etymologies, it is important to examine their history more closely before we proceed. To begin with the 'shoulder' word, ὦμος is cognate with Ved. áṁsa-, Toch. B āntse, Arm. ows, Goth. amsans (acc. pl.), Lat. umerus, etc. Vedic áṁsa- goes back to *(H)omso-, with a short *ŏ-. Most of the remaining words are ambiguous with respect to vowel length, but Tocharian āntse seems to continue a preform with a long root vowel (e.g., Ringe 1984: 49). An inherited *ōmsos, with primary *ō, would regularly develop to ὦμος in Attic-Ionic.[6]

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not preceded by an asterisk reflect the pronunciation of Attic and Ionic during the archaic period (8–6 c. BCE). The term 'early Greek' refers to the Greek language approximately during the second millennium BCE.

3   The lengthenings and contractions involving PIE laryngeals took place very early, and their result fell together with inherited *ē and *ō in all dialects; cf., e.g., *dʰi-dʰeh₁-mi > τίθημι /titʰɛːmi/ (CL) or gen. pl. *-oHom > -ων /-ɔːn/ (contraction).

4   According to several scholars, the theonym Διώνῡσος /diɔːnyːsos/ (Hom.+) 'Dionysus' originally contained the sequence *-osn- (e.g., García Ramón 1987; Peters 1989: 217–220; Dunkel 1995: 10–13; Janda 2022: 80–81). Given forms like Aeol. Διοννυσος/Ζόννυσος (N.B. *-V̆sR- > Aeol. -V̆RR-), this is quite likely. However, the exact etymology of Διώνῡσος is uncertain, and the many variations of the name in the Greek dialects make it impossible to derive all forms from one etymon (cf. Ringe 1984: 48–49; García Ramón 1987). The testimony of Διώνῡσος may be used, but with suitable caution. For the perfect γέγωνε 'cry out', which has been taken as another word showing the development *-ons- > -ων- in Attic-Ionic (Hackstein 2002: 187–193), see the discussion by Vine (2007: esp. 352–354).

5   This problem was first identified by Solmsen (1888: 62 & 81).

6   Lat. umerus represents a distinct problem. It is incompatible with the reconstruction *omso-: this form would leave the second vowel of the Latin word unexplained. A new and promising analysis has been offered by Höfler (2018), who traces the Latin word back to *h₁emHsoh₁ '(the two) shoulders'. This would be the nom. dual of PIE *h₁omHso- (= *(H)omso-; but the idea of root ablaut in o-stems remains controversial; see Höfler 2018: 140–142). The interconsonantal laryngeal was regularly lost via the Saussure effect in *h₁omHso-, but it was retained and vocalized in the full-grade form *h₁emHsoh₁ (note that there is no external evidence for the reconstruction of an internal laryngeal here). A Proto-Italic *emasos < *h₁emHso- (based on

However, we should exercise great caution in multiplying reconstructed items. Also, according to some scholars, Toch. *āntse* does not necessarily go back to *ōmsos,[7] so the status of the latter word remains uncertain. More importantly, Lesb. οννᾱ, and by extention its cognate ὠνή, continues a form with a short vowel (cf. also Ion. ουνη, §6.3). This suggests that the development seen in ὧμος was a more general phenomenon in Greek. Ved. *śáṁsa-* (= κῶμος), which also contains a short vowel, leads to the same conclusion. It is thus more reasonable to suppose—as most scholars do (n. 10)—that ὧμος is exactly cognate with Ved. *áṁsa-*.

Let us now turn to ὧνος. Some researchers have taken the /ɔː/ in this word as secondary (most notably Ringe 1984: 51–52). ὠνέομαι 'buy', which is a denominative of ὧνος, allegedly acquired an omega in Attic-Ionic after its antonym πωλέω 'sell'. The expected form */oːnos/ subsequently became /ɔːnos/, the theory says, on the basis of ὠνέομαι. Lesb. οννᾱ, being an Aeolic form, did not participate in the analogical process.

This theory cannot be disproved and is overall difficult to assess. The omega in ὧνος/ὠνή/ὠνέομαι is not confined to Attic-Ionic; it is also attested in other dialects where /oːn-/ would be expected (see §6). Thus, the fact that /on-/ is found in Lesbian looks suspicious: did the analogy happen in most dialects except Aeolic? It would be easier to assume that **-osn-* regularly developed to -/onn-/ in Lesbian (as expected), but to -/ɔːn-/ in Attic-Ionic and elsewhere. In any case, the present analysis 'does not help with any other forms under consideration, all of which … present the same problem, -ω- for -ου-' (Dunkel 1995: 8).

The last word left to discuss is κῶμος 'song of praise, revelry'. The connection of κῶμος with Ved. *śáṁsa-* 'praise' and GAv. *sə̄ŋha-* 'proclamation' is widely accepted.[8] Particularly notable is the equation of Ved. *śáṁso narā́m* and *nárāśáṁsa-* (≈ YAv. *nairiiō.saŋha-*) with the phrase κῶμον ἀνέρων 'praise of men' in Pindar.[9] The Indo-Iranian forms belong with the PIE root **ḱeNs-* 'verkünden, (öffentlich) schätzen' (*LIV*: 326). This root is found next to the word for 'man'

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the stem allomorph of the dual) would apparently develop to *umerus* in Latin; cf. Lat. *numerus* 'number' < **nemh₁so-* 'the distributed thing' (Digor Ossetic *(i)onœ* 'shoulder blade' may continue an old dual according to Cheung 2002: 211–212, but see also Tremblay 1996: 27–28[72]). On Umb. **uze**, *onse* 'in umero' (loc. sg.), see Höfler (2018: 143[32] with ref.).

7 Peters (1980: 307–308[253]) (on his analysis cf. Cheung 2002: 211); Hackstein (2002: 190–191); Höfler (2018: 129–130); see also Darms (1978: 325) and Dunkel (1995: 9).

8 See Durante (1974); Darms (1978: 325); Euler (1979: 45); Peters (1984: 86[9]); Thieme (1985: 258[56]); Dunkel (1995); Le Feuvre *apud CEG* (2000: 273); Hackstein (2002: 190–191); Eckerman (2010: 311); Batisti (2014: 210–212); Höfler (2018: 129); Blanc (2019: 58–59); Meusel (2021).

9 Durante (1974); Dunkel (1995: 14); Hackstein (2002: 190[36]); Meusel (2021: 188).

also in the compound names Myc. *Ke-sa-do-ro* /kessandros/, Hom. Κασσάνδρη, Καστιάνειρα, etc. (García Ramón 1992). In light of *nárāśáṃsa-* and κῶμον ἀνέρων, these names further support the connection of Gk. κῶμος with Ved. *śáṃsa-* (Euler 1979: 45; Dunkel 1995: 14; Meusel 2021: 188). This closer relationship is also evident in the use of the two terms, since both are systematically found in reciprocal contexts, where a κῶμος/*śáṃsa-* is offered to a god in return for something else (Meusel 2021).

According to Dunkel (1995: 14) and Meusel (2021), κῶμος mostly means 'song of praise' in Pindar (cf. also ἐγκώμιον 'celebratory song, eulogy'). Eckerman argues that κῶμος means 'celebration', but '[i]t would not be surprising that an epinician celebration in victory would semantically relate to "praise"' (2010: 311). The sense 'revelry, party', which is frequently associated with the followers of Dionysus, is generally thought to be secondary. It 'must have arisen through semantic specialisation, due to the fact that the usual divine recipient of κῶμοι ἀνέρων (with subjective genitive) ... was none other than Dionysus' (Dunkel 1995: 14; similarly Eckerman 2010: 311; Meusel 2021: 208). For arguments supporting the historical priority of the meaning 'song of praise/celebration', see Eckerman (2010) and Meusel (2021).

An alternative etymology of κῶμος has been proposed by Janda (2000: 277–282). According to him, κῶμος is related to Ved. *kā́ma-* 'desire' and goes back to a PIE *mo*-stem *koh_2mo- (: *keh_2- 'desire', *LIV*: 343). Formally, this works well; however, the semantic differences between the Greek and the Vedic words are quite substantial. Although there might be ways to account for this difficulty, these are largely ad hoc, so Janda's analysis remains hypothetical (cf. Batisti 2014: 211; Meusel 2021: 187).

To summarize: most scholars take the /ɔː/ in ὦμος, ὦνος, and κῶμος as the phonologically regular outcome of *(-)*osN*- and *(-)*oNs*- in Attic-Ionic.[10] This is the most plausible and economical way to approach the data, but it comes at a price: in other sonorant clusters involving *s*, the result of CL was always /oː/. The present paper seeks to explain this discrepancy. There have been several attempts in this regard, so it may be appropriate to begin our investigation with a brief review of earlier theories.

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10   See Kretschmer (1909: 123–124); Hermann (1923: 43–44); Buck (1955: 30); Polomé (1967: 825–826); Durante (1974: 127[16] & 128); Malikouti-Drachman (1975: 141–142); Euler (1979: 45 & 99); Szemerényi (1981: 116); Peters (1984: 86[9]); Tremblay (1996: 27[69] & 29–30[82]) (undecided about ὦμος; he prefers *$ōmsos$); Le Feuvre *apud CEG* (2000: 273); Hackstein (2002: 184–185 & 190–191); Batisti (2014: 201–228); Höfler (2018: 129 & 142); Blanc (2019: 58–60 & 63–64); Meusel (2021: 188); Nikolaev (2024: 15) (no mention of individual examples). Words containing PGk. *-osm-* and *-ons-* are not known.

2   Previous accounts

In order to overcome the difficulties raised by the vocalism of ὦμος, ὦνος, and κῶμος, Dunkel (1995) proposed that these words are all borrowings from Mycenaean. In dialects with five long vowels, secondary long *ē* and *ō* fell together with the inherited long mid vowels.[11] In Attic-Ionic, which had seven long vowels (cf. §6), secondary *ē* and *ō* (= ει, ου) were kept distinct from inherited *ē* and *ō* (= η, ω). If the word for 'shoulder' is a borrowing from a dialect with five long vowels, then that word would regularly be written ὦμος in Attic-Ionic. However, the borrowing theory is empirically untestable, and it is far from clear that Mycenaean really had a system of five long vowels. Also, it is very difficult to accept that everyday words like ὦμος and ὦνος were borrowed from Mycenaean in more than one Greek dialect (see further Hackstein 2002: 184–185; Batisti 2014: 223–224).

Batisti (2014: 226–227) proposed that *[oː] resulting from *osN/oNs fell together with inherited /ɔː/ in Attic-Ionic for structural reasons. According to him, there was no phoneme /oː/ (or /eː/) before the lengthening in sequences containing nasals and *s. In order to avoid overcrowding on the back axis and because *[oː] was rare, this segment was not phonologized as /oː/ but merged with inherited /ɔː/ instead. CL involving liquids and *s allegedly occurred at a later stage. At that point, a new phoneme /oː/ eventually emerged. The reasons for this delayed emergence of /oː/ remain uncertain. Also, the sequences *-esN- and *-eNs- regularly became -/eːN/- in Attic-Ionic, with a high-mid vowel (but see §6.2).[12] Greek had a phoneme /ɛː/, so overcrowding on the front axis was apparently acceptable.

Blanc (2019: 58–60) argued that the outcome of *osN/oNs and *esN/eNs depended on whether the nasal and the sibilant were separated by a morpheme boundary. According to him, when these sequences were tautomorphemic, they regularly became /ɔːN/ and /ɛːN/. Heteromorphemic *osN/oNs and *esN/eNs resulted in /oːN/ and /eːN/ respectively. One problem with this account is that tautomorphemic *esL yielded /eːL/ in Attic-Ionic (cf. Ion. χείλιοι /kʰeːl/- 'thousand' < *kʰesl-, Att.-Ion. χείρ /kʰeːr/ < *kʰesr-). In the context of Blanc's theory, this would mean that the morpheme boundary played a role only when nasals were involved. It is difficult to see why.

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11   Cf., e.g., Dor. ξηνος 'foreign' < *ksenu̯-, ωρος 'boundary' < *u̯oru̯- (with secondary long vowels) next to μή 'not', dat. sg. -ωι (with inherited *ē* and *ō*).

12   Cf. Att.-Ion. εἶμα /heːma/ 'garment' < *u̯esmn̥ (Ved. *vásman-* 'garment') or ἔμεινα /emeːna/ 'stay' (aor.) < *-mens-.

Another problem with the present theory concerns ὠνή and ὦνος. These words contain a low-mid vowel. If we follow Blanc, we have to assume that the morpheme boundary in *ṷos-nā and *ṷos-nos was not transparent. However, although nominal *-nā- and *-no- were unproductive in Greek, these suffixes were not so rare in the prehistoric period (cf. Schwyzer 1939: 489–491). Also, κρουνός /kroːnos/ < *kros-no- (§ 6.3), which is a similar formation, shows a different development.[13]

3   Vowel nasalization and height alternations

The problem with ὦμος etc. is essentially that the resulting vowel is lower than expected. As far as one can see, the divergent outcome is found only in a nasal environment. The question to be asked, then, is whether changes in vowel height are common next to nasals. The answer is yes, but such changes are not caused by the nasal per se. It is nasal vowels that show height alternations, not just vowels next to nasals. For example, variations in vowel height are very frequent also in distinctively nasal vowels. That is, in Ṽs that are not in the vicinity of a nasal consonant.

Vowel nasalization next to nasals is a universal phonological process. 'In many, and possibly all, languages, vowels are allophonically nasalized to some degree in the context of a nasal consonant' (Beddor 1993: 173). Vowel height alternations in nasal vowels are a robustly attested and well-understood phenomenon.[14] A familiar case comes from French where, for example, high nasal vowels were regularly lowered; cf. OFr. [ˈfin] vs. Mod. Fr. [ˈfɛ̃] *fin* 'end' (Sampson 1999: 22 & 74–80). An analogous process is found in Portuguese. In that language, the low vowels /ɛ/, /a/, and /ɔ/ undergo nasalization before /N/ and are regularly raised to [ẽ], [ɐ̃], and [õ]; cf., e.g., Port. *ânimo* [ˈɐ̃nimu] 'animus' (Goodin-Mayeda 2016: 60 & 90).

The reason why nasal vowels show height alternations is clear. Nasal vowels, unlike oral ones, are produced with a lowered velum. This allows the flow of air through both the nose and the mouth. The coupling of the nasal and oral tracts has certain spectral consequences. Some of these resemble the effects of tongue and jaw movements that alter vowel height. This may lead to confusion and affect perceived height under certain circumstances (see further, e.g., Beddor et al. 1986; Rolle 2013: 237–238).

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13   For two old theories, see Dunkel (1995: 8) and Batisti (2014: 202[2], & 226).
14   Cf., e.g., Schourup (1973: 201–204); Ruhlen (1978: 229–230); Beddor et al. (1986); Beddor (1993: 186–190); Sampson (1999).

4 Greek nasal vowels

4.1 *Mid vowel raising in the Greek dialects*

Beddor (1993: 187) lists many modern languages where mid vowels are raised in nasal contexts. In all cases, the vowels are nasalized. The raising is to be attributed to the masking effect caused by the nasality of the vowels (e.g., Ruhlen 1978: 229; Beddor 1993: 186–190). Sampson (1999: 43–45) takes the raising of *e and *o before *N in Latin as strong evidence that, in that language, vowels next to nasals showed enhanced levels of nasality. According to him (see Sampson 1999: *passim*), raising or lowering next to nasals in ancient languages and generally is an indication of heightened nasality in the vowels involved.

Now, in Arcadian, Cypriot, and Pamphylian, /e/ is frequently raised to /i/ before nasals. Cf. Arc. ιν < *en*, απεχομινος = ἀπεχόμενος, Cypr. *Minokretēs* = Μενοκράτης, *i* < *in* < *en*, Pamph. ι < *in* < *en*, ῑς < *ins* < *ens* = εἰς (see further Buck 1955: 23; Dubois 1988: 17–25; Egetmeyer 2010: 74–78). A similar change is attested sporadically in other dialects as well: cf. West Cretan ινθεμεν = ἐνθεῖναι, ινημε[ν] = ἐνεῖναι, Elean hᾱγιμονευσει = ἡγεμονεύσει, Lesbian ᾱγιμονεσσι = ἡγεμόνεσσι (see Alonso Déniz 2024: 293; Peters 1988/1990: 562–563). /o/ is also raised next to nasals in Arcadian, Cypriot, and Lesbian, but this change is rare in our corpus and seems less regular (cf. Lejeune 1972: 240). Compare, for example, Arc. στυμεον = στόμιον, Cypr. *Tīmukreteos* < *tīmo*-, Lesb. υμολογιᾱς (Dubois 1988: 23–25; Egetmeyer 2010: 54 & 63–66; Hodot 1990: 58–57).

If we assume that in some Greek dialects vowels were nasalized before nasals, raising could be connected with this fact and be compared with similar changes affecting nasal vowels elsewhere (Egetmeyer 2010: 72 & 98; Alonso Déniz 2024: 294; cf. also Hodot 1990: 63 & 146). According to Sampson (1999: 45), 'the fluctuating evidence of vowel raising [in Romance] suggests that levels of vowel nasality in mid vowels … may have varied … from region to region and from period to period'. This may also be the explanation behind the sporadic nature of raising in Greek; vowels were probably moderately to weakly nasalized in that language (see further § 6.1 and the Appendix).[15]

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15 As is well known, in several Greek dialects, word-final -/ns/ from any source and secondary medial -/ns/- were eliminated with loss of the nasal and lengthening of the preceding vowel; cf., e.g., the acc. sg. of the definite article τονς > τούς /toːs/ (Lejeune 1972: 129–132). In Pamphylian, /n/ was regularly lost word-finally; cf., e.g., hιιαρυ = ἱαρόν (Brixhe 1976: 21 & 33). It is clear that -ονς became -ους via a mid-stage *[-õːs] (cf., e.g., Hajek 1997; Sampson 1999). Similarly, the loss of word-final nasals in Pamphylian was probably accompanied by nasalization of the preceding vowel (Brixhe 1976: 33–35, among many others; cf. again Hajek 1997; Sampson 1999). The existence of such vowels in the early first millennium is certainly important for present purposes. However, vowel nasalization in such cases is

How old nasalization may have been in the Greek dialects is difficult to determine. Some scholars take the raising in Arcadian, Cypriot, and Pamphylian (which are traditionally grouped together[16]) as a shared innovation (cf. Wyatt 1970: 584; Dubois 1988; Ruijgh 1988: 132; Egetmeyer 2010). However, pre-nasal raising is crosslinguistically trivial, and is also found in dialects like Cretan, which shares little with Arcado-Cypriot (though see Alonso Déniz 2024: 294). In any case, in Arcadian and Cypriot, raising of /e/ is to a large extent regular and is already attested in our earliest records. Thus, it may be a relatively early change (cf. also Sampson 1999: 161). Similarly, raising in Pamphylian was quite old (Miller 2014: 287). This is suggested, for example, by the adverb ῑς < *ins < ens. In dialects where -Vns was simplified with CL, this happened in pre-alphabetic times. The /e/ in our word was apparently raised to /i/ before the loss of the nasal (Brixhe 1976: 63).

4.2   A case of vowel raising in early Greek

In certain varieties of Occitan, /ε/ and /ɔ/ are nasalized and raised in the doubly nasalizing context /m__N/. However, the same vowels are otherwise preserved intact before nasals (Sampson 1999: 142). A similar phenomenon is attested in Romanian. In that language, nasalization does not apply when a vowel is followed by /m/ or a geminate nasal. In the same contexts, however, nasalization and raising do occur when an additional nasal precedes the vowels /o ɔ e/; cf., e.g., NŌMEN > nume 'name' (Sampson 1999: 308–309). A similar change is found in Italo-Romance and affects only /e/ (see further Sampson 1999: 241 & 335[11]).

Now PIE *o next to a nasal remained unchanged in early Greek,[17] but *o was raised to *u in the sequence *-nom- very early (cf., e.g., Aeol., Dor. ὄνυμα 'name' < *o/enom-; Vine 1999).[18] It would be tempting in light of the Romance evidence to attribute the raising here to the effects of vowel nasalization. The vowel sys-

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closely associated with the weakening of the nasal, so it cannot safely be used as evidence that vowels were regularly nasalized before nasal consonants.

    Preconsonantal nasals are systematically omitted in Pamphylian and Cypriot inscriptions (cf., e.g., Pamph. πεδε for πέντε 'five'). This phenomenon is also attested in other dialects, but only sporadically. The omission of preconsonantal nasals has been taken as evidence for the existence of nasal vowels in the relevant dialects (cf. Brixhe 1976: 64–68; Ruijgh 1988: 134, 137, 142, & 148; Egetmeyer 2010: 97–98). For arguments against this view, see Méndez Dosuna (2007: 358–367).

16   At least the first two of them.

17   Cf., e.g., νότος 'south wind', νόστος 'return home', ὄνος 'donkey'.

18   Given the wide distribution of ὄνυμα and verbs like στόρνυμαι 'spread out' < *-no-mai̯, which have an /u/ in all of Greek, Att.-Ion. ὄνομα must be due to an assimilation of an earlier form with /u/ (Vine 1999: 557, following Warren Cowgill).

tem of Greek was notoriously conservative. The fact that one of the few early changes affecting vowels was raising between nasals may not be accidental and may suggest that another parameter—vowel nasality—was involved in the process. Given that raising did not occur when a singleton nasal was involved, perhaps Greek vowels were more strongly nasalized between two nasal consonants: in Romance, vowel nasalization in such contexts 'has … come about as a result of the cumulative influence of the surrounding nasal consonants' (Sampson 1999: 309). See further the Appendix.

5 Nasal vowels in languages with both /e ɛ/ and /o ɔ/

Vowel height alternations in nasal vowels are very common in systems with two mid vowel heights. More specifically, in languages with both /e ɛ/ and /o ɔ/, the contrast between mid vowels of different heights is frequently neutralized next to nasals. Similarly, in many languages with oral /e ɛ/ and /o ɔ/, the corresponding set of (phonemic) mid nasal vowels is more limited. It typically has only two high-mid or two low-mid vowels.

To illustrate the point, the Western Romance languages inherited the seven-way vowel system /i e ɛ a ɔ o u/ of Late Latin. In many cases, /e ɛ/ and /o ɔ/ were or are realized as high-mid [ẽ õ] only, or as low-mid [ɛ̃ ɔ̃] in nasal contexts, depending on the language. For example, in Galician-Portuguese /e ɛ/ and /o ɔ/ were invariably realized as high-mid [ẽ] and [õ] in certain nasal contexts (Sampson 1999: 180). This pattern is attested in many other Romance varieties. It is also found, for example, in the northern dialects of Italo-Romance (Sampson 1999: 262–263, 51, & *passim*). The outcome of neutralization was not always a high-mid vowel. In Portuguese, for example, in northern dialects spoken in Entre-Douro-e-Minho, /e ɛ/ and /o ɔ/ are normally realized as low-mid [ɛ̃] and [ɔ̃] respectively in nasal contexts (Sampson 1999: 204).

A similar situation is attested in languages with distinctively nasal vowels.[19] In numerous West African languages with oral /e ɛ ɔ o/, the system of nasal vowels contains only /ɛ̃ ɔ̃/ and lacks /ẽ/ and /õ/. For example, the Gur language Bariba has the oral vowels /i e ɛ a ɔ o u/, but a more limited nasal set with /ĩ ɛ̃ ã ɔ̃ ũ/. The high-mid vowels /ẽ õ/ are missing. A similar picture is seen in many Amazonian languages.[20] In systems with two oral mid vowel heights,

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19 Recall that the phenomenon in question arises due to certain *phonetic* properties of nasal vowels (see §3).

20 West Africa and the Amazon area are two of the biggest nasal vowel zones in the world (see Rolle 2013: 229–230 with ref.).

nasal vowels are fewer in number: some languages have only /ɛ̃ ɔ̃/, while others have only /ẽ õ/ (Rolle 2013). In a sample of 155 languages from different genera, Ruhlen (1978: 220) found that 73 have fewer nasal vowels than oral ones, and 28 of these languages show specifically a reduction in mid vowel height distinctions.

All this suggests that in systems with two mid vowel heights, there is a widespread restriction against the coexistence of both ẽ ɛ̃ and õ ɔ̃ in the language. It appears that '[a] phonological distinction ... between /ẽ õ/ and /ɛ̃ ɔ̃/ is unstable perceptually, and primed to undergo diachronic sound change' (Rolle 2013: 238).

6   Analysis

Let us now return to the problem of ὦμος, ὦνος, and κῶμος. As noted above, the lower outcome in Greek is only found before nasals. Nasalization in that environment is crosslinguistically trivial, and height alternations in nasal vowels are very common. /e/ and /o/ were raised before /N/ in Greek, and this suggests that vowels were nasalized in that context. On the basis of these findings, it may be argued that the expected forms */oːmos/, */ u̯oːnos/, and */koːmos/ involved contextual nasal vowels at some stage.

Now the Attic-Ionic phonological system contained the mid vowels /eː ɛː/ and /oː ɔː/ (e.g., Miller 2014: 44–45). There is crosslinguistic evidence that the distinction between phonemic and allophonic ẽ ɛ̃ and õ ɔ̃ is difficult to maintain. It is likely, then, that the high-mid *[õː] in *['õːmos] etc. was lowered to *[ɔ̃ː] at a certain point. This was due to the masking effect caused by the nasality of the vowel and due to the inherent difficulty to distinguish between [õː] and [ɔ̃ː].[21] Lowering led to *['ɔ̃ːmos], *['u̯ɔ̃ːnos], and *['kɔ̃ːmos], and ultimately to the neutralization of the contrast between prenasal */oː/ and */ɔː/ in Attic-Ionic.

There is evidence that the lowering of *[õː] took place in other dialects as well. The phonological system of several Doric dialects contained the vowels /iː eː ɛː aː ɔː oː uː/ (see, e.g., Miller 2014: 44; Andrés-Alba 2021: 30).[22] There are a number of forms coming from these dialects that show /ɔː/ for expected

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21   Primary */ɔːN/ (as in, say, χειμών, -ῶνος 'winter') was probably also realized as *[ɔ̃ːN]. It would be implausible to assume that */oːN/ contained a nasal vowel, but original */ɔːN/ did not.

22   These dialects are known as mild Doric. They contrasted with the dialects of the strong Doric type, which had a system of five long vowels.

/oː/: cf. Sophron (5 c.) ὠνᾶσεῖται,[23] late-5/early-4 c. Delphian ωνη[τα,[24] 4 c. ωνομ[ε]νο(ν),[25] ωνευμενοι,[26] ο̄νευμενους (all found in Dodona),[27] 2 c. Delphian ωνᾱ,[28] ωνᾱτᾱς,[29] and 3/2 c. Aetolian, Locrian ωνᾱ[30] (all from *u̯osn-). If these forms are taken at face value, then the lowering of *[õː] and—most important-ly—vowel nasalization before */N/ was a more general phenomenon in early Greek and was not confined to Attic-Ionic.[31]

The fact that long *[õː] was lowered in Greek, while short [ẽ] and [õ] were raised in some dialects (§ 4.1) does not pose a serious problem. In languages where both [ɔ̃] and [õ] are present, typically either [ɔ̃] is raised or [õ] is lowered. The *short* vowel system of all dialects had only one mid height, so the situation in Greek is unremarkable: early Gk. *[ɔ̃ː] and *[õː] merged into */ɔː/,[32] whereas short *[õ]—which did not have a lower counterpart—remained intact. At a later stage, and perhaps during an independent episode of nasalization, short [õ] and [ẽ] were raised to [ũ] and [ĩ] in some Greek dialects. Importantly, con-textual mid nasal vowels are normally raised in languages with only one mid height (Beddor 1993: 187–189).[33]

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23   This is a contracted Doric future of a denominative verb ὠνάομαι* (: Dor. ωνᾱ; see Bechtel 1923: 224 & 261). The verb is normally ὠνέομαι (: ὦνος).

24   = ὠνητά (n.); the connection of the epigraphic form with ὦνος/ὠνέομαι is certain; see Homolle (1926: 58).

25   = ὠνεόμενον; the dialect was clearly of the mild Doric type; see Lhôte (2006: n° 95).

26   = ὠνεόμενοι (XEΔ: n° 2593A); the typical northwest Greek ending -οι(ν) in l. 4 (3rd pl. opt.) suggests that the dialect was of the mild Doric type (cf. Méndez Dosuna 2018: 48 with n. 173).

27   = ὠνεομένους (XEΔ: n° 305B); /oː/ in the ending is written ου, while the long root vowel is written ο. If the initial vowel was /oː/, it would be expected to be written ου (though ortho-graphic inconsistencies are not unknown in the corpus of the Dodona tablets). However, Méndez Dosuna (2018: 42) reads ο̄νευμενοις (dat. pl.) here. This would make it difficult to decide whether the dialect was mild Doric, but the majority of the texts in the Dodona corpus must have been written by speakers of dialects with seven long vowels (cf. Méndez Dosuna 2018: 34, 43, 46, & 50).

28   Numerous attestations; e.g., *SGDI* II: n° 1843.28 (174 BCE), *SGDI* II: n° 1856.26–27 (173 BCE).

29   = ὠνητής (*SGDI* II: n° 2146.7–8).

30   Numerous attestations; e.g., *IG* IX,1² 1:96.a15 (213/2 BCE), *IG* IX,1² 3:638,12.12.13.18 (153/2 BCE).

31   The contrast between /eː εː/ and /ɔː oː/ is unstable in Greek even outside nasal contexts (for /eː εː/ before nasals, see § 6.2.1). There are Doric dialects with seven long vowels and Doric dialects with five. According to most scholars, the system with seven vowels rep-resents a more archaic stage. The original inventory of all Doric dialects contained the vowels /i: e: ε: a: ɔ: o: u:/. In some cases, this developed to a more limited set with one mid vowel height (see extensively Andrés-Alba 2021).

32   Via lowering of *[õː]. There is no compelling reason to believe that [õ] > [ũ] in the Greek dialects would presuppose a raising of *[ɔ̃ː] to *[õː].

33   *[õː] resulting from secondary and word-final *ons was not lowered (see n. 15), but the sim-

6.1   *The asymmetry between* *osN/oNs *and* *esN/eNs

According to the *communis opinio*, the outcome of *esN and *eNs was /eːN/ in
Attic-Ionic, with a high-mid vowel (see § 2). As we shall see in the following sec-
tions, this is only partly true, but for the sake of argument it will be convenient
to accept the standard view for now. In the previous paragraphs, it was argued
that the reason why *o was lengthened to /ɔː/ instead of /oː/ is because */oː/
was lowered before nasals and thus the contrast between /ɔː/ and /oː/ was neu-
tralized in that environment. This would imply that *esN and *eNs show the
expected outcome because lowering did not occur when *e was involved (or
was less significant), and thus /eː/ and /ɛː/ remained distinct.

Now, according to Sampson (1999: 142 with ref.), in certain Gascon dialects
of Occitan, /o/ and /ɔ/ are neutralized in nasal contexts but /e/ and /ɛ/ are not,
exactly as in Greek. The opposite pattern is also found: in some Occitan dialects
in the Pyrenean valleys of Luchon and the Haute-Garonne, /e/ and /ɛ/ are neu-
tralized in nasal contexts, while /o/ and /ɔ/ remain distinct (Sampson 1999: 142).
Similarly, in certain Catalan dialects, neutralization affected /e/ and /ɛ/ in nasal
contexts, but not the back vowels /o/ and /ɔ/ (Sampson 1999: 162).[34]

It appears that in nasalizing languages with two mid vowel heights, the dis-
tinction between /e ɛ/ and /o ɔ/ in nasal contexts (1) may be neutralized (see
§ 5), (2) it may remain intact (cf., e.g., Sampson 1999: 161 & 263; Rolle 2013: 226),
or (3) it may be neutralized unevenly. In the third case, only one set of mid vow-
els is affected by the process. Greek apparently belonged to the last category of
languages.

The reason why, in some phonological systems, neutralization did not occur
with all mid vowels is not clear. Asymmetric neutralization and the lack there-
of is found in languages where nasalization has been of limited importance
diachronically. Sampson (1999: 142), therefore, argues that the reason for the
'patchy neutralization of mid vowels is that … nasalization … was at best weak
… and fitfully carried through' in the relevant languages. This observation is
also compatible with the Greek data: judging from the sporadic nature of vowel

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plification of *ns* is certainly a later change than the one discussed here. It is not a given
that nasal vowels will behave the same at all periods (cf. § 6.2.1). In any case, it is far from
clear for how long vowel nasality was preserved after the loss of the consonant: by the
time /n/ was deleted, the vowel would be liable to denasalization (cf. Hajek 1997; Samp-
son 1999).

34   One of Sampson's key indicators of historically high levels of vowel nasality is the loss of
mid vowel contrasts in nasal contexts. This means that in some cases—as in the Catalan
example above—such changes are attributed to vowel nasalization by Sampson, although
there may be no direct evidence for the existence of that process in the language (but most
times the indirect evidence is very strong).

raising (see § 4 and cf. the Appendix), Greek probably did not possess strongly nasalized vowels.

6.2   The problem of δήνεα

Ved. *dáṁsas-* n. 'marvellous power, wonderful deed' is cognate with the Homeric noun δήνεα /dɛːnea/ n. 'thoughts, plans' (nom./acc. pl.; cf. Hsch. δῆνος· βούλευμα). Both words go back to an *s*-stem **denses-* (: **dens-* 'become knowledgeable', cf. διδάσκω 'teach'; *LIV*: 118–119).[35] This would imply that **-ens-* became -/ɛːn/- in Ionic,[36] but words like Hom. εἷμα /heːma/ 'garment' < **u̯esmn̥* and ἔμεινα /emeːna/ 'stay' (aor.) < **-mens-* show a different development. For this reason, it has been assumed that the stem **denses-* was remodeled to **danses-* in Greek after contamination with the zero-grade allomorph **das-* (< **dn̥s-*) that was common in the verbal domain (e.g., Euler 1979: 219–220).[37] A form **dansesa* would regularly give Ion. δήνεα via the well-known change of **ā* to Att.-Ion. /ɛː/. The idea that δήνεα goes back to **dans-* is perhaps supported by the Hesychian gloss ἀδανές· ἀπρονόητον (Bechtel 1914: 99; Euler 1979: 220[1090]; Peters 1986: 305–306).[38]

However, the Mycenaean name *Te-de-ne-o* (m.), which seems to have passed unnoticed, may indicate that δήνεα goes back directly to full-grade **denses-*. The form is certainly in the genitive singular and is thus clearly an *s*-stem (as is δήνεα). According to Ruijgh (2011: 269), *Te-de-ne-o* may represent *Tʰesdēnehos*. This would be the regular genitive singular of an *s*-stem adjective *tʰes-dēnēs**.

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35   Cf., e.g., Bechtel (1914: 99); Euler (1979: 219–220); Dunkel (1995: 2–5); *LIV*: 119[1]; Hackstein (2002: 185); Stüber (2002: 79); Le Feuvre (2022: 130–131 with n. 61). Cf. further the word equation between Hsch. πολυδήνεα· πολύβουλον and Ved. *purudáṁsas-* 'rich in wonderful deeds'.

36   The dialect of the Homeric epics was predominantly Ionic.

37   Hackstein (2002: 185–186) assumes that the basis of the remodeling was the old weak stem of the noun, i.e., **dases-* (< **dn̥ses-*). But one may doubt that the original root ablaut of neuter *s*-stems was still preserved in early Greek (cf. Le Feuvre 2022: 131[61]; Stüber 2002: 48 & 79).

38   Due to its differing vocalism, Hom. δήνεα has been considered an Achaean (i.e., Mycenaean) form by some scholars. This view, which was revived recently by Le Feuvre (2022: 130), has been criticized by Peters (1986: 305–306), to my mind rightly (despite Dunkel 1995: 4–5), on the basis of the form αδηνεως in a prose inscription from Ionic-speaking Chios (cf. also West Ion. Ευδηνη (: δήνεα), *Lexonyme*: 312 & 397). The proponents of the theory that δήνεα is not genuine Ionic (despite αδηνεως), tacitly make the following pretty much gratuitous hypotheses: (1) The inherited noun *dēnea* was lost in Ionic; (2) Hom. δήνεα is a poetic Achaean word that was passed on to the Ionic dialect through poetry, esp. Homer (on the controversial question of Achaean features/vocabulary in the Homeric language, cf. Peters 1986 and most recently Le Feuvre 2022); (3) It was (re)established as a regular word of Ionic vocabulary, from which forms such as αδηνεως were derived.

There are several similar adjectives attested in Greek; cf. Hdn. δυσδηνής, late epic κακοδηνής, and Hsch. ἀδηνής and πολυδήνης* (cf. Blanc 2018: 192). For the first member, cf. θέσ-φατος 'spoken by a god'. Ruijgh's proposal has been accepted by Blanc (2018: 194) and several Linear B specialists (see *DMic.*[supl.]: 351). His interpretation would be at odds with the traditional analysis of δήνεα, since -*de*- in the Mycenaean form points unambiguously to Proto-Greek **e*.[39]

The *e*-vowel is also attested in Hsch. δυσδηνίας, which is another neglected form. This is glossed as δύσνους, κακὰ βουλευομένους by Hesychius, and is the accusative plural of the adjective δυσδηνής that is also mentioned by Herodian (see above). δυσδηνίας (< δυσδηνέας*) apparently shows the change of ⟨ε⟩ to ⟨ι⟩ before ᾰ̆ and ŏ that is common in the Doric dialects (Latte 1953: 484). This change is also found in Boeotian, Thessalian, Cypriot, and Pamphylian, but the important point here is that in Attic and Ionic it is practically unknown (see further Méndez Dosuna 1993).[40]

Of course, the form δυσδηνίας could hardly be Attic anyway, since the accusative plural and all other case forms of *s*-stem adjectives were consistently contracted in that dialect (see, e.g., Blanc 2018: 12).[41] In Ionic, the accusative plural of *s*-stem adjectives almost always ended in -εας (see Blanc 2018: 6–11).[42] If δυσδηνίας is neither Ionic nor Attic, /ε:/ in that form cannot continue **ā* (< **ă*), since in dialects other than Attic-Ionic long **ā* remains intact. The /ε:/ in δυσδηνίας, then, must ultimately go back to **ĕ*.

It is hard to see how the reconstruction **dansesa*—allegedly required by Hom. δήνεα—could be reconciled with the non-Homeric data. In theory, the replacement of **dens*- by **dans*- could have happened only in some Greek dialects, but this is rather hypothetical. It is possible to argue that *Te-de-ne-o* was not affected by the analogy because it was a proper name.[43] However, such an analysis would not work for δυσδηνίας, and taking this gloss as a mixed

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39   Despite Blanc (2018: 192 & 194), who accepts Ruijgh's interpretation, but still derives δήνεα
        from **dānea*.

40   Some examples from *s*-stem nouns and adjectives include Heraclean gen. sg. Τῑμοκρα-
        τιος = Τῑμοκρατεος, Cret. Υπερφ[α]νιος, τεμενια = τεμένεα, ϝετιõν = (ϝ)ἐτέων, Thess. gen. pl.
        [συγγ]ενιουν = συγγενέων, Cypr. nom./acc. pl. *a-te-li-ja* = ἀτελέα. Contrary to what is sug-
        gested by the spelling of these words, [e] did not become [i] but [i̯]. Desyllabification was
        accompanied by a shift of accent, so δυσδηνίας was probably oxytone and was pronounced
        [dusdε:ni̯ás/-n̠ás]. The accent mark was placed on -ι- probably on the model of -έας, which
        was the older accusative plural of adjectives in -ής (cf. Méndez Dosuna 1993: 244–245).

41   The accusative plural of masc./fem. *s*-stem adjectives ended in -εῖς -/e:s/ in Attic.

42   But there are also some traces of contraction in the inflectional paradigm of *s*-stems in
        Ionic.

43   As is well known, names frequently preserve phonological and morphological archaisms.

form[44] would not be an attractive idea. In any case, it would be arbitrary and a violation of Occam's razor to separate the root vowels of *Te-de-ne-o*, δυσδηνίας, and δήνεα. It is unlikely that each of these forms shows an *ē*-vowel for a different reason.

Hsch. ἀδᾱνές might contain a hyperdoric/secondary *ā* for original *ē* (cf., e.g., Hsch. πλάθους· πλήθους),[45] so it does not necessarily speak against taking the *ē*-forms at face value. This approach to the vocalism of ἀδᾱνές has been taken independently by Stüber (2002: 79) and Le Feuvre (2022: 131) without consideration of *Te-de-ne-o* and δυσδηνίας (for a different analysis, see Dunkel 1995: 5[16]).[46]

6.2.1   δήνεα in the context of the nasalization theory

Myc. *Te-de-ne-o* and Hsch. δυσδηνίας strongly suggest that Hom. δήνεα goes back directly to a form containing *-ens-*. If so, lowering in Greek must have also affected the vowel *[ĕ:]. This change apparently took place only under certain conditions: cf. the noun εἷμα /he:ma/ (Hom.+) < *u̯esmn̥ and adjectives like φαεινός /pʰae:nos/ < *-esno- 'shining'.[47] If δήνεα comes from *densesa, as is most likely, its vocalism is historically connected with that of ὦμος, ὦνος, and κῶμος. Therefore, any theory that accounts for the latter words should also account for the discrepancy between δήνεα and εἷμα. This section aims to demonstrate that the nasalization theory effectively explains all relevant data with minimal additional assumptions.

If CL happened at different periods in *-VNs-* and *-VsN-*, then the contrast between δήνεα and εἷμα would be perfectly understandable. It is relatively clear that the first step toward the elimination of *-sN-* and *-Ns-* was the weakening of *s to *h (Batisti 2014: 78–79).[48] Let us think that the earlier change was

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44   That is, as a form with both Attic-Ionic and Doric phonology.

45   For similar cases, see Schwyzer (1939: 185).

46   The poetic adjective ἀμενηνός 'weak' (Hom.+) is possibly a privative compound based on an older (but unattested) *menes-no- 'powerful' (Blanc 2019); cf. μένος n. 'fury, strength'. The word is clearly related to the hapax ἀμενής 'weak'. Blanc considers the -η- in ἀμενηνός phonologically regular and compares ὦμος, δήνεα, etc. However, a hypothetical */amene:no/-, with the expected outcome, could well have become /amenɛ:no/-, with a low-mid vowel, after ἀμενής /amenɛ:s/ and perhaps other adjectives in -ηνός, such as ἀκμηνός, γαλαθηνός, etc. (cf. Blanc 2019: 61–62).

47   But on φαεινός and similar forms, cf. §6.3. On aorists like ἔμεινα /eme:na/ < *-mens-, see again §6.3.

48   In both *-hN- and *-Nh-, the glottal was lost through coarticulation with the adjacent sonorant. Initially, this resulted in voiceless *-[N̥]-. Such segments are phonologically unstable and tend to undergo revoicing, so Gk. *-[N̥]- probably soon became -[N]- (Méndez Dosuna 1994: 111; Blevins 2018). On the theory that *-hR- and *-Rh- first became *-RR- in all of Greek (cf. most recently Le Feuvre 2022: 130), see Batisti (2014: 84–94).

the elimination of *-Nh-. The high-mid vowels that emerged from that process were all lowered before nasals and merged with their lower counterparts (cf. δήνεα, ὦμος, κῶμος < *-Ns-).[49] By contrast, the younger mid vowels resulting from *-ehN- and *-ohN- followed a slightly different development. In that case, neutralization affected only /oː/ and /ɔː/; the vowels /eː/ and /ɛː/ remained distinct in nasal contexts (cf. ὦνος vs. εἷμα < *-sN-, and see §6.1 for parallels).[50] It has been proposed that *-hR- and *-Rh- fell together as *-hR-, with consonant metathesis (Kiparsky 1967). This would entail that CL happened at the same time in *-VhN- and *-VNh-. However, several scholars have voiced doubts that *-Rh- was metathesized to *-hR- in Greek, and none of the reasons for positing such a metathesis seems compelling (cf. Batisti 2014: 82, 95–96, & 100–122).[51,52]

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49   For original /ɛːN/, cf., e.g., acc. Ζῆν 'Zeus' < *$d\underset{\cdot}{i}\bar{e}m$. Cf. further n. 21.

50   In theory, *-hN- might have been eliminated earlier than *-Nh-, but certain considerations support the reverse chronology that was proposed just above. If the change of *[dẽːnea] to *[dɛ̃ːnea] took place while εἷμα was already *[hẽːma], i.e., if *-hN- was simplified before *-Nh-, then one would expect †ἧμα, with the same lowering of *-[ẽːN]- to *-[ɛ̃ːN]- that is seen in δήνεα. Since this did not happen, the elimination of *-Nh- and the change *-[ẽːN]- > *-[ɛ̃ːN]- must have occurred first.

51   CL after the simplification of a sequence *-VR.hV- would be somewhat unexpected, because the lost segment and the lengthened vowel belonged to different syllables. Kiparsky's metathesis would solve this problem (cf. *-VR.hV- > *-Vh.RV- > *-V̄.RV-). However, the lengthening could be accounted for even if *h was not metathesized. After the loss of the glottal in the sequence *-VR.hV-, the first syllable would be expected to become light by resyllabification. The lengthening of the first vowel would be the result of the combinatory effect of h-loss and the change of *-VR.V- to *-V.RV-. Cf. the parallel of Ion. ξεῖνος 'foreign' and similar words: *ksen.u̯os became *kse.nu̯os and ultimately ksē.nos; *u̯ here was clearly lost without being metathesized first (Att. ξένος, with a short root vowel, indicates that the cluster was tautosyllabic in some dialects: the change from *kse.nu̯os to kse.nos did not alter the weight of the first syllable so the root vowel remained short). See further Steriade (1982: 117–125 & 146–163); Méndez Dosuna (1994: 116[29]); Batisti (2014: 146–153).

      According to Peters (1980: 309), the reason why suffixal *s was restored in s-aorists involving *-i̯h- but not in those containing *-Rh- and *-u̯h- was because the latter clusters had been already metathesized to *-hR- and *-hu̯- at the time of the restoration (it is commonly assumed that *-i̯h- was not metathesized: *-V̆i̯s- became -V̆i̯i̯- in Attic-Ionic). But *h may have been missing from the position after *R and *u̯ when restoration occurred for reasons other than metathesis; e.g., because it had already been lost.

52   There is some evidence that /m/ is a weaker nasalization trigger than /n/ (Hajek 1997: 161–179; Sampson 1999: 224–226 & 341). Of course, nasalization clearly took place before *m in Greek (cf. ὦμος, κῶμος), but if we reconstruct two episodes of nasalization, the high-mid /eː/ in εἷμα might be attributed to the context. In that case, it would not be necessary to assume that /eː/ and /ɛː/ were kept distinct when *-sN- was involved. However, this is a rather hypothetical scenario and εἵνῡμι 'clothe, put on' < *u̯esnū- goes against it.

      Social factors often play a significant role in influencing nasalization patterns. εἷμα might have been generalized somehow from lower registers (Wackernagel 1909: 330 asso-

6.3 *The double treatment of* *-osn- *and* *-eNs-

The noun ὠνή frequently has the form ουνη /oːnɛː/ in the Ionic variety spoken in Chalcidice. The result of CL here was apparently the expected high-mid vowel /oː/.[53] A similar problem is raised by Att.-Ion. κρουνός 'spring, stream'. This word probably comes from *krosno-. It is traditionally connected with κρήνη/κρᾱνᾱ 'spring' < *krasnā- (cf. Hsch. κρούναι· κρῆναι τέλειαι) and compared with ON hrǫnn f. 'wave' < PGmc. *hraznō- (< *-nā-) and OE hræn n. 'wave, flood' < PGmc. *hrazna- (< *-no-).[54] Aorists like ἔμεινα /emeːna/ < *-mens- and ἔνειμα /eneːma/ < *-nems- are also noteworthy in the present context: although *-ens- became -/ɛːn/- in δήνεα, ἔμεινα and similar forms show a high-mid vowel.

ουνη and ὦνος contained the same cluster. This is also true for ἔμεινα and δήνεα. Thus, the reason behind the different outcome in these words cannot be chronological (as in the case of δήνεα and εἶμα). Peters (1984: 86[9] & 1984a: 100*) suggested that the outcome in the sequences *osN/oNs was conditioned by the position of the accent. This idea is followed by several scholars.[55] According to Peters, when the lengthened vowel was accented, the outcome was a low-mid /ɔː/; cf. ὦνος, ὦμος, κῶμος, and perhaps Διώνῡσος. When the vowel was unaccented, the outcome was the regular high-mid vowel /oː/; cf. ουνη and κρουνός.

The noun δήνεα and forms like ἔμεινα are also compatible with this rule. However, the *s*-aorist mostly contained an accented root vowel,[56] and *-éNs- would normally develop to -/ɛːN/- under the present analysis. The high-mid vowel in the *s*-aorist might have been generalized from the singular and the 3rd plural forms of the indicative (cf. Batisti 2017: 8–10),[57] yet the augment was not compulsory in early Greek. This means that, for example, 3sg. ind. ἔμεινε had also the form μεῖνε, with an accented root vowel. Aorists built to roots ending in liquids also contained a high-mid vowel (cf., e.g., ἔστειλα < *-stels-). Perhaps such

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ciates the change of /eː/ to /iː/ in the diminutive ἱμάτιον 'robe' with the 'untersten Sprachschicht' of Attic). However, nasalization is generally more common in uneducated and everyday speech than in more formal contexts (see Sampson 1999: 71, 99, 207, & 269–270), so one would again expect †ἦμα under such an analysis.

53   Hatzopoulos (1988); Peters (1988/1990: 559). The same result is perhaps seen in East Ion. (Perinthus) ονονημενα (prf. prtc. of ὠνέομαι), if this represents /onoːnɛːmena/ as per Ringe (1984) (cf. also East Ion. ?ονōνησ[θαι, *SEG* 64 890). However, 6 c. East Ion. ονωνησθαι (*SEG* 53 1153, Emporion) suggests otherwise (though the use of ο for ω in ονονημενα would still be surprising; see further *CEG* 2004: 178).

54   See further Dunkel (1995: 7); Batisti (2014: 209–210); van Beek (2022: 440).

55   Tremblay (1996: 27[69] & 29–30[82]); Höfler (2018: 129); Meusel (2021: 188[6]); Nikolaev (2024: 15).

56   Cf., e.g., 1pl. ἐμείναμεν, 2pl. ἐμείνατε, subj., opt. μείν-.

57   Cf., e.g., 1sg. ἔμεινα, 2sg. ἔμεινας, 3sg. ἔμεινε, 3pl. ἔμειναν.

forms also played a role in the generalization of /eː/ in ἔμεινα etc., but this idea remains hypothetical (cf. Batisti 2017: 8–10).

In any case, it is important to note that 'stress and nasalization are strongly correlated' (Schourup 1973: 192).[58] There are languages where nasalization either applies only in stressed syllables or is stronger in that environment (see Schourup 1973: 192–193; Hajek 1997: 95–96; Sampson 1999: 251–252 & 309). For example, in Brazilian Portuguese, accented vowels are nasalized before onset nasals, but unaccented vowels are not; cf., e.g., *fumo* 'tobacco' [ˈfũmu] vis-à-vis *fumaça* 'smoke' [fuˈmasɐ] (Goodin-Mayeda 2016: 60). Similarly, in Irish dialects contextual nasalization is 'markedly greater' in stressed syllables than in unstressed ones (Hajek 1997: 95–96).

If we accept reconstructions like *[ˈɔ̃ːmos], *[ˈu̯õːnos], and *[ˈkõːmos], with contextual nasal vowels, then the presence of a high-mid vowel in κρουνός, ουνη, and perhaps ἔμεινα (etc.) may be easier to understand. These words either did not contain a nasal vowel, or their root vowels showed low levels of nasality. Due to the lack of nasalization, the quality of the vowel remained unchanged.[59]

6.3.1　　　　Problems with the present analysis 1

This approach to the vocalism of ουνη etc. raises the important question of the nature of the Greek accent. Sound changes that are conditioned by the position of the accent are normally expected in stress-accent languages.[60] Greek had a pitch accent, so the idea that only accented vowels were nasalized in that language is questionable. However, it has been argued that the accentual system of Greek had also a stress component (Batisti 2019; Méndez Dosuna 2023: 228; cf. also Probert 2006: 57). This 'was not strong enough to interfere with poetic metre …, but strong enough to act as a conditioning factor in sound change' (Batisti 2019: 8). Typologically, a mixed system like this would be unremarkable, and there are Greek sound changes that are apparently conditioned by the position of the accent (Batisti 2019). The least controversial of these is the change

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58　See also Krakow (1993: 102–105 & 111–112); Hajek (1997: 94–115); Sampson (1999: 252–253).

59　This analysis presupposes that Attic ὠνή contains an analogical root vowel after ὦνος (Peters 1984a: 100*; Tremblay 1996: 29–30[82]). These words are cognates and synonyms, so this is a small price to pay. Note in this context that ουνη apparently coexisted with ωνη in Chalcidice (cf. *SEG* 58 593). The idea that ουνη shows a (sporadic) dialect-specific raising of /ɔː/ to /oː/ before nasals (Hackstein 2002: 191) is difficult to accept, since there is no independent evidence for this change, and /ɔː/ in Chalcidice remains intact before nasals (see Bastisti 2014: 220).

60　Stressed syllables typically have greater prominence, which affects how sounds are produced and perceived. In pitch-accent languages, prominence is primarily conveyed through pitch variations rather than increased articulatory effort.

of unaccented *-VLs- to -V̄L- (cf., e.g., ὄρσος 'rump' vs. οὐρᾱ́ 'tail' < *orsā́).[61] In Greek, there are also cases of syncope. This is a change that is typically found in stress-accent languages (see further Batisti 2019: 5).[62]

6.3.2   Problems with the present analysis II

The idea that the outcome of *osN/oNs and *eNs was conditioned by the accent is possibly contradicted by Att.-Ion. ζωμός 'soup, broth'. This word is usually connected with the family of Gk. ζῡ́μη 'leaven, yeast', Ved. yū́ṣ- 'broth, soup', and Lat. iūs 'broth', but the ablaut ω : ῡ creates problems (NIL: 405–407).[63] According to another analysis, ζωμός goes back to *i̯os-mo- and belongs with the root *i̯es- that is seen in Gk. ζέω 'boil' (Forssman apud Darms 1978: 325). If this is the correct preform (the semantic similarity with yū́ṣ- and iūs is certainly remarkable), that would pose a serious challenge to Peters' theory, since ζωμός is oxytone (as, e.g., κρουνός) but shows the lower outcome.

One way to retain the connection with *i̯es- without discarding Peters' analysis of ουνη and κρουνός would be to trace ζωμός back to a form with primary *ō (= Gk. /ɔː/). In this context, Nikolaev (2024: 15) suggested recently to derive ζωμός from a substantivized adjective *i̯ōs-mó- 'of boiling' (> 'soup'). The basis of this would be an abstract noun *i̯ós-mo- 'boiling'. This derivational scenario is similar to the one proposed by Weiss (2016: 482–483) to account for μόλος 'toil' vs. μῶλος 'struggle' and Lat. mōlēs 'struggle'. According to Weiss, '*mólos 'toil' (Gk. μόλος) made a vr̥ddhied genitival adjective *mōlos 'of toil' and this was then substantivized in Greek by zero-derivation (μῶλος) and in Latin by i-stem nominalization (mōlēs)'.

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61   The role of the accent here is acknowledged by several scholars, including Jacob Wackernagel, Felix Solmsen, and D. Gary Miller (see further Batisti 2017).

62   If *-ósn- gave -ων- and *-éns- gave -ην-, then, κρουνός < *krosno- and ἔμεινα < *-mens- owe their high-mid vowels to the fact that they contained an unaccented root vowel. Now if *-sn- and *-ns- were eliminated at different periods, as tentatively suggested above (§ 6.2.1), then both nasalization processes were conditioned by the position of the accent. This might be seen as an indication that the two changes were not too far apart chronologically.

63   Sergio Neri (apud Nikolaev 2024: 15), in an effort to save the old etymology, derived ζωμός from *i̯ou̯(h₃)mo-, with regular loss of the laryngeal (Saussure effect), and a change of PGk. *-ou̯- to *-ō- before *m. There seem to be no other known cases of this particular sound change in Greek, but we do not know what happened to word-internal *-ou̯m- in that language. The ablaut ω : ῡ is also attested in μῶμος (Hom.+) 'blame, reproach' vs. Hsch. μῦμαρ· αἶσχος. φόβος. ψόγος and μυμαρίζει· γελοιάζει. The root vowel here is again found before /m/ (sporadic raising of /ɔː/ between nasals? Cf. § 4.2).

7   Conclusions

The root vowel in */o:mos/, */u̯o:nos/, and */ko:mos/ was nasalized, lowered, and eventually it merged with /ɔː/. There is independent evidence that Greek vowels were nasalized and showed height alternations next to /N/, as in many other languages. Most importantly, in phonological systems with two mid vowel heights (like that of Attic-Ionic), neutralization of mid vowels is a widespread phenomenon in nasal contexts. Exceptions like ουνη and κρουνός may be explained by the hypothesis that nasalization was weaker or did not take place in unstressed syllables. This is a common pattern crosslinguistically, but more research is needed on this point. Hom. δήνεα suggests that the lower outcome was also found with words containing *e, contrary to the standard view (cf. Myc. *Te-de-ne-o* and Hsch. δυσδηνίας < *-dens-). If so, neutralization in Greek affected the front mid vowels as well under certain conditions.

Appendix

Nasal vowels and height alternations in Greek: two less clear cases
PIE *ņ [ņ] and *m̨ [m̨] regularly gave Myc. *a*. When *ņ and *m̨ were close to a labial, the result was variably written as *a* or *o*; cf. Myc. *pe-ma*/*pe-mo* /sperma spermo/ < *spermņ̥ 'grain'. According to Skelton (2022), Myc. *a* < *N̨
was phonetically still [ã] in second-millennium Greek (thus also Ringe 2024: 113). The variation between *a* and *o* results from an effort on the part of Mycenaean scribes to represent a perceptually ambiguous nasal vowel. Vowel nasality led to the false impression that the actual vowel was more raised.[64] When this raised vowel was close to a labial consonant it was perceived as rounded, thus closer to /o/. Since orthographic variation is attested only when [ã] was close to a labial, the raising apparently became more detectable when rounding from the neighboring consonant was involved (but *a* < *N̨ was most frequent next to labials in the Linear B tablets).[65] If Skelton's analysis is correct, height alternations in nasal vowels were not unknown in second-millennium Greek.

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64   As a rule, low nasal vowels are raised; see, e.g., Beddor (1993: 187–189).

65   To my knowledge, there is no evidence that nasal vowels are more liable to rounding than oral vowels. Thus, it is not easy to attribute the change of [ã] to [õ] simply to rounding in a labial context, especially since Myc. [a] remains intact in such an environment.

This is also suggested by another early Greek sound change. PIE *o stayed intact in all dialects when adjacent to a labiovelar (= labialized velar).[66] Similarly, *o next to a nasal remained unchanged in prehistoric times (see n. 17). However, PIE *o between a nasal and a labialized velar (and vice versa) was raised to *u very early (cf., e.g., *nokʷt- > *nukʷt- > νυκτ- 'night').[67] This change cannot be attributed solely to the coarticulatory effects of the labialized velar, since *Kʷo and *oKʷ are not changed. The raising must have also been facilitated by the nasal. In the present context, this would involve the hypothesis that PGk. *o was nasalized and slightly raised next to nasals.[68] The impression that the raised */o/ was closer to */u/ in such cases was strengthened by the secondary articulation of the labialized velar. This ultimately led to a change of PGk. */o/ to */u/ in the relevant environments (cf. Skelton's analysis of Myc. a/o < *N̥).[69]

Acknowledgments

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66   Cf., e.g., *kʷote > π/κότε 'when?', *kʷōs > π/κῶς 'how?', *okʷʰis > ὄφις 'snake', *u̯okʷm̥ (acc. sg.) > ὄπα 'voice'.

67   This process, which is pan-Greek and pre-Mycenaean, as well as the raising of PGk. *-nom- to -num- (§ 4.2) are commonly known as Cowgill's law (see Vine 1999).

68   Weak contextual nasalization slightly raises perceived vowel height (Beddor et al. 1986: 212–213).

69   Perhaps the following consonant in, say, νόστος, being very different from /u/ phonetically, did not support the phonologization of the raising, so the (weakly nasalized) vowel remained unchanged.

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