

LÁSZLÓ FEJES (Budapest)

AN EXPLANATION FOR THE UNEXPLAINABLE:
ANTI-HARMONY IN FINNISH INFLECTION (*merta* AND *verta*)

Abstract. No persuasive explanation has been offered for the exceptional disharmony in Finnish *merta*¹ 'sea-PART.SG' and *verta* 'blood-PART.SG' until now. In this paper, it is argued that the reason for this phenomenon is complex. On the one hand, the word initial pattern #(*C*)*ertä* occurred only in these two forms, while the pattern #(*C*)*erta* was – and is – much more common. On the other hand, the change of the forms under analogical pressure was facilitated by the fact that they were isolated inside the paradigm; and therefore, intraparadigmatic analogy could not retard the change.

Keywords: Finnish, vowel harmony, exceptionality, irregularity, analogy, disharmony, antiharmony.

The partitive singular forms of the Finnish nouns *meri* 'sea' and *veri* 'blood', *merta* and *verta*, are irregular, the expectable forms being the harmonic **mertä* and **vertä*. One could suppose that the reason for these exceptions is either obvious and well known or a subject of continuous debates. However, it seems that the issue is neglected in the literature, and the rare explanations suggested so far are not satisfactory.

This study offers a new explanation for the above irregularity, based on the assumption that in the choice between two potential grammatical forms, the relative frequency of the competing phoneme sequences can be more decisive than morphophonological regularity. In the first section, it will be surveyed in what ways these forms are exceptional, and what attempts have been made to explain this phenomenon. In the second section, a new explanation will be suggested, and an overview of the data to confirm (or, potentially, disprove) it will be presented. Since the data the new explanation is based on are from present-day Standard Finnish, in the third section it will be examined whether historical or dialectal data can contradict the explanation suggested in the second part. In the last section, the

¹ The Finnish word forms, both modern and historical, will be given according to the rules of contemporary Finnish orthography. The only exception is the (phonemically) back (phonetically central) unrounded mid vowel ("back *e*"), which is written as *õ*, taken from the Estonian orthography, in data from other Finnic languages and in historical examples.

results will be summed up and the vulnerabilities of the argumentation will be pointed out.

1. Irregularity and explanations

Here, it will be demonstrated why the exceptionality of *merta* and *verta* is so difficult to explain. In the first subsection, the basic regularities of Finnish vowel harmony will be sketched, especially those which are relevant for *merta* and *verta*. In the second subsection, some common explanations for irregularity in vowel harmony (and, in general, morphophonology) will be introduced, and it will be pointed out why these are inapplicable for the case of *merta* and *verta*. In the last subsection, the previously suggested explanations for this irregularity will be presented and their weak points will be identified.

1.1. The irregularity of *merta* and *verta*

The Finnish language has a front/back vowel harmony: in native non-compound words, the back vowels *a*, *o* and *u* do not co-occur with the front vowels *ä*, *ö* and *y*. The unrounded non-low front vowels, *i* and *e*, are neutral in the sense that they can co-occur with both back and front harmonic vowels.² However, their co-occurrence with these vowels show different regularities depending on both the serial and the morphological position of the vowels.

Since the occurrence of *i* and *e* is not restricted, and these vowels never undergo vowel harmony, they can follow both back and front harmonic vowels, independently of whether they belong to a suffix or a stem. In stems, including native ones, an *i* or *e* in the initial syllable can be followed by both back and front harmonic vowels. Nonetheless, in native stems, after two or more syllables containing only neutral vowels, only front vowels can appear.³ In derivation, after stems containing only neutral vowels (one or more), derivative suffixes undergoing harmony usually occur in their front allomorphs of harmonizing suffixes, but exceptions are not extremely rare (e.g. *heitt-o* 'throw-NMLZ', *kiit-os* 'thank-NMLZ', *itk-u* 'weep, cry-NMLZ', *mieh-uus* ~ *mieh-yys* 'man-hood/liness', *heini-kko* ~ *heini-kkö* 'meadow, lawn (grass-COLL)' — Hakulinen, Vilkuna, Korhonen, Koivisto, Heinonen, Alho 2004 : §16). However, in inflection, vowel harmony is much more regular: stems (both derived and non-derived) containing only neutral vowels are almost always suffixed by the front allomorphs of harmonizing inflectional suffixes. Only two exceptions are known: the partitive singular forms of the word *meri* 'sea' and *veri* 'blood', which are *merta* and *verta*, instead of the expected *mertä* and *vertä*, respec-

² In the following sketch of the regularities of Finnish vowel harmony, the behavior of long vowels and diphthongs will not be considered separately. Long vowels behave like their short counterparts. Diphthongs behave like their first components: *ie* and *ei* behave like *i* and *e*; while diphthongs containing a harmonic and a neutral vowel and diphthongs containing two harmonic vowels behave like harmonic vowels.

³ In NSSL (2007), among monomorphemic words, there are only a few foreign words (e.g. *peseta* '(currency)', *espresso* 'espresso', *etikka* 'vinegar' etc.) and abbreviations like *heteka* 'steel spring bed' (from *Helsingin Teräshuonekalutehdas* 'Helsinki Steel Furniture Factory') in which two neutral vowels are followed by a back one. However, the number of monomorphemic words in which two neutral vowels are followed by a front harmonic one, such as *lirinä* 'purl, gurgle', *imelä* 'overly sweet', *kiverä* 'tightly turning or winding' are rare, except for the type ending in *eä*, like *leveä* 'wide', *pimeä* 'dark', *vehreä* 'verdant', *vihreä* 'green' etc.

tively. It is noteworthy that no other forms of the two lexemes are suffixed by back allomorphs of harmonic suffixes (except for forms generated by adding further affixes to the partitive singular form, like *mertaan* 'sea-PART.SG-3sg', *mertakaan* 'sea-PART.SG-neither', *mertaankaan* 'sea-PART.SG-3SG-neither' etc.).⁴ This kind of deviation from harmonic uniformity is very atypical for Finnish:⁵ another example is *seistä* 'stand-INF': *seison* 'stand-1SG' (see a more detailed discussion below).

It does not seem that the high degree of irregularity of *merta* and *verta* makes Finnish speakers unsure of its suffixation. At least, it is not reported that they tend to use the regular forms *mertä* and *vertä* so that the protectors of the standard are forced to stress the correctness of the back forms again and again. In addition, it is not reported that other words containing a neutral vowel tend to be suffixed with back allomorphs of inflectional suffixes, not even substandardly. Even foreign words containing just one neutral vowel are suffixed with front allomorphs without hesitation. As a consequence, we have to find a cause which may affect these two forms but no other similar forms.

1.2. Explanations to be ruled out

The exceptionality of *merta* and *verta* cannot be explained by any regularities of Finnish, nor by intraparadigmatic analogy. This is clearly visible if we compare their case to that of *seistä* 'stand-INF' : *seison* 'stand-1SG'. The form *seistä* is regular since *seis-* is a stem with a neutral vowel, and such stems are regularly suffixed by front allomorphs of harmonizing inflectional suffixes. This is the case in all other forms with a monosyllabic stem, such as *seissyt* 'stand-PST.PTCP' or *seisty* 'stand-PASS.PTCP'.

However, the stem *seis-* has a defective paradigm: it occurs only in the forms where a consonant-final stem can appear. In forms where a vowel-final stem is needed, its paradigm is completed with forms based on the stem *seiso-*. Even so, the paradigms of the two stems are not in complementary distribution: *seiso-* has a full paradigm. All the forms with *seis-* have an equivalent with the stem *seiso-* (e.g. *seistä* ~ *seisoa* 'stand-INF'). In addition, *seis-* also occurs in the imperative singular form (or interjection) *seis!* 'stop!'.

According to Itkonen (1980 : 110–111, footnote 3), in the eastern dialects, forms with monosyllabic stems also get back suffixes (*seista* 'stand-INF', *seissut* 'stand-PST.PTCP', *seistu* 'stand-PASS.PTCP' etc.). One of the possible explanations offered by Itkonen is that this change happened on account of intraparadigmatic analogy; that is, the suffixation of the forms with monosyllabic stems was adapted to the suffixation of bisyllabic stems. In other words, harmonic uniformity overrode the rules of harmonic suffixation. This explanation seems plausible, but it cannot be applied for the changes

⁴ This case is completely different from that of Hungarian, where stems containing neutral vowels are always suffixed with either front or back allomorphs of harmonizing suffixes, but not with front allomorphs for some suffixes and back ones for others.

⁵ Harmonic uniformity is violated in the paradigms of some pronouns: *minä* : *minu-* 'I', *sinä* : *sinu-* 'you (sg., informal)', *kuka* : *ken(e)-* 'who?'. Nonetheless, these paradigms are irregular in other ways, too. In this case, the notion of *harmonic uniformity* means a consistent usage of back or front harmonic suffixes inside the paradigm. This differs from the definition in Rebrus, Szigetvári 2016 : 102: "the root morpheme's harmonic property is inherited by the whole word", according to which a derived word inherits the harmonic class of its base despite its phonemic structure (the Hungarian verb *némít* 'to make mute' is suffixed by back harmonic suffixes because it is derived from *néma* 'mute').

mertä > *merta*, *vertä* > *verta*, since these changes took place against harmonic uniformity.

Another explanation offered by Itkonen (1980) is that eastern dialects have preserved the original consistent suffixation by back allomorphs from the age when forms with monosyllabic stems today still had the second syllable *o*. When the *o* was dropped, the suffixation — despite its irregularity — did not change. On the contrary, in western dialects, back allomorphs were replaced with front ones for the sake of morphophonological regularity. Recently, Pystynen (2019 : 157) has argued that *seis-* was developed from an earlier **sais-*, and *o* was not originally the part of the stem.⁶ However, morphophonological regularity cannot be an explanation for the case of *merta* and *verta*, which are irregular from the morphophonological point of view.

However, there is a third possibility, which is similar to the case of the eastern *seista* etc. Theoretically, *merta* and *verta* could be relicts of an earlier stage, when the ancestors of *meri* and *veri* were suffixed by back suffixes in all their forms (or at least in more forms than today) for some reason (the most obvious one could be that they contained a back vowel).

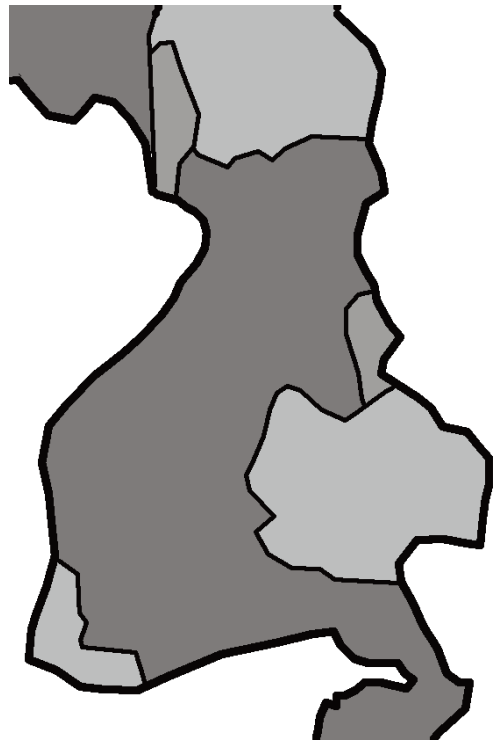
Nonetheless, no historical data to support this idea are known. The case of *veri* is straightforward: it is a word of Finno-Ugric origin, and the frontness of the vowels in the proto-word is not debated (cf. UEW 1152, Sammallahti 1988 : 551 etc.). The case of *meri* is a bit more complicated. The word exists only in Finnic, and the first syllable contains *e* in all the languages and dialects (Sköld 1996; EES). However, it must be an early Baltic or Germanic loanword, and in both cases it must have contained a back vowel in the first syllable. Therefore, one could suppose that the form *merta* is a relict from the period when the word had back vowels. In this case, we should assume a scenario in which *vertä* changed to *verta* due to the analogy of *merta*. However, this seems to be improbable.

First of all, even if we suppose that *meri* had a back vowel in its first syllable earlier, it is unclear what vowel it could have been. The vowel *õ* can be the only regular back ancestor of *e* — however, initial-syllable *õ* only occurred in words with a second-syllable *a* (Häkkinen 2019). Practically, if *meri* had a back vowel in its initial syllable earlier, it must have gone through a very irregular change at some point of its development.

Moreover, there is no other trace of the earlier back vocalism of *meri* than the form *merta* — which is parallel with the *verta* form of *veri*, which never contained back vowels. In addition, it seems that there are dialects with *verta* and *merta*, and also dialects with *vertä* and *mertä* as partitive singular forms of 'blood' and 'sea', respectively. But there seems to be no dialect with *merta* and *vertä*, which could be expected (or at least likely, although not necessary) if this was indeed the original case.

Geolinguistic arguments also support the idea that the form *merta* is not older than the form *verta*. According to Kettunen (1940 : map 172, cf. Map 1), the forms *mertä*, *vertä* occur in the Southwestern dialects, in Southern Savonian, in Northern Karelian dialects and in the Peräpohjola dialects (except for the westernmost parts of Finnish Lapland and the dialects outside Finland, including

⁶ Kuokkala (2018 : 31) does not definitely exclude the possibility of an earlier (Proto-Finno-Saamic) state with a second syllable *o*, but he argues that since "the southern Finnic languages have the stem vowel *-a* in this word, a labial vowel can be reconstructed for the Finno-Saamic proto-form only supposing that an illabial form was also preserved as a dialectal or functional variant".



Map 1. The occurrence of *merta* and *verta* (dark) vs. *mertä* and *vertä* (light) based on Kettunen (1940 : map 172). In the territories marked with a medium dark shade, both variants are attested of both words.

those which are referred to as independent languages nowadays). Moreover, Finnic languages do not have any parallel forms suffixed with a back allomorph, but some of them have a front allomorph even in the partitive singular (Karelian: Зайков, Ругоева 1999 : 105, 204; although Zaikov 1987 : 22 states that proper Karelian has *merta*, and only Livvi, where the vowel is high, has front suffixes: *merdy*; the forms of *veri* are not mentioned. Votic: VKS 712, 1501).

These facts suggest that the suffixation with back allomorphs is an innovation which began to spread somewhere in Western Finland. When a phenomenon is attested in different points of the periphery of a language area, it most probably signals that the phenomenon is a relict of an earlier stage, as it is not very probable that the same innovation occurs in different places. "If, of two linguistic forms, one is found in peripheral areas and the other in central areas, then the former is the older" (Chambers, Trudgill 2004 : 168).⁷ If the original forms were *merta* and *vertä*, and analogical adjustment happened all over the territory, one should expect a more mottled dialectal distribution.

As a consequence, we have to suppose that even if *meri* had back vocalism sometime earlier, this was not the situation anymore when the change *vertä* > *verta* (and, consequently, *mertä* > *merta*) began. Or, even if there were some traces of back vocalism, it did not play any crucial role in the change.

In addition, even if we were able to find any data supporting the preservation of *merta* from a period when the stem was generally suffixed with back allomorphs (e.g. a dialect exhibiting *vertä* alongside *merta*), it would not help much to explain the current situation. Although the change *vertä* > *verta* due to the analogy of the already existing partitive singular form *merta* cannot be excluded in principle, such probability is very low. In such

⁷ In fact, the authors cite a principle of geolinguistics (spatial linguistics), but they draw attention to the fact that this is rather a guideline than a law.

a situation, it is much more likely that the irregular *merta* gets regularized by general rules of harmony, intraparadigmatic analogy and the analogy of *vertä*. If the opposite happens, it must be supported by additional factors, unmentioned until now. But if such factors exist, they can engender the change *mertä* > *merta* in addition to the change *vertä* > *verta*. If we find such factors, it is needless to assume the existence of a primary form *merta* (but even if it did exist, it will not play a crucial role).

1.3. Previous attempts of explanation

Anderson (1980 : 285–286) suggests that the exceptionality of *merta* and *verta* can be explained by phonetic facts. Due to his explanation, *t* is often retroflexed after *r*. However, this kind of explanation is not really convincing, since there seem to be no other cases where the quality of consonants could affect vowel harmony in Finnish. In addition, the assumption that *t* after *r* is pronounced differently than otherwise has apparently never been supported by phonetic experiments. Moreover, experiments on Finland Swedish show that it lacks the retroflexion of *t* after *r* (Kuronen 2004 : 176–177; Puraja 2009 : 2, 21–23); therefore, it can be excluded that *r* after *t* in Finnish is retroflex due of the influence of Swedish pronunciation.

In the same year, Itkonen (1980 : 110–111, footnote 3) explains the changes *mertä* > *merta*, *vertä* > *verta* by the analogy of the stems *merta* 'pot (a trap for fishing crabs)' and *verta* 'extent, match', respectively. However, this explanation does not seem to be plausible either. The forms of **mertä* 'sea-PART.SG' and *merta* 'pot-SG.NOM' on the one hand and **vertä* 'blood-PART.SG' and *verta* 'match/extent-SG.NOM' on the other hand are not related semantically, and due to their different grammatical forms, they must occur in different contexts, where analogy cannot play any role. As a consequence, the base of analogy can only be the phonetic resemblance of the two forms.

In analogy, more frequent forms affect the less frequent ones. It is clear that both *meri* 'sea' and *veri* 'blood' are parts of the core vocabulary and are (and also must have been) very frequent in Finnish. On the contrary, *merta* 'crabbing pot' and *verta* 'extent, match' are much more specific, and therefore, less frequent words. Today the crabbing pot itself is rarely used, i.e., the frequency of the word *merta* 'crabbing pot' has declined. If we look for the word *merta* by Google, the search results will be the partitive forms of *meri*, whereas *merta* 'crabbing pot' occurs just as proper names of people or institutions (e.g. fishing center, cottage) etc. The word *verta* 'extent, match' is even rarer, and is usually used in its genitive form *verran*, which has developed into a postposition meaning 'to (some) extent, about'. We must suppose that these words were used more often in the past, but their frequency could not reach the frequency of *meri* and *veri* in the partitive singular.

In the corpus of old Finnish (VKK), *merta* occurs 64 times, and all the occurrences are partitive forms of *meri*. In the same corpus, *verta* occurs four times as the partitive form of *veri* and only once as 'extent'. In the form *werta*, however, it occurs 324 times: in this case, the proportions seem to be much more balanced. For example, 43 cases of *sen werta* 'as much as, quantity of', 10 times *yhden werta* and 10 times *saman werta* (both 'as much as, the same amount of') etc.. In addition, *mertä* occurs 10 times, always as the partitive form of *meri*; however, *vertä* occurs four times (always written as *wertä*).

2. Searching for a real explanation

Despite the counterarguments above, Itkonen could have been right at least partly. We cannot find any reasons for the exceptionality of the forms *merta* and *verta* in grammar, it is obvious that we suspect some kind of analogical effect of lexicalized stems. These words are bisyllabic forms with a neutral vowel in their first syllable. Monomorphemic stems with a similar phonemic structure often have a back harmonic vowel in the second syllable (*velka* 'debt', *kiista* 'dispute', *rieska* 'unleavened bread', etc.). Thus, it cannot be excluded that the change is a result of their power of analogy. This effect might be facilitated by the fact that the partitive singular forms, having a monosyllabic stem, are considerably isolated from the other forms of the paradigm;⁸ therefore, the intraparadigmatic analogy cannot support resistance to the analogical forces from outside the paradigm. Moreover, the striking similarity of the forms *merta* and *verta* itself suggests that we have to suppose an analogical effect: it is possible that at first one of these forms changed (or began to vacillate) and the other followed it.

Below, in the first subsection, words whose partitive singular forms have a monosyllabic stem will be collected. In the second subsection, it will be explored how isolated the partitive singular forms in the paradigm really are. In the next subsection, it will be explored what stems can assist to or hold up a change based on their analogy. Finally, in the last subsection, it will be discussed what sound patterns in use (in a corpus) can do the same.

2.1. Candidates for irregularity

If we accept the assumption that the two forms under discussion were changed by analogy, we have to find an explanation why other similar forms were not. No other form with a monosyllabic stem, containing a neutral vowel in the first syllable, is suffixed with a partitive case suffix with a back vowel. In order to explore how they are different from *merta* and *verta*, we have to list these words first. There are about 70 nominal words in Finnish which contain a neutral vowel in their first syllable of their bisyllabic partitive singular form. Out of these only two, *merta* and *verta*, contain a back vowel in the second syllable (see Table 1).

The involved stems have been collected from the subpages of AFNI (2020). If we compare these forms, we can see that *merta* and *verta* differ only in their first consonant, but both the vowel in the first stem (*e*) and the consonants between the two vowels (*rt*) are identical. However, they do differ from all other forms. On the one hand, we find some other words with *e* in their first syllable, but the consonants between the vowels of the partitive singular forms are different: *kettä* 'thin outer layer of skin', *mettä* 'nectar', *vettä* 'water'. On the other hand, we find some forms in which the consonants between the two vowels of the partitive singular forms are *rt*, but in these cases the vowels of the first syllable are different: *hiirtä* 'mouse', *piirtä* 'ring, district, region etc.'.

Theoretically, almost nothing restricts these combinations. Since there are no native CV stems with a short vowel, we could not expect to find parti-

⁸ At least in one of the two possible forms of plural genitive, we find the same monosyllabic stem (*merten* and *verten*), but in these cases the suffix *-ten* contains a neutral vowel. Therefore, this form cannot affect the vowel harmony of other forms.

Table 1

#(C)N(C)tA patterned partitive singular forms in Finnish (with KOTUS type in the upper index)							
C/V	short		long		diphthong		
	<i>i</i>	<i>e</i>	<i>ii</i>	<i>ee</i>	<i>ei</i>	<i>ie</i>	
<i>t</i>	<i>bitä</i> ¹⁸		<i>iitä</i> ¹⁸ etc. (10)	<i>ceetä</i> ¹⁸ etc. (~10)		<i>tietä</i> ¹⁹	
<i>ht</i>			<i>riihtä</i> ²⁴				
<i>lt</i>			<i>hiiltä</i> ²⁴ , <i>tiiltä</i> ²³			<i>kieltä</i> ²⁶ , <i>mieltä</i> ²⁶	
<i>nt</i>						<i>lientä</i> ²⁵ , <i>nientä</i> ²⁵ , <i>pientä</i> ²⁶ , <i>sientä</i> ²⁶	
<i>st</i>				<i>seestä</i> ⁴¹		<i>peistä</i> ³⁰ , <i>veistä</i> ³⁰	<i>iestä</i> ⁴¹ , <i>miestä</i> ⁴²
<i>tt</i>		<i>kettä</i> ²⁷ , <i>mettä</i> ²⁷ , <i>vettä</i> ²⁷	<i>hiittä</i> ²⁷ , <i>niittä</i> ²⁷ , <i>riittä</i> ²⁷ , <i>viittä</i> ²⁷		<i>heittä</i> ²⁷	<i>hiettä</i> ⁴⁸ , <i>liettä</i> ²⁷ , <i>riettä</i> ²⁷	
<i>rt</i>		<i>merta</i> ²⁴ , <i>verta</i> ²⁶	<i>hiirtä</i> ²⁴				
<i>rtt</i>	<i>hirttä</i> , <i>kirttä</i> , <i>virttä</i>						

tive forms with a short vowel and a single *t*. Nonetheless, there is a fresh loanword with the structure CV: it is *bi* with the partitive singular form *bitä*.⁹ We could not expect stems with *ee*, since historically it has changed into *ie*, but a number of loanwords exist with the pattern #Cee. On the contrary, many of the expectable patterns are not attested. Therefore, we have to suppose that the analogy between these patterns can be very weak in many cases. The interesting forms closest to *merta* and *verta* are, on the one hand, *kettä*, *mettä* and *vettä* (in which the two consonants are identical) and, on the other hand, *hiirtä* (in which the vowel is different both qualitatively and quantitatively). The forms *hirttä*, *kirttä* and *virttä* can also be considered relatively similar, since they contain a short vowel and the *rt* consonant sequence. Nonetheless, the quality of the vowel and the structure of the consonant cluster (and, consequently, the syllable structure) are different. This means that there are no similar forms that could have prevented or turned back the changes *mertä* > *merta*, *vertä* > *verta* analogically if the process was evoked by the analogy of other forms. Of course, we can assume such forms to have existed earlier,

⁹ However, this case is problematic. It is rather difficult to get reliable information on the pronunciation of fresh loanwords, and the available sources contradict each other. According to the English version of Wiktionary (<https://en.wiktionary.org/wiki/bi#Finnish>), *bi* can be pronounced both with a short and a long vowel. Nonetheless, according to the Finnish version of Wiktionary (<https://fi.wiktionary.org/wiki/bi#Suomi>), *bi* is always pronounced with a long vowel. Additionally, according to the English version, singular forms must be written with *i* and plural forms with *ii*, while according to the Finnish version, it is always written with *i*. An Internet search shows that both forms (written with *i* and *ii*) are used both in singular and plural forms. Anyway, it cannot be decided whether pronunciation with a short vowel occurs at all, at least for part of the speakers.

when the change happened, but no such forms are known. Even if they existed but have disappeared since then, they must have had a very low frequency, and consequently, no considerable power of analogy.

2.2. Isolation in the paradigm

We have to remember that the partitive singular forms *merta* and *verta* are unique in their paradigms due to the fact that they are the only forms in which these stems (*mer-* and *ver-*, respectively) are followed by a(n otherwise) harmonizing suffix.

Table 2

Key forms in the paradigm of <i>meri</i> 'sea'		
	singular	plural
nominative	<i>me.ri</i>	<i>me.re-t</i>
genitive	<i>me.re-n</i>	<i>me.ri-en ~ mer.-ten</i>
partitive	<i>mer.-ta</i>	<i>me.ri.-ä</i>
essive	<i>me.re.-nä</i>	<i>me.ri.-nä</i>
illative	<i>me.re-en</i>	<i>me.ri-in</i>
inessive etc.	<i>me.re-s.sä</i>	<i>me.ri-s.sä</i>

This can be important, because intraparadigmatic analogy cannot affect the forms here, and it cannot support any resistance against analogical effects from outside the paradigm. The case is similar with all of the words above in which the stem (the segment before *-tA* in the partitive singular form) ends in a consonant.

However, stems ending in a vowel (short, long or diphthong) behave differently. Vowel-final stems are always completely identical in all cases in the singular. In the essive case, even the syllable structure of the word is the same (although the essive itself is not very frequent; therefore, it cannot have a high power of analogy). In the case of stems ending in *ii* or *ei*, the stem is the same in all the plural forms, and most of the case forms (including the partitive) are homophonous in the two numbers (the only real exception is the genitive case). As a consequence, words with a vowel-final monosyllabic stem are much more resistant to an analogical effect of a form from outside the paradigm.

However, we still do not know why only the forms *mertä* and *vertä* should have been affected, while others with a stem ending in a consonant were not. To understand this, we have to examine not only the possible targets of analogy, but also the source of it.

2.3. The possible sources of the relevant influence

It is high time to examine which forms could have had sufficient power of analogy to evoke the changes *mertä* > *merta*, *vertä* > *verta*. We know that the change was already in process in the 16th century: the forms suffixed with the back allomorph of the partitive suffix prevail even in the earliest Finnish texts. Written Finnish emerged in the Turku region, next to the territory where front forms were used until recent times. (Despite the strong position of back forms in Standard Finnish, the change has not terminated yet, since many of the dialects have preserved the front forms.) However, it is much more difficult to get data for a statistical comparison from those times. On the contrary, it seems

to be appropriate to get data from contemporary Finnish. On the one hand, fresh loanwords can be excluded from the survey. On the other hand, the result can be improved if we find words which have become extinct since that time.

Data for contemporary Finnish were extracted from NSSL (2007). This word list contains almost 95,000 words (although most of them are compounds or derived forms, and only a small proportion of them are bisyllabic). Bisyllabic words with a neutral vowel in the first syllable and a low vowel in the second one were collected. They show the following distribution:

Table 3

The distribution of second syllable <i>a/ä</i> after first syllable neutral vowels							
V ₂ /V ₁	<i>i</i>	<i>e</i>	<i>ii</i>	<i>ee</i>	<i>ei</i>	<i>ie</i>	Total
<i>a</i>	174	88	44	8	20	20	354
<i>ä</i>	16	51	6	1	8	16	98

These statistics themselves may suggest that the analogy could result in a change from front to back allomorphs of the partitive singular suffix in all the cases presented above, because in all these cases back vowels prevail in the second syllable (although in a different proportion). However, these data include new loanwords (usually with a back vowel in the second syllable). Below, we will look at the VC(C) pattern which occurs in the partitive singular forms above.

To begin with *merta* and *verta*, the #(C)ertA pattern occurs besides the already mentioned *merta* 'crabbing pot' and *verta* 'match, extent' in the word *kerta* 'time (occasion), layer'. Importantly, there is no word with the pattern #(C)ertä. Additionally, the pattern #(C)NrtA is also represented by the pattern #(C)irtA: *pirta* 'weaving reed', *virta* 'flow, stream, river etc.', but there is no #(C)irtä. Based on these data, it seems to be plausible that these forms may have affected the partitive singular forms of *meri* 'sea' and *veri* 'blood'. Nonetheless, this kind of argumentation can be convincing only if we can exclude a similar effect in other forms, or at least we can demonstrate that the power of analogy cannot have affected in other forms.

One of the most similar sets includes *kettä*, *mettä* and *vettä*. We find no stems with the pattern #(C)etta, and there is only one word with the pattern #(C)itta: *mitta* 'measure'. However, we find one word with the pattern #(C)että: the conjunction *että* 'that', and there is no word with the pattern #(C)ittä. In this case, we find no words which could have affected the partitive singular forms of *kesi* 'thin outer layer of skin', *mesi* 'nectar' or *vesi* 'water', and, possibly, we can assume a countereffect of *että* 'that'.

The other most similar case, the pattern #(C)irttA (*hürttä*, *kirttä*, *virttä*), does not occur at all. The only stem with the pattern #(C)NrttA is *hertta* 'heart (in card games)' – a Swedish loanword, which has presumably always belonged to a peripheral part of the vocabulary.

The only remaining pattern with a short vowel is #(C)itA. Although Finnish has words such as *kita* 'mouth, throat', *rita* 'box trap' and *vita* 'pondweed', it also has *itä* 'East'. Moreover, the partitive singular of the foreign word *bi* 'bisexual', by all probability, follows the pattern of the partitive singular of the interrogative pronoun *mikä* 'what' and the demonstrative pronoun *se* 'it, that': *mitä* and *sitä*, respectively. The two partitive singular pronoun forms are too frequent to be affected by the analogy of a noun, especially when the nouns are not very frequent.

The forms with long vowels can be treated together. Since the original long vowel *ee* has changed into the diphthong *ie*, all the words with a first syllable *ee* are loanwords. The oldest one can be *eeva* 'woman' from the name *Eeva*. There are only two words with the pattern #*(C)iiCtA* in which *C* is not *t*: *kiista* 'dispute, quarrel' and *riista* 'game, hunted animal'. However, there are two words with the pattern #*(C)iitta*, the homonyms *viitta* 'sign' and *viitta* 'cape, cloak'. Although the second one is a Russian loan (< *свѣта*) and probably has never been a very frequent word, the first example is old and common. Additionally, the pattern #*(C)iita* also occurs: *riita* 'quarrel' and *viita* 'thicket of young trees', while the pattern #*(C)iittä* does not occur. Nonetheless, the pattern #*(C)iitä* is attested, although in just two homophonous, suffixed forms *siitä*: the elative singular form of the demonstrative pronoun *se* 'it, that' and the infinitive of the verb 'to be conceived, to procreate'. In these cases, an analogical effect similar to the one that may have affected *merta* and *verta* seems to be possible; nonetheless, it also seems to be weaker (there are fewer possibly affecting forms, and some possibly counter-affecting forms also occur).

The pattern #*(C)ei(C)ta* occurs in two different forms: *peitta* 'mordant' and *seita* 'Saami sacred place' (a loanword from Saami). The pattern #*(C)ei(C)tä* occurs in the suffixed verb form *seistä*, the infinitive of *seis-* 'stand' mentioned above. The pattern #*(C)ie(C)ta* occurs in the stems *hieta* 'silt, fine sand' and *siesta* 'siesta' (from Spanish). The pattern #*(C)ie(C)tä* occurs in the suffixed forms *piestä* (infinitive of 'to beat, to thrash etc.'), *pietä* (infinitive of 'to pitch'), *sieltä* (the singular delative form of the demonstrative pronoun *se* 'it, that'), *sietä* (both the infinitive form of 'to become deeper' and 'to be conceived, to procreate', an alternative form of the above mentioned *siitä*), *tietä* (an alternative form of *tietää*, the infinitive of 'to know').

These data show that based on the lexicon, most probably the #*(C)NrtA* forms could be affected by stems. However, based solely on these data, it would not be really convincing to state that stems had such an impact on the forms **mertä* and **vertä* that they had to change.

2.4. The role of sound pattern frequency

The calculations above are based on lexicon and grammar but ignore the real frequency of the given patterns. Once again, we are able to check the frequencies of different phonemic patterns in contemporary Finnish. The calculations below are based on KSKST, which was generated from Parole (1998). The corpus includes books and newspapers. For the extraction of statistical data, the narrow list was used, which contains only those word forms which occur at least three times in the corpus. This material contains 362,514 types (16,447,716 tokens).

All the words in which the vowel of the first syllable is neutral but that of the second is (a short) *a* or *ä* and the consonants between them are those which also occur in the partitive singular forms discussed above (see Table 1) were collected. Table 4 presents how many of these patterns occur and what the proportion of the pattern with *a* among similar patterns is. The patterns which also occur in the partitive singular forms are given in bold.

Table 4

The proportion of second syllable *a* (vs. *ä*) after first syllable neutral vowels, and *t* and certain *t*-final consonant clusters in texts

C/V	short		long		diphthong	
	<i>i</i>	<i>e</i>	<i>ii</i>	<i>ee</i>	<i>ei</i>	<i>ie</i>
<i>t</i>	10249 70045 13%	3159 3334 49%	2314 3790 46%	88 229 28%	19 5912 0%	3112 4251 42%
<i>ht</i>	71 0 100%	38 10409 0%	0 621 0%	0 0 –	0 0 –	6 0 100%
<i>lt</i>	5344 3487 61%	245 6 98%	0 709 0%	0 0 –	0 946 0%	0 8432 0%
<i>nt</i>	5676 3 100%	223 4352 5%	0 20 0%	0 0 –	0 0 –	180 1183 13%
<i>st</i>	2194 4659 32%	5728 5984 49%	1673 5624 23%	5 28 15%	5 3228 0%	100 2550 4%
<i>tt</i>	2240 0 100%	32 156380 0%	2015 6087 25%	85 385 18%	0 1338 0%	0 1381 0%
<i>rt</i>	2274 3 100%	2415 0 100%	0 1687 0%	0 0 –	0 0 –	3 977 0%
<i>rtt</i>	0 46 0%	154 0 100%	0 0 –	0 0 –	0 0 –	0 0 –
Total	28048 78243 26%	11994 180465 6%	11994 180465 6%	178 642 21%	24 10478 0%	3401 18794 15%

The table shows that although first syllable neutral vowels are rather followed by a second syllable *a* than *ä*, there are some exceptional subpatterns where the opposite is true, at least when the neutral vowel is short. Although the patterns preferring *a* could have affected the partitive singular forms, the actual partitive singular forms only occur with the #(C)ertA pattern among these.

Of course, the table is somewhat misleading in this form, because the data on the #(C)ertA pattern are from contemporary Finnish, and they include the partitive singular forms of *meri* 'sea' and *veri* 'blood'. Therefore, it is necessary to have a closer look at the data belonging to this pattern.

Among the 2415 occurrences of the pattern #(C)ertA, 844 begin with *m* or *v*. If all of these were forms of *meri* and *veri*, it would mean that about a third of the patterns would contain *ä* and two thirds would have *a*. The form *verta* itself occurs 565 times, *merta* 105 times (670 times together) — of course, some of these can be the nouns *merta* 'crabbing pot' and *verta* 'match/extent' —, while *kerta* occurs 940 times. The data suggest that the verbs derived from *kerta* 'time, occasion, layer' and *verta* 'extent', *kerrata* 'to repeat'

and *verrata* 'to compare', respectively, could considerably contribute to the frequency of the #*(C)erta* pattern. However, the extent of this contribution is difficult to measure, since, e.g., the form *vertasi* (103 occurrences) can be 'blood-PART.SG-2SG', 'extent-SG.NOM-2SG' and 'compare-PST-3SG' as well. Anyway, the most probable scenario is that because of the prevalence of the pattern #*(C)erta* over the pattern #*(C)ertä*, the forms representing the latter one, such as *mertä* 'sea-PART.SG' and *vertä* 'blood-PART.SG', began to vacillate with *merta* 'sea-PART.SG' and *verta* 'blood-PART.SG', since the appearance of the latter forms made the pattern #*(C)erta* even more frequent. As a result, disharmonic forms can indeed have displaced the original harmonic ones.

Additionally, some patterns similar to #*(C)ert* also show a strong dominance of *a* over *ä* in the next syllable. The pattern containing the other short neutral vowel, *i* instead of *e*, i.e. #*(C)irt*, is also nearly always followed by *a*. If we see patterns with a geminate *t*, that is #*(C)ertt*, it is never followed by *ä* either. If we replace the *r* with the other liquid, *l*, #*(C)elt* is also dominantly followed by *a*. Although it is difficult to determine how strongly these "neighbouring" patterns can affect (or other similar patterns counteract) these forms, in this case, the nearest patterns rather strengthen than weaken the effect of the pattern #*(C)ert*.

The data suggest that contrary to the suggestion of Anderson (1980 : 285–286), the choice between front and back vowels (or, at least *a* and *ä*) does not simply depend on the quality of the consonants. The back *a* is preferred after after *irt*, *ert* and *ertt*, but not after *irtt*. The back *a* also prevails after *iht*, *int* and *itt*, , but it remains in minority after *eht*, *ent* and *ett*. In the case of *lt*, we find an inverse tendency: although the back *a* is also preferred after *ilt*, it is much more preferred, almost exclusive after *elt*; and it is almost exclusive after *int*, but rare after *ent*. Consequently, it is rather a matter of chance which harmonic class is preferred after a certain *NCt* pattern.

3. Historical and dialectal data

Although our argumentation is based on data of contemporary standard Finnish and can be challenged by historical and dialectal data, it offers a more circumspect and credible explanation than those offered before. Apparently, there are no historical and dialectal corpora comparable to NSSL and KSKST. However, the historical and dialectal corpora available do not show any traces of words with the structure #*(C)Nrtä*.

In VKK, there are 108 words which contain the sequence *ertä*. Among these, only the words *mertä* and *vertä* (*wertä*) show the structure #*(C)ertä*:¹⁰ In all other cases, either the sequence occurs in further syllables (e.g. *ymmertä*, *wihertä*, *wisertä*, etc.) or *e* is the second element of a diphthong (e.g. *wiertä*, *kiertä*, etc.). The sequence *irtä* occurs only in *virtä* (*wirtä*), *hirtä* and *sirtä*, the Standard Modern Finnish equivalents are *virttä* 'psalm-PART', *hirttä* 'timber-PART' and *siirtä(ä)* 'move-PRS.3SG' — that is, all these cases occur because of the inconsistent/inaccurate marking of (consonant and vowel) length.

For dialect data, LAM was analyzed. It contains 133 texts from various Finnish dialects. 140,817 different forms (types; 969,679 tokens) were counted.

¹⁰ There is also a form *kertä*, but it must be some kind of typo (*caxi kertä wuodes* — Standard Modern Finnish *kaksi kertaa vuodessa* 'twice a year').

Since each text represents a different dialect, statistical analysis of this corpus might be problematic. On the one hand, the proportions of phoneme sequences in the whole corpus cannot say anything about the different dialects (because the proportions can strongly differ in different dialects). On the other hand, texts from a certain dialect are not large enough for a reliable statistical analysis. However, the results suggest that these concerns are irrelevant in our case.

The most important observation is that although the corpus contains 183 occurrences of the pattern #(C)*erta*, it does not contain any cases of the pattern #(C)*ertä* (despite that the corpus contains texts from dialects where the forms *vertä* and *mertä* could occur).¹¹ The most frequent forms are *kerta* (82), *verta* (66) and *merta* (11). Similarly, #(C)*irta* occurs 40 times (*virta* (10), *pirta* (4), etc.), but #(C)*irtä* only once (*hirtännä*). This means that the pattern #(C)N*rta* is highly dominant over the pattern #(C)N*r*tä throughout the Finnish dialects.

In addition, all other #(C)N(N)C*tA* patterns relevant for us (i.e. those realized as the partitive singular form of a word, bolded in Table 4) predominantly have a front *A*. We find the highest proportion of a second syllable back open vowel in the following cases: 29% #(C)*eistA* (14 *a* vs. 34 *ä*), 25% #(C)*ientA* (11 *a* vs. 33 *ä*), 15% #(C)*eetA* (11 *a* vs. 33 *ä*), 11% #(C)*iihtA* (6 *a* vs. 47 *ä*), 6% #(C)*eestA* (2 *a* vs. 28 *ä*). In all the other cases, the proportion of the forms with a second syllable back open vowel is between 0% and 2%. The proportions do not change considerably even if we count cases with long vowels, diphthongs and vowel sequences. The only considerable difference is in the case of #(C)*irttA*: 37% (3 *a*: *virttaan* (2), *irttaottaa* (1) vs. 5 *ä*: *hirttä* (3), *virttä* (1), *hirttäntys* (1)). In any case, the relatively high proportion of forms with a second syllable back open vowel occurs when the pattern is relatively rare (less than a hundred cases with either of the vowels).

To sum up: dialectal data show that the only phoneme patterns which can trigger an analogical change in partitive singular forms are #(C)*irta* and #(C)*erta*. Since there are (and were) no partitive singular forms #(C)*irtä*, in this case, the change remained a theoretical possibility. However, the partitive singular forms of *meri* 'sea' and *veri* 'blood', *mertä* and *vertä*, could and did change into *merta* and *verta*, respectively.¹²

4. Conclusion

Instead of phonetic factors, it is the lexicon that must have played a crucial role in the change *mertä* > *merta*, *vertä* > *verta*. The fact that the pattern #(C)*ertä* occurred only in two suffixed forms, but the pattern #(C)*erta* was preponderant otherwise (in stems), led to the change in the suffixed forms. Itkonen (1980 : 110–111, footnote 3) must be right in that the stems *merta* 'crabbing pot' and

¹¹ Again, only patterns with a short *a* and *ä* were counted, whereas long vowels and diphthongs, and even short vowels followed by another vowel were ignored. However, the most frequent pattern belongs to this group: *kertaa* (317).

¹² The anonymous reviewer drew my attention to the dialectal word *keri* 'crust, upper layer'. It is of Finno-Ugric origin (UEW 289) and its partitive singular form should be **kerta* or **kertä*. However, no data were found on its partitive singular form. According to the SMS, the word is attested in six locations only (https://kaino.kotus.fi/sms/?p=map&map_id=163821), one of which lies on the territory where *mertä* and *vertä* are used. Expectedly, the partitive singular form of *keri* 'crust, upper layer' follows the pattern of the partitive singular form of *meri* and *veri*. Nevertheless, without reliable data, it is just vague speculation.

verta 'extent, match' must have played an important role in this change; at least in the sense that without them (and more importantly, without words derived from *verta*), the change could not have happened. However, what is important here is not the similarity of these stems or unsuffixed forms on the one hand and the partitive singular forms of *veri* and *meri*, respectively, on the other hand. These are not frequent enough to provoke a change by the power of analogy. On the contrary, it is the frequency of the word initial pattern #(C)erta that can be a reason for such a change. There is also a theoretical possibility that the form *merta* 'sea-PART' is a relict from the age when the word 'sea' contained a back vowel in its initial syllable. If so, the analogy of the form *merta* 'sea-PART' could also indicate the change *vertä* > *verta* 'blood-PART'. However, this supposition is not supported by dialectal or comparative linguistic data, and the change *vertä* > *verta* 'blood-PART' could happen simultaneously with the change *mertä* > *merta* 'sea-PART', irrespective of the former (hypothetical) backness of the initial vowel in the latter form.

This explanation makes it possible to define the time of the change. Since the relevant sources of analogy are the words *kerta* 'time, occasion', *merta* 'crabbing pot' and *verta* 'extent, match', the change cannot be older than these words in Finnish. According to EES¹³, *kerta* is a Baltic (or, less probably, a Germanic) loan, *merta* and *verta* are Germanic loans. However, their equivalents in South Finnic languages, that is in Estonian, Votic and Livonian, contain a back vowel (usually *õ*, although the Estonian equivalent of *kerta* is *kord*). Although it is not self-evident at first sight that the direction of the change is *õ* > *e* and not *e* > *õ*, Kallio (2014 : 160–161) argues that the former development is more likely. Since in these words *õ* is present in distinct branches of Finnic, that is in South Estonian (1), in Livonian (2) and in Estonian and Votic (3), the assumption of a change *e* > *õ* would mean crossing dialect boundaries. However, these words contain *e* in North Finnic, i.e. in Finnish, Karelian and Veps, which form a clear dialect continuum. Consequently, the analogical effect of *kerta*, *merta* and *verta* on the partitive forms of *meri* 'sea' and *veri* 'blood' could only begin to show when North Finnic had separated from the other Finnic dialects, and the change *e* > *õ* had happened. According to a cautious estimate by Kallio (2014 : 165), it could happen at the end of the Viking Age, that is in the 11th century. This seems to be the earliest point of time when the change *mertä* > *merta* 'sea-PART' and *vertä* > *verta* 'blood-PART' could begin.

It is also an important factor that both *mertä* and *vertä* were isolated in their paradigm, being the only truncated (consonant final) stems to which a harmonizing suffix was attached. Although there were other sound patterns which could have provoked a similar change, and there were also other partitive singular forms which could have been exposed to such an effect of analogy, only these two forms were those in which the conditions met. And although the coincidence of the two conditions itself was not enough to predict such a change, they can convincingly explain an attested change and a persistent irregularity in an otherwise regular phenomenon such as Finnish vowel harmony.

The results show that the irregularity of the partitive singular forms *merta* and *verta* is relative. They are irregular from the point of view of the #CN(C)-tA pattern, but they are completely regular from the point of

¹³ <https://www.eki.ee/dict/ety/index.cgi?Q=kord>; <https://www.eki.ee/dict/ety/index.cgi?Q=m%C3%B5rd>; <https://www.eki.ee/dict/ety/index.cgi?Q=v%C3%B5rd>.

view of the #CVrtA pattern. The point of interest of the case derives from the fact that these kinds of patterns rarely conflict: this kind of conflict seems to be unique in Finnish vowel harmony as well.

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Abbreviations

AFNI 2020 — Appendix: Finnish nominal inflection. https://en.wiktionary.org/wiki/Appendix:Finnish_nominal_inflection; **KOTUS** — Kotimaisten kielten keskus; **KSKST (2016)** — Kirjoitetun suomen kielen sanojen taajuuksia. <http://kaino.kotus.fi/sanat/taajuuslista/parole.php>; **LAM** — Lauseopin arkiston murrekorpuksen ladattava VRT-versio. Kielipankki. <http://urn.fi/urn:nbn:fi:lb-2019092001>; **NSSL 2007** — Kotimaisten kielten keskuksen nykysuomen sanalista. <http://kaino.kotus.fi/sanat/nyky-suomi/>; **Parole 1998** — The Finnish Parole Corpus. Kielipankki. <http://urn.fi/urn:nbn:fi:lb-2016042612>; **SMS** — Suomen murteiden sanakirja. Helsinki 2012 (Kotimaisten kielten keskuksen verkkojulkaisuja 30). <http://kaino.kotus.fi/sms>; **VKK** — Vanhan kirjasuomen korpus. Kielipankki. <http://urn.fi/urn:nbn:fi:lb-201407165>; **VKS** — Vadja keele sõnaraamat. 2., täiendatud ja parandatud trükk, Tallinn 2013.

— word boundary; - — morpheme boundary; **1** — first person; **2** — second person; **3** — third person; **A** — *a* or *ä* (short); **C** — consonant; **COL** — collective; **INF** — infinitive; **N** — neutral vowel (including long vowels and diphthongs); **NMLZ** — nominalizer/nominalization; **NOM** — nominative; **PART** — partitive; **PASS** — passive; **PST** — past; **PTCP** — participle; **SG** — singular; **V** — vowel.

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ЛАСЛО ФЕЙЕШ (Будапешт)

**ОБЪЯСНЕНИЕ НЕОБЪЯСНИМОГО:
АНТИГАРМОНИЯ В ФИНСКОЙ ФЛЕКСИИ (*merta* И *verta*)**

До сих пор не было предложено убедительного объяснения исключительной дисгармонии в финских словоформах *merta* 'море-PART.SG' и *verta* 'кровь-PART.SG'. В этой статье утверждается, что причина этого явления комплексна. С одной стороны, начальный образец слова #(*C*)*ertä* встречался только в этих двух формах, тогда как образец #(*C*)*erta* был — и остается — гораздо распространнее. С другой стороны, изменению форм под давлением аналогий способствовало то, что они были изолированы внутри парадигмы; и поэтому внутрипарадигматическая аналогия не могла замедлить изменение.

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**SELETUS SELETAMATULE:
SOOME VOKAALHARMOONIATA PARTITIIVID *merta* JA *verta***

Soome vokaalharmoniata sõnavormidele *merta* 'merd' ja *verta* 'verd' pole seni veenvat seletust pakutud. Artiklis väidetakse, et sellisel erandlikul nähtusel on mitu põhjust. Ühest küljest esines algne muster #(*C*)*ertä* ainult neis kahes sõnas, samal ajal kui muster #(*C*)*erta* oli ja on palju levinum. Teisest küljest võimendas selle levinuma mustri analoogiasurvet asjaolu, et partitiivivormid *mertä* ja *vertä* olid konsonanttüvelistena paradigma sees vokaaltüvelistest isoleeritud, ning seetõttu ei saanud paradigmasisene analoogia vokaalharmonia kadumist takistada.