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Detail from above the entrance of Tehran's fire temple, 1286š/1917–18. Photo by © Shervin Farridnejad

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Notes on a Middle Persian sound change: Greek Ἀναΐτις and features of vowel length

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This article discusses additional evidence for the Middle Persian lengthening of *i* and *u* in final syllables suggested by KORN 2009. It removes the apparent counterexample of Greek “Anaītis”, which would appear to speak against the lengthening being linked to voiced stops, and presents evidence from phonetic research that vowel height can play a role in lengthening processes, which explains why Middle Persian *a* is not lengthened.

1. Introduction

In KORN 2009, an argument was put forward suggesting that unetymologically long *i* and *u* in Persian are due to a regular sound change rather than an analogical process. Old Persian *i* and *u* would thus yield Middle Persian *ī* and *ū*, respectively, when preceding word-final voiced stops and *z* (1).

[1] Old Persian [*i, u*] / _[*p, t, k, č*] > Middle Persian [*ī, ū*] / _[*b, d, g, z*] #

Characteristic examples include those in (2).¹

[2]	Old Iranian	Middle / New Persian	Balochi
	*-i-ta-	past stem suffix - <i>id</i>	- <i>it</i>
	Anāhītā-	Nāhīd ‘Venus’	
	*-uta-	e.g. MPZ āšnūd, MPM išnūd ‘heard’	
	Av. huxšnuta-	NP xušnūd ‘contented’	
	*zānu-ka-	zānūg ‘knee’	zānuk
	*-i-ka- e.g. Av. ka’nikā-	MP kanīg ‘girl’	-ik e.g. jīnik ‘girl’ ²
	*-ič-	diminutive suffix -iz, e.g. murw-iz-ag ‘little bird’	

1- Ir. = Iranian; MP = Middle Persian; MPZ = Zoroastrian MP (Pahlavi), MPM = Manichaean MP.

2- The part of the word preceding the suffix is a cognate of MP kanīg, it is just given for comparison.

The argument further suggested that this change took place in the context of the voicing of Old Persian voiceless stops (including the affricate *č*). The process can thus be described as an instance of the cross-linguistically very frequent lengthening of vowels preceding voiced stops, one variety of which is known as “Lachmann’s Law”. JASANOFF (2004: 407, referring to English) notes that the mechanism at work is due to “the natural tendency of speakers to assign part of the voicing of the consonant to the preceding vowel”. In languages with phonemic quantity contrast, the result of such a lengthening can be interpreted as instances of long vowels (Henning Reetz, p.c.).

A further argument for the lengthening being linked to the Persian voicing of postvocalic stops comes from Balochi, which characteristically reflects Old Ir. stops without any voicing, and shows no lengthening of *i*, *u* (cf. the instances in (2)).

The 2009 article could not quite explain the apparent presence of a long vowel alongside a voiceless *t* in Greek Ἀνάτις, and the fact that *a* is not lengthened in Middle Persian while *i* and *u* are. In the meantime, data have come to my attention that seem to permit more straightforward explanations than the reasoning suggested in 2009.³

2. The apparent counterevidence of Ἀνάτις⁴

2.1. (Supposed) attestations

As mentioned by KORN (2009: 206f.), some editions of Plutarch’s *Lives* (27.11 in ZIEGLER & GÄRTNER 1996: 347; 27.8 in SINTENIS 1860: 132)⁵ present a form Ἀνάτιν (the accusative of an apparent Ἀνάτις) referring to the Iranian goddess *Anāhitā*.⁶ The same form occurs in BOISSEVAIN’s (1895: 386) standard edition of Cassius Dio’s *Roman Histories* (36.48; 36.31 in some other editions).⁷ If the Greek forms were correctly given, they would contradict the suggestion that the lengthening of Old Ir. *i*, *u* in the prehistory of Persian was connected with the voicing of the following obstruent, inasmuch as their circumflex appears to show a long vowel followed by the (at that time) voiceless *-t*.

However, upon closer inspection this Ἀνάτιν is not a real form. It seems to be a conflation, maybe by SINTENIS (1860: vii, 132), of two logically different and incommensurate things: (a) the first one being the actual accent of one of the attested manuscript forms (ἀνείτιν) in the Plutarch passage,⁸ (b) the second one an emendation of this passage proposed by KORAËS (1813), which KORAËS does not insert in the text (p. 306) but discusses in the notes (p. 450) – however, what KORAËS actually suggests is not Ἀνάτιν, but Ἀνάτιν

3- My sincere thanks go to Alexis Manaster Ramer, who alerted me to the lack of evidence for a long *i* in Ἀνάτις and suggested to work on the topic together. He contributed a previous version of Section 2.1.-2.2., but various factors called him to other fields before the cooperation could be finalized, and he did not wish to appear as co-author.

I am also grateful to Yitzhak Dana, Timothy Duff, Alexander Nikolaev, Michael Weiss and François Jacquesson for discussion about Greek philology and to Anja Geumann for advice on phonetic matters.

4- The essential points and the structure of 2.1.-2.2. was contributed by Alexis Manaster Ramer (see note 3) while work on details and the final formulations of the entire section 2. are the result of our cooperation.

5- Plutarch (AD 46 to after 119).

6- For the etymology and meaning of *Anāhitā*-, see the contributions by SCHWARTZ (2006: 103f.), KELLEN 2003, OETTINGER 2001 and GOTÖ (2000: 160f.).

7- Lucius Cassius Dio (ca. 155 to ca. 235).

8- The actually attested variants in the various manuscripts are ἀνείτιν, ἀνείτιν, and ἀνείτιν, differing in accentuation, but all with *-ei-* vocalism (SINTENIS 1860: vii, ZIEGLER & GÄRTNER 1996: 347 n. ad loc.).

(with an acute rather than a circumflex),⁹ thus implying a short vowel.

The accentuation of Ἀναΐτιν is thus a simple invention: SINTENIS 1860 (if it was in fact he) appears to have combined the circumflex found in some (but not all) manuscripts on a form containing -ει- on the one hand (which would say nothing about the quantity of the original ι because ει is a diphthong in Greek and automatically long) with the emended vocalism *-αϊ- (where a circumflex would indeed be a crucial sign of vowel length) suggested by CLAVIER (1802) and KORAËS on the other. This yields a ghost form that has no claim to reality.

The accent aside, the conflated form Ἀναΐτιν, which has been reprinted in the various later editions, may not even be what Plutarch intended as to vocalism. It is possible that he intended the form ANEITIS, which is indeed attested in medieval manuscripts (but rarely in ancient ones), or the frequently attested ancient ANAEITIS found on coins.¹⁰ There is thus no reason to suppose that Plutarch intended the editorially restored ANAITIS (though this also cannot be excluded), and no good reason to accept the emendation even as to the vocalism.

In the second case of the supposed Ἀναΐτιν, viz. in BOISSEVAIN's edition of Cassius Dio, none of the manuscripts have such a form, but rather an otherwise unknown Μαναιτιν [sic], variously accented. The form Ἀναΐτιν (acute accent, thus short vowel) is an emendation¹¹ by FABRICIUS & REIMARUS (1750: 104), while the circumflexed Ἀναΐτιν is a hyper-emendation, as it were, by BOISSEVAIN (1895: 386), who cites the form as occurring in Plutarch, and must thus have been either directly or indirectly influenced by SINTENIS' (1860) edition of Plutarch.

Thus, whereas it initially seemed that there are two independent attestations of our name with a long vowel in Plutarch and in Dio, in reality there is no attestation, but a chain of emendations, which moreover are directly dependent on each other and only go so far as to identify the Iranian goddess, but may not be fully correct even on the spelling of this name as used by this or that ancient author, and are in any case entirely arbitrary when it comes to the accent (i.e. evidence for vowel length).

9- KORAËS in turn attributes the idea “τῷ Κλαυερῷ”. This surely refers to CLAVIER (1802: 487), a French translation of Plutarch, featuring “Anitis” (presumably the latinized form of the Greek manuscript form with -ει-) in the text, but a footnote has the emendation “Lisez: *Anaitis*” – the name being given in French/Latin, there is no accent, and so the Greek acute must be due to KORAËS.

10- See the discussion by ROBINSON (1921: 21, no. 31).

11- Of course, an emendation is virtually inescapable, since the text of Dio demands a geographical term referring to a region of Armenia that corresponds to the name of a divinity (καὶ τὴν Μαναιτιν χώραν τῆς τε Ἀρμενίας οὖσαν καὶ θεῷ τινι ἐπωνύμῳ ἀνακειμένην “and the Manaitis land, which belongs to Armenia and is dedicated to some eponymous deity”, tr. ours). This divinity can only have been Anahita, and Pliny, *Natural History* (5.24(20).83, MAYHOFF 1906: 396) refers to what appears to be the same region as “Anaitica”. According to DE JONG (1997: 277), this is the region of Acilesene (Armenian *Ekeleac*). At any rate, we can at most restore an unaccented “Ἀνα(ε)τιν”, since both the exact spelling (as noted, the simple -αι- is less likely than -ει-) and *a fortiori* the accentuation is beyond our power to recover.

There is a further issue in that BOISSEVAIN 1895 phrases his comment in a way suggesting that the nom.sg. *Ἀνάτις (with the circumflex corresponding to the supposed *Ἀνάτιν) occurred in Strabo's *Geography* 12.3.37.¹² This is not the case either, though, since this passage has the gen.sg. Ἀνάτιδος (whose accentuation, even if it were original, would tell us nothing, since in the antepenultimate Greek only allows the acute regardless of the length of the vowel). Nor do the other attestations of the name in Strabo (11.8.4, 11.14.16 and 15.3.15) take us any further, as they all have Ἀνάτιδος; nor does the edition by RADT (2002-2011) give any variants *Ἀνάτι- or a note by RADT quoting such a form.¹³

It is not quite clear what led BOISSEVAIN to quote a form Ἀνάτις, but the issue is immaterial insofar as it would not shake the conclusion: The attested forms tell us nothing about the quantity of the -ι-, and the forms with circumflex on αῖ are all inventions. Nevertheless, “Ἀνάτις” has been repeated with considerable certainty in Greek handbooks such as the standard work on Greek personal names, PAPE & BENSELER (1911/I: 82: “Ἀνάτις, ἰδος, acc. ιν”), and in the Iranological literature, for instance the dictionary of Old Iranian (BARTHOLOMAE 1904: 125: “weibliche Gottheit, Ἀνάτις”).¹⁴

2.2. Problematics of the transmission

Even if *Ἀνάτιν (or rather *ἀνάτιν, since we are dealing with manuscripts written in minuscule throughout) were attested, it would not prove that the vowel had been long in Plutarch's pronunciation, or what his spelling was. The accent marks of medieval manuscripts are in general undependable, and Greek vowel quantities need to be determined from other types of information (notably, occurrences in verse, explicit statements of grammarians, certain kinds of misspellings, and so on).

One needs to keep in mind that a problem of several steps of transmission is involved here. First of all: “Ancient Greek authors of the classical, hellenistic and Roman periods wrote their works in scriptio continua, without accents and with very few punctuation signs. These were invented by scholars, first in

12- There might be a confusion of type (the word) and token (the particular occurrence of that word in some case form in a given context), which would explain BOISSEVAIN's otherwise puzzling claim that (the nom.sg.) Ἀνάτις occurs in Strabo: “Ἀνάτις Strabo (12, 3, 37 p. 559, ἀναείτιδος 11, 8, 4 p. 512, τῆς ταναίτιδος 11, 14, 16 p. 532 [...])”. (The pages BOISSEVAIN refers to are those of the edition CASAUBON 1620, who has Ἀνάτιδος for 12.3.37 like everyone else.) Since the accentual possibilities (and their implications, if any, for determining vowel length) differ between the different case forms (and in particular the accent of the genitive form, as noted, would not tell us anything about the vowel length), this seeming detail becomes the critical issue. The confusion might have been initiated by KORAËS, who phrases his comment (1831: 450) on the Plutarch passage mentioned above in a way that might lead one to suppose that Strabo as well as Pausanias' *Description of Greece* (3. 16. 8) have the form Ἀνάτιν, saying “Γραπτέον Ἀνάτιν, ὡς περ ἔδοξε καὶ τῷ Κλαυερῷ. Ἡ αὐτὴ γὰρ ἐστὶν ἡν καὶ Παιυσανίας, καὶ Στράβων, Ἀνάτιν, ἢν Ἀνάτιδα καλοῦσιν” (“Read: Ἀνάτιν [scil.: in the Plutarch passage], as it also appeared to Clavier. For she is the one whom both Pausanias and Strabo call Ἀνάτιν or Ἀνάτιδα”). Again, this is in fact not so, since Pausanias has the genitive in the form Ἀναίτιδος (ROCHA-PEREIRA 1973: 241). KORAËS' accusative may have been dictated by the syntax of his own Greek, and it is quite likely that he was concerned with the identification of the name itself, not with the particular case forms used by Pausanias and Strabo.

13- Besides those in Strabo, the only other occurrences of the name earlier than Plutarch are two quotes from Berossus (a Babylonian priest from the 4th/3rd century BC), one each related by Clement of Alexandria (ca. AD 200) and Agathias Scholasticus (6th c.) via other sources; these likewise have the obl. stem Ἀνάτιδ- / Ἀνάτιδ-, etc., saying nothing about the quantity of the *i* preceding the *t*.

14- Note that LOMMEL (1927: 27, 29f.) has a still different form of unclear origin, viz. Ἀνάτις (quoted by KELLENS 2003: 325). It is not clear either whether the form Anáitis found in FACUNDO DE ZUBIRÍA (1860: 102) has something to do with LOMMEL's form.

hellenistic Alexandria, where Homer was the main beneficiary,¹⁵ and generalised only after the introduction of the minuscule in the 9th century A.D. Modern editions of Homer, Herodotus or Aristotle all have word division, full accentuation and punctuation. For the accentuation the rules are laid down by the ancient grammarians, and modern editors follow, with few exceptions, the tradition of the Byzantine copyists” (CLARYSSE 1997: 177). The “accents” mentioned here refer to any diacritics (not just the accents proper but also the presence or absence of aspiration and the distinction between diphthongs and disyllabic vowel sequences).

As it happens, there even is an statement by Plutarch in which he explicitly voices his disdain for the use of the diacritics, specifically contrasting (*Platonic Questions* 10, XYLANDER 1624: 1009, BERNARDAKIS 1895: 147) “those [who] embellish the letters (by) putting (marks of) aspiration and nonaspiration as well as some (marks of) length and shortness on the letters” (and presumably also the accents, which must be included because of what follows), with “the Ancients being satisfied with the sixteen [sc. letters]”; he even compares the use of the diacritics to “the groans and shrieks of stage-players, and even their smiles and their [sc. dramatic] silences” (tr. ours). This appears to imply that in his time the writing of diacritics was known, but was not in general use – and adds to the argument that Plutarch himself would not have written or dictated any particular markings on AN(A)(E)ITIN.

Also, in the case of a proper name, and particularly a foreign one such as *Anaitis*, and one not discussed in any known Alexandrian work, whatever accentuation the manuscripts show would necessarily be of particularly doubtful authority. Indeed, modern editors have been largely arbitrary in dealing with this problem: “Keine Gewähr hat die von den Herausgebern schematisch durchgeführte Akzentuierung fremder Namen in Inschriften und Papyri” (SCHWYZER 1939: 395).

The philological problem highlighted here is of course by no means infrequent, and not just in Greek. Handbooks, dictionaries, and editions quite commonly quote forms whose status is doubtful at best. This may often be inevitable, and would not be problematic *if* these works also indicated in each case the basis for what they report. Unfortunately, that is very often not done, giving rise to ghost forms that then are taken for granted and perpetuated in the literature. In fact, critical editions have sometimes created ghost words based on a perceived need to settle on a single fully-spelled-out form by combining pieces of information of entirely different ontological status (that is, combining documented forms from a given text, forms from other texts, or coins or inscriptions, with emendations).

2.3. The input form for Greek again

One should also beware of assuming that there was a single way that a given foreign name was rendered by the Greeks. There is explicit testimony that in some cases the Alexandrine grammarians themselves disagreed, and there is no way to recover the true extent of variation in actual usage outside of the grammatical schools.

Indeed, Greek versions of Iranian names exhibit considerable variation.¹⁶ A case in point is Artaxerxes, for which we find inter alia Ἀρταξέρξης, Ἀρτοξέρξης (Plutarch) and Ἀρταξέσσης (SCHMITT 1979: 61). It is not straightforward how to combine these with Manichean MP <’rdšyhr> on the one hand and Old Persian

15- Like Homer, some other authors likewise have a textual tradition going back to Alexandrine times; this obviously is not the case for later authors like Plutarch.

16- For Middle Persian, this is conveniently shown in the inscriptional material studied by BACK (1978: 151-157).

Artaxšaça- on the other. It seems that some contraction of the original form (perhaps **Arta-xšaθriya-*) took place in the prehistory of Middle Persian, yielding perhaps **xšaiθra-*.¹⁷ The latter could quite well agree with the Manichean spelling and would also fit the Greek renderings Ἀρταξίρ, Ἀρταξείρ (vs. genitive Ἀρταξάρου for Ardašir I) in the Greek versions of the Sasanian inscriptions (whose MP version has the archaising <rtštr>) as well as Ἀρταξήρ, Ἀρτασήρ, Ἀρδεσήρ, Ἀρτασ(ε)ίρης attested in Byzantine sources (SCHMITT 1979: 68). Another contraction seems to be at the root of the Armenian form *Artasēs*, which is rendered as Ἀρταξίης, Ἀρτάξας, later on also Ἀρτάξης (SCHMITT 1979: 63f.).

The considerable variation in this royal name is pertinent because it sheds light on the name in question: It seems likely that modern scholarship has preferred **Ἀναίτις* in order to bring it in line with its Iranian origin, specifically Avestan *Anāhitā*. However, this form might actually not even be expected to be reflected in Greek: The Ir. input for the Greek could quite well have shown some contraction as we see for Artaxerxes; it seems not entirely impossible that **Anāhitā* was pronounced **[anēita]* or so in the Ir. variety which was the source for the Greek. Indeed, as pointed out by HOFFMANN (1976: 624, 644), it is only Elamite that can be trusted to reflect Old Iranian directly, while any Greek data is likely to mirror a later stage, and/or to have come via third languages.

Concerning the Ir. source, the only Old Persian inscriptions containing the name are rather late (by Artaxerxes II).¹⁸ There is <a-n-h-i-t> in A²Sd, which does not say anything since vowel length of *i* and *u* is not distinguished in Old Persian (both being noted by <i>, <u>, preceded by a sign <C^{i/u}> where available). The other instances are noteworthy in noting <a-n-h-t> (A²Sa [several copies] and A²Ha). These forms may reflect *Anāhata*, with a change of *hi* to Old Persian *hə* suggested by HOFFMANN (1976: 642f.),¹⁹ and neutralization of quantity of word-final vowels.²⁰ The Elamite version of the inscription A²Sa has *an-na-hi-ud-da* (HINZ & KOCH 1987/I: 60), which might likewise speak for a short vowel since for a long one might perhaps have chosen a sign *iC* rather than *ud*. Old Persian thus does not provide evidence for a long *ī* that might have been an input for Greek, rather to the contrary.

2.4. Conclusion

There is no Iranian and certainly not Greek-internal evidence to tell us that Plutarch or any other ancient author wrote, or dictated, a form with -AI- or -αῖ-.

In the light of all this, the explanation advanced by KORN (2009: 207) to account for a potentially troublesome **Ἀναίτ-* (the supposed Greek reflex of Iranian **Anāhitā* with a lengthened /ī/ before a still voiceless /t/)²¹ is superfluous because the alleged Greek form dissolves into nothingness on closer inspection.

17- See SUNDERMANN and SIMS-WILLIAMS *apud* BOYCE (1990: 7f. note 7) and KORN (2009: 203) for discussion.

18- Artaxerxes II (reigned first half of 5th c. BC).

19- HOFFMANN does not mention this name, though.

20- Cf. also SCHMITT (1999: 73, 81) and KORN (2021).

21- The suggestion was that an input form **Anāhit* was influenced by Middle Persian *Anāhīd*, and/or potentially by ***Anāhit*. The latter would be a hypothetical learned form such as one commonly finds in names, which are frequently re-borrowed from classical languages and sometimes coexist with the inherited forms, cf. e.g. contemporary Persian first names such as artificial *Zar(ā)tošt*, *Mitrā*, *Dāryūš* besides the regularly developed forms *Zardošt*, *Mehrī*, *Dārā*, etc.

3. The discrepancy between *i/u* and *a*

3.1. The Iranian data

Another question that remained unresolved in KORN 2009 was the curious difference in the treatment of Old Ir. *i* and *u* vs. *a*: While one might expect that “the natural tendency of speakers to assign part of the voicing of the consonant to the preceding vowel” cited in Section 1. should operate for any short vowel, short *a* is not affected by the change that lengthens short *i* and *u*. For instance, the vowel in Old Ir. **-aka-* is not lengthened, yielding the extremely common MP nominal suffix *-ag* while **-ika-* and **-uka-* yield the MP adjective suffixes *-īg*, *-ūg*; and *āmad* ‘came’ shows a short *-ad* vs. the long vowels in the parallel past stems *-īd*, *-ūd*. (< **i/uta-*).

There might be a morphological motivation for this difference (KORN 2009: 208): Had **-aka-* resulted in MP *†-āg*, it would have been homonymous with the suffix *-āg* of the present participle, while the adjective suffix *-īg* < **-ika-* rather conveniently coalesced with the functionally identical suffix *-īg* < **-iyaka-*; this in turn maybe provided another motivation for the change in *-ūg* < **-uka-*. Similarly, the past stem suffixes *-īd* and *-ūd* going back to **i/uta-* happened to agree with the functionally identical past stem of roots in **-H*, e.g. the particularly common *dīd* ‘saw’ (< Proto-Ir. **diH-ta-*) and *būd* ‘became, was’ (< **buH-ta-*).

3.2. Phonetic data

While these factors may quite well have played a role, phonetic data have come to my attention which suggest that high and low vowels may indeed be treated differently in lengthening processes.

Firstly, a number of languages of Europe (not only from the Indo-European family) show a difference in vowel duration depending on height (with low vowels being longer than high ones) while front- vs. backness does not yield such a difference (NEWKLOWSKY 1975: 38, 40). Obviously, vowel length is also influenced by the phonetic context and by the number of syllables of a given word form, but in all cases, there is a length difference between low and high vowels (LSKER 1974: 228), even in whispered speech (NEWKLOWSKY 1975: 40, 53). Also, the intrinsic pitch (fundamental frequency, F_0) of low vowels is lower than that of high ones; and the specific sonority (intensity) of low vowels is likewise greater than that of high ones (NEWKLOWSKY 1975: 39).

There is thus solid evidence for a correlation of vowel height and length, even if the precise articulatory mechanisms behind these factors have been much debated.

JILKA & MÖBIUS 2007, studying a corpus of standard German to gain “insights into the phonetic realisation of prosodic categories” (p. 2621), contribute additional data which point to vowel height being relevant in lengthening processes. Examining the impact of various factors on peak alignment, i.e. the time point when the peak (the maximum of the F_0 contour) occurs within the syllable, they find that vowel height correlates with duration and peak position of accented vowels.²² This is a noteworthy result because vowel height has not usually been held to affect peak alignment. Furthermore, factors such as vowel front-

22- In their sample, the peak position for high vowels is at 41.8% of the duration of the syllable vs. 30.9% for low vowels, and the mean duration of the syllable is 93 ms for high vowels vs. 139 ms for low ones. Both differences are statistically significant (p. 2622f.).

/ backness and syllable structure do not have an effect on peak alignment in their data.²³ For instance, while stressed syllables have a later peak than unstressed ones, there is no particular difference between accented vs. unaccented high and low vowels that might account for the effect on peak position triggered by vowel height (p. 2623).

We thus find the apparently conflicting evidence of low vowels being longer, and of having their peak earlier than high ones, but the two factors are not in a causal relation: vowel duration turns out not to be the cause of peak position. Crucially, the known fact that the intrinsic pitch of high vowels is higher than that of low ones might be connected to peak alignment: JILKA & MÖBIUS 2007 suggest that the higher intrinsic pitch of high vowels could take longer to reach.

So far as the phonetic context is concerned, vowels preceding voiced consonants are longer generally than those preceding voiceless ones (see Section 1.), but here as well, the phonetic details have been subject to much discussion (LSKER 1974: 228f.). Again, vowel height might play a role: MÖBIUS 2009, following up on his earlier studies on German vowels, investigates vowels preceding voiced stops, and finds a higher tendency for high vowels preceding voiced stops to be lengthened than for low ones.

3.3. Conclusion

The data just presented give at hand that there is evidence (1) of a difference between high and low vowels in terms of peak alignment and length, with a tendency for low vowels to be longer than low ones, and (2) of this tendency operating in different contexts, including the one preceding voiced stops.

Needless to say, the contemporary languages studied in recent phonetic research do not need to imply anything for Middle Persian at the time when the sound change in (1) operated. I do argue, though, that they open up the possibility that similar differences in the behaviour of high and low vowels may obtain cross-linguistically, and offer a parallel to the difference suggested as having operated in Middle Persian.

23- The apparent difference in peak position between tense vs. lax vowels that has been noted previously turns out to be a secondary effect of closed vs. open syllables, and indeed peaks are regularly later in open syllables than in closed ones (pp. 2621f., 2623). Similarly, there is apparently an earlier peak for central vowels on the one hand and front and back vowels on the other, but the problem here is that “central vowels” include vowels such as ə, which only occur in unstressed positions in German, i.e. the effect observed is one of the impact of vowel height blurred by the effects of stress (p. 2622).

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