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The non-initial-syllable vowel reductions from Proto-Uralic to Proto-Finnic

1. Non-initial-syllable vocalism in Proto-Uralic

According to our *Jubilar* Juha Janhunen (1981), the Proto-Uralic non-initial unstressed syllables had two vocalic archiphonemes, a low **A* and a high **I*, both of which had front and back allophones depending on the vowel harmony, that is, whether the initial stressed syllables had front or back vowels, respectively (see also Korhonen 1988; Sammallahti 1988).[1] Before this view, however, Janhunen (1982)[2] reconstructed reduced **ə* instead of high **I* (cf. **ə* and **ə̂* already in Lehtisalo 1936: 16–17, 22–23). In other words, the Proto-Uralic non-initial unstressed syllables would not have had the qualitative opposition between low **A* and high **I* but a quantitative opposition between full **A* and reduced **Ə*, which can still be supported by the following facts:

- Samoyed: non-initial-syllable **ə* and **ə̂* (= Janhunen's **i* and **ï*) were either lost or merged as **ø* (= **ə*), whereas **a* and **ä* were usually preserved as such (Sammallahti 1988: 485).
- Mari: non-initial-syllable **ə* and **ə̂* were either lost or merged as **ə̂*, whereas **a* and **ä* were usually only reduced to **ə̂* (Bereczki 1994: 121–136).
- Mordvin: non-initial-syllable **ə* and **ə̂* were either lost or preserved as **ə* and **ə̂*, whereas **a* and **ä* were at most reduced to **ə* and **ə̂* (Bartens 1999: 60–66).
- Saami: non-initial-syllable **ə* and **ə̂* usually developed to short **e̮*, whereas **a* and **ä* usually developed to long **ē* or **ā* (Korhonen 1981: 99–102).
- Finnic: non-initial-syllable **ə* and **ə̂* of words of three syllables or more were more likely to be lost than **a* and **ä* (see Section 3 below).

1. I see no reason to discuss the earlier standard theory by Erkki Itkonen (1948) whose reconstructed non-initial-syllable vowel system, **a*, **ä*, and **e*, can easily be dismissed as violating linguistic universals (see e.g. Korhonen 1988: 9–11). Regrettably, many recent reference works ranging from etymological dictionaries (e.g. Rédei 1986–1991) to historical grammars (e.g. K. Häkkinen 2002) still cling to these obsolete reconstructions, as if nothing had happened in Uralic historical phonology over the past few decades.
2. Janhunen's studies (1981, 1982) were not written in the same order as they were published, because the one published later is cited in the one published earlier, but not vice versa. Note also that his change of mind was largely notational, since even today he speaks of "an original Proto-Uralic high (reduced) vowel" (2007: 215).

Per Urales ad Orientem. Iter polyphonicum multilingue.
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Only Ugrian and Permian offer no evidence, because all of their original non-initial-syllable vowels were sooner or later reduced to zero. In addition, Saami does not necessarily belong here either, since its non-high vowels were lengthened in initial syllables as well (Korhonen 1981: 112; Sammallahti 1998: 184). True, from a phonetic point of view, low vowels are stronger than high vowels, just as back vowels are stronger than front vowels (Foley 1977: 44–48). Hence, the evidence above would not yet force us to replace **I* with **Ə*, but there is more, such as the fact that most Uralic branches simply point to **Ə* rather than **I*, to say nothing of traditional (pre-Janhunen) **e*.

Jaakko Häkkinen (2007: 38, 75, 77) was already on the right track when he suggested a non-initial-syllable vowel reduction **I* > **Ə* shared by Central and East Uralic (viz. Mari-Permian and Ugro-Samoyed, respectively). As Mordvin could be added as well, it would indeed be much more economic to argue the opposite, namely that all these branches preserved original **Ə* and that only Finnic and Saami changed it to something else, not that the Saami central vowel **ę* dramatically differed from reduced vowels. Thus, Finnic alone points to non-initial-syllable **I*, or **e* for that matter, something that has long been known but hardly ever considered a problem.[3]

Reconstructing non-initial-syllable **Ə* rather than **I* is further supported by its phonotactic peculiarities, such as the fact that while the stem type **(C)VVCA-* long remained impossible (Plöger 1982), the stem type **(C)VVCƏ-* was perfectly possible from early on. Consider also the following etymological doublets (mostly adapted from the etymological word lists by Sammallahti 1988 and J. Häkkinen 2007):

- Uralic **kola-* (> Saami **koalō-*, Mordvin **kulə̑-*, Permian **kul-*) ~ Uralic **koolə̑-* (> Finnic **koolë-*, Mari **kolə̑-*, Hungarian *hal*, Mansi **kāl-*, Khanty **kol-*, Samoyed **kåø-*) ‘to die’.[4]
- Uralic **ńola-* (> Saami **ńoalō-*, Mari **nulə̑-*, Permian **ńul-*, Hungarian *nyal*, Mansi **ńăl-*, Khanty **ńol-*) ~ Uralic **ńoolə̑-* (> Finnic **noolë-*, Samoyed **ńåø-*) ‘to lick’.
- Uralic **pelä* (> Saami **pealē*) ~ Uralic **peelə* (> Finnic **peeli*, Mari **pelə̑*, Hungarian *fél*, Samoyed **piøj*) ‘half, edge, side’.

3. Cf. Erkki Itkonen and his circular reasoning *par excellence* (1988: 325): “Koska käsitykseni mukaan itämerensuomi edustaa hyvin konservatiivista vokaalijärjestelmää, pidän *e*:tä todennäköisempänä kuin **ə*:tä.” [“As in my view Finnic represents a very conservative vowel system, I find *e* more likely than **ə*.”] In comparison, mainstream Indo-European linguistics abandoned the concept of ‘key language’ soon after August Schleicher (d. 1868).

4. Saami **koalō-* ‘to feel cold, to freeze’ either belongs here (cf. Genetz 1897: 20) or is a borrowing from Pre-Germanic **golo-* > Old Norse *kala* ‘to freeze’ (cf. Aikio 2006b: 29). In turn, Mordvin **kulə̑-* ‘to die’ can in theory go back to both **kola-* and **koolə̑-*.

- Uralic **wara* (> Mansi **wŭr*, Khanty **wur*, Samoyed **wårå*) ~ Uralic **waarə̂* (> Finnic **voori*, Permian **vi̯r*, Mansi **wār*, Khanty **wor*) ‘mountain, hill, ridge, forest’.[5]
- Uralic **wärä* (> Saami **vārē*) ~ Uralic **wäärə* (> Finnic **veeri*, Saami **vierë*, Mordvin **vɛr*) ‘mountain, hill, ridge, forest’.[6]

The examples above can best be explained that the lengthening of the initial-syllable vowel caused the reduction of the non-initial-syllable vowel (or vice versa).[7] Namely, it would be phonologically more difficult to substantiate that the lengthening of the initial-syllable vowel would instead have caused the raising of the non-initial-syllable vowel (cf. **kola-* ~ **koolï-*), whereas it would appear nearly impossible to replace the initial-syllable alternation between a short and long vowel with that between a vowel and a combination of a vowel and consonantal **x* (cf. **kola-* ~ **koxlï-*), by which Janhunen (1981: 239–243) now replaces the earlier reconstructed long vowels. This solution fails to explain why the stem type **(C)VxCA-* would have been impossible, even though otherwise the stem type **(C)VCCA-* was possible (cf. Helimski 1984: 245–246; Janhunen 2007: 218). The problem can only be solved by returning to the long vowels, because the stem type **(C)VVCA-* may more easily have been phonotactically impossible, although the stem type **(C)VCCA-* was not.

In general, there is no comparative evidence for preconsonantal **x* on the Finno-Ugrian side, whereas the Proto-Samoyed **Vø* diphthongs can also go back to long vowels whose second moraic element had simply been reduced, as already pointed out by Janhunen himself (1981: 239). On the other hand, even though Janhunen’s **x* (= traditional **γ*) corresponds to the Proto-Indo-European

5. Admittedly, my distinguishing between **aa* and **oo* is only based on internal reconstruction, because the comparative evidence suggests the contrary that their merger was already Common Uralic, yielding Finnic **oo*, Saami **uo*, Mordvin **a* (monosyllabically) or **u* (polysyllabically), Mari **o*, Permian **i̯*, Hungarian **a*, Mansi **ā*, Khanty **o*, and Samoyed **åø* (J. Häkkinen 2007: 40). In turn, Samoyed preserved the opposition between **ää* and **ee* (> Samoyed **eø* and **iø*). The recent idea that so did also Mordvin and Mansi (J. Häkkinen 2007: 41) is crucially based on Uralic **seejə* ‘matter’, whose **j* might very well have caused vocalic irregularities, not that its consonantism is fully regular either (e.g. Mansi points to initial **ś*). Thus, I prefer the earlier idea that the merger of **ää* and **ee* was shared by the languages formerly known as Finno-Ugrian (Sammallahti 1988: 486), thus yielding Finnic **ee*, Saami **ie*, Mordvin **ɛ* (monosyllabically) or **i* (polysyllabically), Mari **e*, Permian **i̯*, Hungarian **ä*, Mansi **ā̆*, and Khanty **e*.

6. Uralic **wärä* was evidently a front-vowel variant of **wara* (cf. E. Itkonen 1975: 168–175; Aikio 2006a: 27–28). Such alternation was, and still is, most typical of descriptive words in Finnic (Saukkonen 1962), but there are also examples which are neither descriptive nor even exclusively Finnic (Aikio 2002: 30–31).

7. This vowel alternation bears some resemblance to Indo-European quantitative ablaut (cf. Latin *pēs*, gen. *pedis*; Greek *πώς*, gen. *ποδός*; Sanskrit *pā́t*, gen. *padáḥ* ‘foot’) which, however, was caused by mobile accent, something that hardly occurred in Uralic whose richness of initial-syllable vowels, compared to its poverty of non-initial-syllable vowels, most likely points to the existence of initial stress (but see e.g. Estill 2004: 193–199). Perhaps more evidence can be gathered from the Uralic 1st and 2nd person possessive suffixes where **Ə* and **A* alternated depending on whether they were followed by a consonant (cf. nom. 1sg. **-mƏ*, nom. 1pl. **-mAt*; Janhunen 1982: 31–32). One may thus wonder if Uralic morphology had, after all, been more fusional in both verbs (e.g. ind. pres. 3sg. **koolə̂*, ind. pres. 3pl. **kolat*?) and nouns (e.g. nom. sg. **peelə*, nom. pl. **pelät*?) and if the doublets above were just differently generalized basic forms. Be that as it may, the fact that the stem type **(C)VCCA-* existed shows that, instead of the heaviness of the initial syllable, the length of the initial-syllable vowel caused the reduction of the non-initial-syllable vowel, thus arguing against foot isochrony or some such.

laryngeals in several loanwords, only two of the suggested cases are preconsonantal (Koivulehto 1991: 65–67, 1995: 126–128), and they might in fact go back to Pre-Uralic, because Proto-Indo-European probably dates from earlier than Proto-Uralic (on whose dating see Kallio 2006):

- Indo-European **d^{h}uHli-* → Pre-Uralic ***tuxə̂lə̂* > Uralic **tuulə̂* > Finnish *tuuli* 'wind'.
- Indo-European **sh$_2$inu-* → Pre-Uralic ***sëxə̂nə̂* > Uralic **sëënə̂* > Finnish *suoni* 'vein'.[8]

As a matter of fact, all Proto-Uralic long vowels might very well be explained by the Pre-Uralic developments ***VxəCə > *VVCə* and ***VCA > *VVCə*, the latter of which, however, continued to sporadically take place much later. As this phenomenon has never been named, I hereby introduce the concept of length shift further discussed in my following section.

2. The length shift and related phenomena in Proto-Finnic

The length shift **VCA > *VVCə* was particularly typical of Finnic where it must be dated well before the Middle Proto-Finnic stage.[9] Still, all of the examples suggested so far (Koivulehto 1987: 196–208, 1999: 217–219; Kallio 1998: 616–617; Sammallahti 1998: 266) are limited to the case **oCa > *ooCə̂* (> MPF **ooCi*, **ooCë-*):

- EPF **kora* > MPF/LPF **koori* > Finnish *kuori* 'shell'.
- EPF **oδa* > MPF **ooti* > LPF **vooci* > Finnish *vuosi* 'year'.
- EPF **pola* > MPF/LPF **pooli* > Finnish *puoli* 'half, side'.
- EPF **śola* > MPF/LPF **sooli* > Finnish *suoli* 'intestine'.
- EPF **śoma* > MPF/LPF **soomi* > Finnish *Suomi* 'Finland' (cf. Finnish *suomalainen* 'Finn').
- EPF **šola* > MPF **šooli* > LPF **hooli* > Finnish *huoli* 'worry'.
- EPF **woja-* > MPF **woojë-* > LPF **voi-* > Finnish *voida* 'to be able to'.

Why the length shift only affected the stem type **(C)oCa-* is a mystery.[10] True, low **a* and **ä* could hardly even have lengthened, because neither **aa* nor **ää* belonged to the Early Proto-Finnic vowel paradigm. On the other hand, no high vowel seems to have lengthened in Proto-Uralic either. Still, there is no obvious

8. Uralic initial-syllable **ï* has mainly been reconstructed for symmetric reasons (Sammallahti 1979: 57; Janhunen 1981: 227), although **ë* looks better based on comparative grounds (J. Häkkinen 2007: 60–63).
9. Throughout this article I use the following trichotomy: Early Proto-Finnic (EPF) = the stage before any distinctively Finnic innovations (≈ Finno-Saami-Mordvin), Middle Proto-Finnic (MPF) = the stage largely recoverable by internal reconstruction immediately before the development **ti > *ci*, Late Proto-Finnic (LPF) = the proto-language of all the (Baltic) Finnic languages (see Kallio 2007 on further criteria).
10. Cf., however, Brugmann's law in Early Proto-Indo-Iranian, namely that among all the vowels only **o* was lengthened in open non-final syllables (see e.g. Lubotsky 1990).

reason why the length shift never affected the stem type **(C)eCä-*.[11] Moreover, even **oCa* > **ooCə̂* must be considered sporadic, because there are numerous counterexamples (cf. Finnish *kota* 'hut', *oma* 'own', *ora* 'thorn', *sota* 'war', *tora* 'quarrel', etc.).

In any case, the lengthening of the initial-syllable vowel most likely caused the reduction of the non-initial-syllable vowel because the stem type **(C)VVCA-* was still avoided.[12] Then again the lengthening was only possible in open syllables since there were no long vowels in closed syllables. Yet the reduction of the non-initial-syllable vowel was also possible after closed syllables, although my first example, whose unexpected non-initial-syllable vocalism was already pointed out by E. N. Setälä (1896: 32), does not necessarily belong here:

- EPF **kakta* > MPF **kakti* > LPF **kakci* > Finnish *kaksi* 'two' (cf. Finnish *kahtalainen* 'twofold').

Namely, the example above may very well have been influenced by the neighbouring numeral **ükti* (> Finnish *yksi*) 'one'. In turn, the following three examples, similarly already mentioned by Setälä (1896: 32), look more plausible:

- EPF **järwä* > MPF **järwi* > LPF **järvi* > Finnish *järvi* 'lake' (cf. the Estonian place name *Järvamaa*).[13]
- EPF **särkä* > MPF/LPF **särki* > Finnish *särki* 'roach'.
- EPF **täštä* > MPF **täšti* > LPF **tähti* > Finnish *tähti* 'star, mark' (cf. Finnish *tähdätä* 'to target').

Interestingly enough, the examples above belonged to the stem type **(C)äCCä-*, which in fact even more often underwent the phonologically mysterious development **äCCä* > **aCCə̂* (> MPF **aCCi*, **aCCë-*), exemplified by the following cases (Sammallahti 1988: 541, 548, 550):

- EPF **pärtä* > MPF **parti* > LPF **parci* > Finnish *parsi* 'board'.
- EPF **säppä* > MPF/LPF **sappi* > Finnish *sappi* 'gall'.
- EPF **tälwä* > MPF **talwi* > LPF **talvi* > Finnish *talvi* 'winter'.
- EPF **wäśkä* > MPF **waski* > LPF **vaski* > Finnish *vaski* 'metal'.

While the development **äCCä* > **aCCə̂* was already at least tentatively revealed by Arvid Genetz (1897: 11; 1899: 15, 17), it was not until Ante Aikio (2009: 72–73), who has discovered that there is also at least one example of the development **äCä* > **aCə̂* (> MPF **aCi*, **aCë-*):

- EPF **käsä* > MPF/LPF **kasi* > Finnish *kasi* 'dew'.

11. The only counterexample that occurs to me is Late Proto-Finnic **neemi* (> Finnish *niemi*) 'cape', which can perhaps be connected with Early Proto-Finnic **ńenä* (> Finnish *nenä*) 'nose'. While this idea is semantically most plausible (cf. Common Slavic *носъ* 'nose, cape'), it would require assuming yet another sporadic change (dissimilation?) **n* > **m* (on which see Nikkilä 1999: 148–158), not to mention that South Estonian, Livonian, and Saami point to Early Proto-Finnic **ńana* (< Pre-Finnic **ńëna*?) rather than **ńenä*.
12. Yet Finnish *puola* (< EPF **pola*) 'cowberry' somehow managed to preserve its *a*-stem — perhaps because otherwise it would have become homonymic with Finnish *puoli* 'half, side' (Koivulehto 1987: 204).
13. The development *ä* > *a* in Vote *jarvi* (cf. Kreevin *järwi*) took place only a few centuries ago (see Kettunen 1930: 125–126), whereas Livonian *jǭ ra* (cf. Salaca *järu*), too, can be traced back to Late Proto-Finnic **järvi*, although with more difficulty (see Posti 1942: 6, 51–53, 130, 266). The opposite idea that **järvi* and **jarvi* would have coexisted in Finnic for centuries or even millennia (cf. Lauerma 1993: 254–256) seems most unlikely to me.

We can therefore speak of the single development **ä(C)Cä* > **a(C)Cə̂*, which in fact occurred more often than not in the case of the earliest vocabulary (cf. Finnish *päivä* 'sun' and *äimä* 'needle' whose EPF diphthong **äj* perhaps blocked the development, whereas *jänkä* 'bog' has already been considered a Saami borrowing by Aikio 2009: 23, 248). In this respect, the development **ä(C)Cä* > **a(C)Cə̂* differed from the following, yet phonologically equally mysterious, development **oCCa* > **aCCə̂* (> MPF **aCCi*, **aCCë-*), the preliminary version of which once again goes back to Genetz (1897: 14, 1899: 5).

- EPF **komta* > MPF **kamti* > LPF **kanci* > Finnish *kansi* 'lid'.
- EPF **korta* > MPF **karti* > LPF **karci* > Finnish *karsi* 'snuff'.
- EPF **lonta* > MPF **lanti* > LPF **lanci* > Finnish *lansi* 'pasture'.
- EPF **poδwa* > MPF **patwi* > LPF **patvi* > Finnish *patvi* 'curly-grained wood'.
- EPF **polma* > MPF **palmi* + **-(j)kkoj* > LPF **palmikkoi* > Finnish *palmikko* 'braid'.
- EPF **por(a)wa* > MPF **parwi* > LPF **parvi* > Finnish *parvi* 'loft'.
- EPF **śolma* > MPF/LPF **salmi* > Finnish *salmi* 'strait'.
- EPF **śorwa* > MPF **sarwi* > LPF **sarvi* > Finnish *sarvi* 'horn'.
- EPF **tomma* > MPF/LPF **tammi* > Finnish *tammi* 'oak'.

Note that only the first and the last three of the examples above have always been mentioned in this connection (cf. E. Itkonen 1977: 5; Honti 2002: 236; Saarikivi 2010: 258–259), whereas the rest of the cases have not even been revealed until most recently (cf. Sammallahti 1988: 547, 1999: 75–76; Koivulehto 1994: 139; Aikio 2009: 99). In any case, this time there are so many counterexamples in the earliest vocabulary (cf. Finnish *kotka* 'eagle', *oiva* 'head', *olka* 'shoulder', *oksa* 'twig', *ottaa* 'to take', *sotka* 'duck', etc.) that this development must be taken as sporadic.

The exact phonological mechanism of **ä(C)Cä* > **a(C)Cə̂* and **oCCa* > **aCCə̂* has never been satisfactorily explained. Remarkably, these developments took place simultaneously in both syllables, because there are no other examples of the developments **ä* > **a* and **o* > **a* in the first syllable.[14] In general, both **ä(C)Cä* > **a(C)Cə̂* and **oCCa* > **aCCə̂* can be combined with the length shift **oCa* > **ooCə̂*, since they all shared the weakening of the non-initial-syllable vowel dating to approximately the same period. It is therefore tempting to assume that they also shared the strengthening of the initial-syllable vowel, which, however, only in the case of open-syllable **o* was able to affect the quantity, whereas in the case of **ä* and closed-syllable **o* it was only able to affect the quality. As low back vowels are also the phonetically strongest vowels, **a* was indeed the most expected outcome of the qualitative strengthening of both **ä* and **o*. Perhaps the fact that **ä* and **o* were the closest neighbouring vowels of

14. True, there was the front/back alternation **ä* ~ **a* (cf. Footnote 6), but even in this case the back-vowel shapes always seem to be primary, at least on distributional grounds.

**a* was also the reason why they were the only two vowels to be affected by such strengthenings.[15]

As for previous studies on this topic, the most popular theory to explain the second-syllable vowel with the suffix **-j* (cf. E. Itkonen 1977; Honti 2002; Saarikivi 2010) violates everything we know about the actual sound laws of the non-initial-syllable **Vj* diphthongs (on which see Rapola 1919–1920), not to mention that no suffix better explains what happened in the first syllable. Still, an even less convincing solution is to replace the Uralic reconstructions **ä(C)Cä* and **oCCa* with **ä(C)Ca* and **aCCo* (cf. Иллич-Свитыч 1971: ix–xi; Helimski 1984: 249), which simply expands our phonological problems from Finnic to elsewhere in Uralic. Finally, all of these Finnic words have even been considered Saami borrowings (cf. Tálos 1987: 77–78), something that shows hardly any familiarity with the generally acknowledged sound substitution patterns between these two branches (see e.g. Aikio 2007: 39–40, 49).

3. Further non-initial-syllable vowel reductions in Proto-Finnic

Paavo Ravila (1939) has been one of the few scholars to pay attention to the fact that the identical reduction of the word-final vowel took place more or less simultaneously in certain grammatical forms (cf. already Ojansuu 1913–1918: 13–16),[16] such as the (eventual) present tense 3rd person singular ending:

- EPF **-pA* > MPF **-pi* > LPF **-pi/*-βi* > dialectal Finnish *-pi/-vi*, standard Finnish *-(V)*.[17]

Compare also the nominative singular of comparatives and superlatives as well as caritives:

- EPF **-mpA* > MPF/LPF **-mpi* > Finnish *-mpi*.
- EPF **-mA* > MPF **-jmi* > LPF **-in* > Finnish *-in*.[18]
- EPF **-ktama* > MPF **-ktojmi* > LPF **-ťtoin* > Finnish *-tOn*.[19]

15. Perchance **ä(C)Cä* > **a(C)Cə̂* and **oCCa* > **aCCə̂* were also fueled by the fact that the stem type **(C)a(C)Cə̂* was strangely rare in Proto-Uralic (Aikio *apud* Saarikivi 2010: 261). Then again the developments were both distinctively Finnic and therefore also posterior to West Uralic (viz. Finno-Saami-Mordvin) **ë* > **a* (J. Häkkinen 2007: 60, 75, 81, 88), after which the stem type **(C)a(C)Cə̂* was no longer rare (cf. EPF **appə̂* 'father-in-law', **aptə̂* 'hair on the head', **lapćə̂* 'child', **panə̂-* 'to put', **sakə̂-ta* 'thick', **walkə̂-ta* 'white', etc.).

16. Ravila further suggested that the word-final vowel reduction led to paradigms like nom. sg. **-i* vs. nom. pl. **-At*, thus generalized to nom. sg. **-i* vs. nom. pl. **-Et* on the analogy of *E*-stems.

17. The corresponding plural ending shows no vowel reduction (cf. EPF/MPF **-pA-t* > LPF **-βAt* > Finnish *-vAt*), which reminds one of the Proto-Uralic 1st and 2nd person possessive suffixes (cf. Footnote 7).

18. Here the reduction was followed by the epenthesis **mi* > **jmi* /*V_#*, by which I prefer to replace the earlier supported metathesis **mi* > **jm* /*V_#* (see e.g. T. Itkonen 1968), because the latter would have led to a phonotactically impossible word-final consonant cluster. As the resulting **Vj* diphthongs underwent the same developments as the inherited **Vj* diphthongs of the non-initial syllables, the epenthesis must be dated very early.

19. This back-vowel suffix originally only occurred in back-vowel words, but after its front-vowel variant had regularly come to look very different (cf. EPF **-ktämä* > MPF **-ktejmi* > LPF **-ťtin*), the back-vowel suffix was generalized to front-vowel words as well (cf. LPF **töö-ťtoin* > Vote *tõtõ* 'unemployed').

Now speaking of comparatives, also the stem vowel preceding the comparative suffix was reduced in the case of disyllabic *A*-stems:

- EPF **ala-mpa* > MPF/LPF **alëmpi* > Finnish *alempi* ‘lower’.
- EPF **ülä-mpä* > MPF/LPF **ülempi* > Finnish *ylempi* ‘upper’.

The same can also be seen in the translative verbs derived from disyllabic *A*-stems:

- EPF **ala-nə̂-pa* > MPF **alënëpi* > LPF **alënëβi* > Finnish *alenee* ‘lowers’.
- EPF **ülä-nə-pä* > MPF **ülenepi* > LPF **üleneβi* > Finnish *ylenee* ‘rises’.

The idea that the examples above could have been due to the analogy of *E*-stems must be rejected for two reasons. First, even though *E*-stem nouns in general were almost as common as *A*-stem nouns, *E*-stem adjectives were far less usual than *A*-stem adjectives, so that it would have been strange if the former had served as a model for the latter. And second, the analogy is supposed to make it all simpler, and at least in my view ***alampi* and ***alanee* would have been far simpler derivatives from Finnish *ala* ‘under’ than *alempi* and *alenee*, whose *-e-* can hardly be considered anything but the result of a sound law. The idea of vowel reduction is also supported by the fact that the stem vowel preceding the comparative suffix was not reduced in the case of *A*-stems with three or more syllables, whose stem vowel had a secondary stress:

- EPF **walkə̂ ta-mpa* > MPF **walkëtampi* > LPF **valkëδampi* > Finnish *valkeampi* ‘whiter’.
- EPF **śelkətä-mpä* > MPF **selketämpi* > LPF **selkeδämpi* > Finnish *selkeämpi* ‘clearer’.

Similarly, the stem vowel was reduced in the case of passives of *A*-stem verbs, except that this time it also happened in *A*-stems with three or more syllables, because the secondary stress always fell on the passive suffix instead of the preceding stem vowel. For instance, take the present passive participles below:

- EPF **aja-tta-pa* > MPF **ajëttapa* > LPF **ajëttaβa* > Finnish *ajettava* ‘drivable’.
- EPF **wetä-ttä-pä* > MPF **wetettäpä* > LPF **veδettäβä* > Finnish *vedettävä* ‘pullable’.

Once again the analogy of *E*-stems can be rejected, because only one stem *aja-* would have been simpler than two stems *aja-* and *aje-*. Besides, the stem vowel was often weakened in the case of passives of *E*-stem verbs as well. However, as their stem vowel was already reduced, this time it was simply lost:

- EPF **purə̂-tta-pa* > MPF **purtapa* > LPF **purtaβa* > Finnish *purtava* ‘biteable’.
- EPF **tekə-ttä-pä* > MPF **tektäpä* > LPF **tektäβä* > Finnish *tehtävä* ‘doable’.

As we can see, the original passive suffix **-ttA-* was shortened after a consonant where it violated Middle Proto-Finnic phonotactics just as it did after a long vowel and a diphthong (Lehtinen 1984: 27–28):

- EPF **sayə̑-tta-pa* > MPF **saatapa* > LPF **saataβa* > Finnish *saatava* ‘obtainable’.
- EPF **käwə-ttä-pä* > MPF **käwtäpä* > LPF **käütäβä* > Finnish *käytävä* ‘walkable’.

Although both the reduction of **A* and the loss of **Ə* were most typical of unstressed syllables of words with three or more syllables, these weakenings did not occur hand in hand. In general, while the former more easily occurred before and/or after consonant clusters where vowels often tend to be phonetically weaker, the latter more easily occurred before and/or after single consonants where it could not have led to too heavy consonant clusters. For instance, the stem vowel was never reduced in the partitive singular of *A*-stem nouns or the first infinitive of *A*-stem verbs, whereas it was quite frequently lost in the partitive singular of *E*-stem nouns as well as the first infinitive of *E*-stem verbs (Bussenius 1939: 57–66). Nonetheless, there has been so much analogical levelling that the exact sound laws can no longer be easily formulated.

As for the reduction of word-medial **A*, only Lauri Kettunen (1924) has so far supported the idea of a regular sound change (cf. Bussenius 1939: 1–8, 105–116; Pajusalu 2000: 156–162). Still, his proposed conditions that the change would only have occurred between two dental consonants belonging to the same syllable are not at all sufficient, because they do not explain the stem vowels of comparatives (cf. EPF **tiwä-mpä* > Finnish *syvempi* ‘deeper’), to say nothing of the reduction of word-final **A*. Besides, I fail to see any phonological quality of dental consonants that could have caused such a change. However, Kettunen’s basic idea to explain the alternation between **A* and **E* phonologically rather than analogically (cf. Kalima 1911) or, even worse, in terms of gradation (cf. Ojansuu 1911) was well ahead of his time.

4. The aftermath of the non-initial-syllable vowel reductions in Proto-Finnic

The reduction of **A* must be considered one of the earliest distinctively Finnic innovations, because **Ə* (< inherited **Ə*, reduced **A*) eventually strengthened word-medially to **E* and word-finally to **I*. After so many weakenings, one may of course wonder at such a strengthening that is a far less natural sound change. Perhaps Finnic had finally left the Uralic areal context behind and was now influenced by typologically different languages with no reduced vowels (e.g. Baltic, Germanic or Palaeo-European). Approximately at the same time, no less than seven Uralic consonant phonemes (viz. **č*, **ś*, **δ*, **δ́*, **γ*, **ń*, **ŋ*) were eliminated from Finnic (Kallio 2007: 231–235), which makes the idea of non-Uralic influence even more likely.

However, our story does not end here, because still before the Middle Proto-Finnic stage not only non-initial-syllable but also initial-syllable **i* and

**ï* merged as **i*, because a palatalization like **ti* > **ci* could hardly have been caused by a back vowel:

- EPF **tïka* > MPF **tika* > LPF **cika* > Finnish *sika* 'pig'.
- EPF **kuutə̂* > MPF **kuuti* > LPF **kuuci* > Finnish *kuusi* 'six'.

At least we can say that if there had been the development **tï* > **cï*, we would then also expect the developments **tü* > **cü* and **tu* > **cu* (cf., however, Finnish *tymä* 'glue', *tuli* 'fire', etc.). In other words, **i* was probably as neutral in Middle Proto-Finnic as it is in most modern Finnic languages. Instead, I see no reason to think that the non-initial-syllable allophones of **E*, front **e* and back **ë*, merged as **e*, because they regularly correspond to Vote *e* and *ę* as well as South Estonian *e* and *õ*. The reason why **i* and **ï* merged more easily than **e* and **ë* was once again the phonetic fact that high vowels are simply weaker.

So why have I after all replaced Proto-Uralic non-initial-syllable **i* and **ï* with **ə* and **ə̂*? First, they behaved like reduced vowels, namely that they were not only easily lost, but they were also often the result of weakening of full vowels. And second, the positive evidence for **i* and **ï* is limited to only one branch, Finnic, whose indisputable conservative nature in certain respects does not mean that it should circularly be considered the most conservative branch in every respect. Thus, my present paper follows the path opened by Janhunen's 1981 study mentioned above, gradually de-Finnicizing Proto-Uralic vocalism.

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