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On the question of substitution of palatovelars in Indo-European loanwords into Uralic

In this paper, the Indo-European etymologies of Uralic words are analyzed that allegedly contain reflexes of Proto-Indo-European palatal stops (palatovelars) *$\acute{k}$, *$\acute{g}$ and *$\acute{g}^h$. Especially Jorma Koivulehto has in many works argued that words that show these reflexes attest to very early contacts between Indo-European and Uralic, and these ideas have been very influential in the discussion of the location and dating of early varieties of Uralic, and to a lesser extent, Indo-European languages. While most of these etymologies are convincing in that they are indeed borrowed from Indo-European, a critical examination leads to the conclusion that they can be considered loanwords from later branches (such as Indo-Iranian) that had already gone through satemization (the merger of plain velars with labiovelars and change of palatovelars to affricates or sibilants). Some etymologies also turn out to be unconvincing in the light of modern views of Uralic and Indo-European historical phonology. These results support other recent, more skeptical views of contacts between Proto-Indo-European and Proto-Uralic and mean that many of the extra-linguistic conclusions based on earlier loanword studies have to be considered unreliable, which is in line with recent studies of prehistory.

1. Introduction[1]

The question of the earliest Indo-European loanwords into Uralic has been intensively discussed in recent decades, especially by Jorma Koivulehto (1991; 1999b; 2001), as well as by Pekka Sammallahti (1999; 2001), Petri Kallio (2009: 32–33; see also Kallio 2006: 10–11) and Jaakko Häkkinen (2009: 41–43) (for earlier sources on the early loanwords, see e.g FUV: 128–141; Joki 1973). While there clearly are loanwords from various branches of Indo-European into the Uralic languages, the idea of borrowings from the Indo-European proto-language into Proto-Uralic is a more controversial issue, and there are various criteria that have been used to show that the word in question is borrowed from Indo-European.

One of these is the old idea, originally suggested by Aulis J. Joki (1959: 52, 1973: 303), that Proto-Indo-European or North-West Indo-European *$\acute{k}$, *$\acute{g}$, *$\acute{g}^h$ are reflected

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by the Proto-Uralic affricate *ć in early loanwords.[2] This idea has been further developed by Jorma Koivulehto in numerous studies (Koivulehto 1983; 1991; 1999b; 2001; 2006).

In addition to *ć, also other substitutions for PIE *ǵ(^{h}) have been claimed, such as the PU glide *j and the velar-spirant *γ. Those cases will also be discussed here.

In addition to Koivulehto's Proto-Indo-European loan etymologies, the retained palatovelars are also found in some etymologies that are considered "Pre-Indo-Iranian" in the works of Rédei (1986) and Katz (2003). Phonologically, the latter etymologies could be simply considered Proto-Indo-European, and it is only a matter of terminology that both Rédei (1986) and Katz (2003) have called these loanwords "Indo-Iranian".[3] As this stage is practically Proto-Indo-European, those etymologies are also included in the present discussion.

It has to be noted here that Rédei's criteria for Indo-European loanwords were not very clear, and in general he assumed that all the earliest Indo-European loanwords were borrowed from an early form of Indo-Iranian, even if there were no arguments to support this (this idea has been criticized especially by Gippert 1985 and Katz 1987; see also Holopainen 2019b: 7). Although Katz operated with very different views of Uralic and Indo-European etymology, his ideas resemble Rédei's in that he had very broad criteria in labeling loanwords "Indo-Iranian". This can also be seen from the fact that Katz (2003) has also suggested a few words which, he assumes, are borrowed from a stage of Indo-Iranian that still retained the palatovelars, but where Uralic languages show velar *k as the substitution of *ḱ. Like Rédei's views, also the etymologies of Katz have been criticized (see especially Aikio & Kallio 2005; Pinault 2007).

In addition to retained palatovelars, a few etymologies have been suggested that allegedly show reflexes of the Proto-Indo-European labiovelars (*k^w, *g^w, *g^{wh}). Koivulehto (1991: 68) argues that Uralic *kulki- 'to go' (> Fi kulkea, Hu halad 'to proceed') is borrowed from Indo-European *k^{w}elh$_1$- (> Sanskrit carati 'goes'), and the Uralic *u-vocalism is due to the labializing effect of *k^w (otherwise one would expect *e as the substitution of Indo-European *e). A similar example is Fi kutsua, North Saami gohččut 'to invite' < *kućću-[4] which, according to Koivulehto (1999b: 261–62), is a possible loanword from Proto-Indo-European *g^{w}ot-yo- (> Armenian kočem 'to name, call'). In this case the u rather than o-vocalism in the Uralic side

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2.   There is an ongoing discussion in Uralic linguistics on whether Proto-Uralic *ć and *ś are the same phonemes. In the traditional reconstruction in sources like UEW, both phonemes are reconstructed, but recent research has shown that there are no minimal pairs to support this opposition, and only one phoneme can be reconstructed in the place of these two (see Zhivlov 2014: 114, footnote 3). In this paper, *ć is used throughout.

3.   Note that it is commonly accepted that there are very early Pre-Indo-Iranian loanwords in Uralic (such as SaN geavri 'circular thing' < PWU *kekrä ← *kekro- 'wheel', Hu méh < PU *mekši 'bee' ← Pre-Indo-Iranian *mekš-), but these can be in most cases distinguished from possible Proto-Indo-European loanwords as they show some Indo-Iranian characteristics (such as the RUKI-rule or *r from PIE *l), even if the Proto-Indo-European vocalism is still retained.

4.   A Khanty cognate for this Finno-Saamic word has been suggested earlier (see SSA s.v. kutsua) but this is refuted by Aikio (2014a: 1–2) as phonologically irregular.

would result from the substitution of *g^w. However, this word also has a competing Baltic etymology (← Proto-Baltic *kwaityia- > Lith kviečiu, kviesti 'call; invite; challenge', likewise suggested by Koivulehto himself), which means that little value can be given to this possible Indo-European loan etymology.

Since the labiovelars merged with the plain velars in the satem languages (see below), the existence of such words could likewise be seen as proof of very early contacts between Proto-Indo-European and Uralic, but there are so few potential examples that little value can given to them. The Indo-European etymology of *kulki- has been doubted by Simon (2020: 246–247), who notes both the lack of parallels of the substitution of PIE *k^w and also of the cluster *lh_1, which means that there are no unambiguous examples of loanwords that display Proto-Indo-European labiovelars.

Koivulehto (1983) argued that loans from an archaic Indo-European language into western Uralic languages would support the early arrival of Uralic speakers to the Baltic Sea region. This language has been called North-West Indo-European in later sources (such as Koivulehto 1999b; 2001), and on the level of phonological reconstruction, it is practically identical to Proto-Indo-European, which means that the three series of velars were retained (as well as the other peculiarities of Proto-Indo-European, such as the system of the three laryngeal consonants; for PIE phonology in general, see Kapović 2017: 13–60; Byrd 2017).

These explanations involve several problems: 1) the environments for the various different substitutions are not clear in all cases, which makes many etymologies dubious; 2) in most instances it is impossible to prove that PU *ć does not reflect later satem developments (Indo-Iranian *ć, *ʒ́(h) or Balto-Slavic *ś, ź; cf. also Koivulehto 2006; Kallio 2008; 2009); 3) due to recent advances in the study of Uralic historical phonology (especially Aikio 2012; 2015b), some of the reconstructions that the earlier etymologies are based on (taken from sources such as Sammallahti 1988 or the UEW) can now be considered outdated.

This means that because many of the etymologies can be explained otherwise, there is not enough evidence to assume that there is a layer of loanwords in Uralic that would result from contacts with Proto-Indo-European or an early Indo-European language which still had the three-way system of velars.

2. The problems of early Indo-European loanwords into (Proto-)Uralic

It is often assumed in more recent research that there were contacts already between Proto-Indo-European and Proto-Uralic (see Koivulehto 1991; 1999b: 12–13; Sammallahti 2001; Kallio 2009: 32; Hyllested 2014: 9–24; Bjørn 2017: 129–134). Earlier research was more cautious about assuming contacts between the two proto-languages (see Joki 1973: 363–363), and it was often assumed that the earliest Indo-European loanwords from Uralic were borrowed from Indo-Iranian. This view was also supported by Rédei (1986), who however reconstructed Indo-Iranian forms that were identical with Proto-Indo-European (for criticism of Rédei's views, see Gippert 1985).

The contacts between the two protolanguages have been questioned recently (Simon 2020; Aikio [in press]). The Indo-European and Uralic protolanguages were often considered to have existed at the same period roughly 6000 BP (Koivulehto 2001: 235–236, 257–260), but in more recent research (see especially Kallio 2006; J. Häkkinen 2009; Parpola 2012: 147, 169), the dating of Proto-Uralic has been considerably later (ca. 4000 before present), making it much younger than Proto-Indo-European (the split of which is commonly dated to ca. 4000 BCE; Mallory 1989: 107–109; Anthony 2007; Parpola 2012: 122–123; Anthony & Ringe 2015; Serangeli 2019: 3–4), which means that it is less probable that the three-way stop-system with palatovelars was intact by the time of the earliest contacts between the two families. Koivulehto's arguments were based on earlier views on both the dating of the spread of western Uralic (such as Korhonen 1976) and the archaeology of Northern Europe (such as Moora 1956).

J. Häkkinen (2009: 41–43) has argued for a later dating of the apparent PIE loans, considering them contemporary to Indo-Iranian loanwords. J. Häkkinen assumes that these words do not represent borrowings from Proto-Indo-European but rather from an early IE daughter language. This is a reasonable idea, and if most of the early IE loans are rather from some early satem language, it reinforces the plausibility of this idea.

At the present moment, it remains uncertain how much evidence there is for the contacts between the two protolanguages. The loanwords that according to Koivulehto show the retained Proto-Indo-European stop-system are important in this regard: if these etymologies are correct, they give evidence for very early contacts between the two families, possibly between Proto-Indo-European and Proto-Uralic.

Although Proto-Indo-European loanwords in Uralic are a controversial issue, the existence of a very early Indo-Iranian loanword layer in Uralic is universally accepted, and it is clear that at least in Proto-Finno-Ugric (in the traditional sense) there were Indo-Iranian loanwords, such as *ćita 'hundred' ← PII *ćatám 'id.' and *ora 'awl' ← PII *(H)ā́ra- 'id.' (Korenchy 1972; Joki 1973; Koivulehto 2001: 247–257; Parpola 2015: 63–67; Holopainen 2019b). Although earlier sources are more cautious about the idea of Proto-Indo-Iranian loanwords that would have clearly been acquired into Proto-Uralic, in the sense that their distribution stretches from the Samoyed branch to the so-called Finno-Ugric languages, it has been recently shown (Holopainen 2019b: 343–344) that there are some possible examples of Indo-Iranian loans having a wide Uralic distribution (stretching to the Samoyed branch), and more importantly, the validity of the distribution of loanwords as an argument has been brought into question, especially due to alternative taxonomic models that question the early split into Proto-Samoyed and Proto-Finno-Ugric (K. Häkkinen 1983: 211; Salminen 2002; J. Häkkinen 2009).

The possibility of Balto-Slavic or "Pre-Baltic" loanwords has been discussed in detail in various works of Koivulehto (1983; 1999b; 2006), and also Sammallahti (1999; 2001) has suggested some Balto-Slavic loans. Similar ideas have been presented in some works of Napol'skikh (Napol'skikh & Engovatova 2000; Napol'skikh

2015) and recently Kallio (2009; manuscript) has found new evidence for this layer. Junttila (2016) has also argued for the existence of a layer of Balto-Slavic loanwords in Finnic, arguing that some loanwords whose origin is attested only in Slavic represent borrowings into Finnic from Balto-Slavic.

Koivulehto's criteria for Balto-Slavic or Pre-Baltic loanwords has been that the words have a distribution limited to Balto-Slavic, and that the words show the change from palatal stops to palatal sibilants. The term Pre-Baltic is also used by Heikkilä (2014: 86) for this layer of the earliest Baltic loanwords. While there are several sound changes separating Proto-Balto-Slavic from Proto-Indo-European (Kortlandt 2009: 43–50), the change of the palatovelars to palatal sibilants is one of the most remarkable, especially from the point of view of loanwords. There are few phonological criteria that can help in distinguishing Proto-Indo-Iranian and Proto-Balto-Slavic loanwords from potential Proto-Indo-European loanwords: even though there were changes in both consonantism and vocalism, the divergent sound-substitutions of vowels make it difficult to distinguish different phonemes, as Uralic *o can reflect a substitution of both retained Indo-European *o as well as Proto-Indo-Iranian (and possibly Proto-Balto-Slavic) *a (Koivulehto 2001: 248; Holopainen 2019b: 48, 327–328). With loanwords showing original Indo-European *e, the situation is different, of course, as this was substituted by Uralic *e.

Many of Koivulehto's suggestions involve words and wordforms that are reflected in the Germanic branch of the Indo-European family. However, Kallio (2009: 40) notes that the Germanic branch has retained Proto-Indo-European vocabulary very well and thus early loanwords that have reflexes in Germanic languages could well originate from earlier forms of Indo-European, as these words could have originally had larger distribution within Indo-European. The distribution of cognates is in any case a problematic criterion, as retention of inherited vocabulary is uneven among related languages (for discussions of distribution and its impact on loanword research, see for example Aikio & Aikio 2001). Note that the notion of "Pre-Germanic" loanwords is not entirely clear, as Koivulehto occasionally uses the term for words that reflect PIE reconstruction but are only found in Germanic, but in other publications he has defined the term more clearly, denoting loanwords that stem from an early form of Germanic that already went through the centum changes but have not yet been affected by many Proto-Germanic changes proper such as Grimm's law (see Koivulehto 2002).

Napol'skikh & Engovatova (2000) criticized many of Koivulehto's etymologies already soon after their publication, see also Napol'skikh (2015: 147, 160). Rédei (2002) also criticized some of Koivulehto's etymologies that point to substitutions of palatal stops. Some of the etymologies were also commented on and cautiously supported by Katzschmann (2005: 106, 107, 111).

Several researchers assume that many of the lexical cognates result from a genetic relationship between Indo-European and Uralic (see, for example, Helimski 2001; Kassian, Zhivlov & Starostin 2015), but this Indo-Uralic relatedness is by no way universally accepted (see Kallio 2015a and Holopainen 2020 for criticism).

However, most of the etymologies discussed here are not included in any of the recent studies of Indo-Uralic, and there is no question about these being loanwords rather than inheritance.

It is widely accepted that the earliest loanwords from the Indo-European languages were borrowed already into the Uralic proto-language (Rédei 1986; Koivulehto 1991). However, most of the early loanwords have a limited distribution in the so-called Finno-Ugric languages, and this is especially true of the loanwords that can be considered Indo-Iranian. Also, the possible Balto-Slavic loans usually have a western (West Uralic or "Finno-Permic") distribution (Koivulehto 2006).

Distribution has been traditionally considered an important criterion in the dating of loans (Rédei 1986), but this has received heavy criticism in subsequent loanword studies (K. Häkkinen 1987; Koivulehto 1999a: 208–209; Kallio 2012: 227; Holopainen 2019b: 43–45). There are early loanwords from Indo-European languages that occur only in Finnic or Saami, but they were clearly borrowed into a variety of Uralic that still had a phonological system identical to Proto-Uralic. It has been assumed that some loans were borrowed into Proto-Finno-Permian or Proto-Finno-Volgaic or, in later research, into Proto-West Uralic (a stage preceding the divergence of Finnic, Saami and Mordvin according to J. Häkkinen 2009), but since all of these stages are practically identical on the phonological level, it is very difficult to distinguish different layers in these loans. As there is no consensus on the internal taxonomy of Uralic (Salminen 2002; J. Häkkinen 2009; Kallio 2015b: 80–83), it is difficult to ascertain to which proto-language the loanwords were borrowed into. In this work, for the sake of clarity and convenience I use the term Proto-Uralic for reconstructions of words which have a wide distribution in Uralic, and the term West Uralic for words that are limited to Finnic and/or Mordvin and/or Saami, but this does not mean that I necessarily agree with the plausibility of a West Uralic node.

3. The reconstruction of Indo-European palatovelars

It is almost universally accepted that three different series of velars have to be reconstructed for Proto-Indo-European. According to the traditional view (see e.g. Szemerényi 1996: 59–63; Mayrhofer 1986: 102–109), the series consisted of plain velars (*k, *g, *g^h), palatovelars (*$\acute{k}$, *$\acute{g}$, *$\acute{g}^h$) and labiovelars (*k^w, *g^w, *g^{wh}), and this view is considered the most likely in modern references on Indo-European reconstruction (e.g. Fortson 2006; 2010: 48–54; Clackson 2007: 34; Beekes 2011: 124–126; Kapović 2017: 21–27; Byrd 2017: 2056–2057). In the satem languages (Indo-Iranian, Balto-Slavic, Albanian and Armenian), the reflexes of the Indo-European plain velars merged with the labiovelars, while the palatovelars remained a distinct series (Mayrhofer 1986: 104; Clackson 2007: 49–53; Fortson 2010: 52–54). In the Anatolian branch of Indo-European, the three series probably survived, as satem reflexes are found in Luwian, Lycian and Carian (Adiego 2007: 345–346; Kapović 2017: 27). Melchert (2017: 176) argues that while there is no unconditional development of

palatovelars into sibilants in these Anatolian languages, there are conditioned developments which show that the three velar series were still distinct in Proto-Anatolian.

The results of satemization in Proto-Indo-Iranian and Proto-Balto-Slavic, the languages that mostly concern us here, were palatal affricates (*ć, *j́, *j́^{h}) in the former and probably palatal sibilants *ś, *ź in the latter (Kim 2017: 1975; Kallio [manuscript]). Although it has been argued by Gamkrelidze (1999) that the assibilation of the palatovelars in the satem languages is a shared dialectal innovation, it should be kept in mind that this is typologically a very common change (see Kümmel 2007: 215–217) that can happen individually, and there are next to no common traits that would otherwise support a satem dialect or branch (see Tischler 1990; Fortson 2010: 53–54; Beekes 2011: 127; Ringe 2017 for questions regarding the centum–satem division and the branching of the Indo-European family).

Although there is agreement on the number of the velar series, there is less agreement on the phonetic nature of these sounds. It has been noted (see, for example, Clackson 2007: 52; Kapović 2017: 26) that the development of the three velar series involves typologically rare changes: especially the change from palatovelars to plain velars (e.g. *$\acute{k}$ > *k) in the centum languages is typologically unlikely, as palatal stops in the languages of the world very rarely change into plain stops (whereas a change from a palatal stop to an affricate is typologically frequent; see Clackson 2007: 52; Kümmel 2007: 317–318). It has been occasionally suggested (see especially Lipp 2009 for a recent discussion) that the palatal stops represent an innovation of the satem languages, and only two series of stops should be reconstructed for Proto-Indo-European, but such views have not received widespread acceptance. In addition, also three-way systems with alternative phonetic values have been reconstructed for Proto-Indo-European (see Kümmel 2007: 310–327; 2019).

Because the reconstruction of the Proto-Indo-European velars is fraught with uncertainty, the loanwords into Uralic could provide external evidence for the traditional reconstruction of the IE velar series (as noted by Anttila 1996: 83), against alternative systems of reconstruction.

Stops	p	t	$\acute{k}$	k	k^w
	b	d	$\acute{g}$	g	g^w
	b^h	d^h	$\acute{g}^h$	g^h	g^{wh}
Fricatives		s			
Laryngeals			h_1	h_2	h_3
Resonants	m	n l r			
Glides	w		y		

Table 1. The Proto-Indo-European consonants as commonly reconstructed (based on Kapović 2017: 21; Beekes 2011: 119)

4. Analysis of the etymologies

In the following, the etymologies that allegedly show reflexes of the Proto-Indo-European palatal stops are critically analyzed. This includes all the etymologies suggested by Koivulehto, and some by Sammallahti (1999; 2001), as well as those etymologies that according to Rédei (1986) and Katz (2003) were borrowed from a stage of "Indo-Iranian" that is identical to the commonly accepted reconstruction of Proto-Indo-European. Also, one etymology suggested by Adam Hyllested (2014) has been included in the discussion.

The main question in this examination is whether the etymology itself is convincing at all, especially in the light of the current reconstruction of Uralic historical phonology (as presented by Aikio 2012; 2015b; Zhivlov 2014) as well as modern views on Indo-European etymology. In addition, it will be argued whether the etymology could rather represent a borrowing from satem languages, mainly Indo-Iranian or Balto-Slavic.

The Indo-European (Indo-Iranian, Balto-Slavic) reconstructions that are given in the beginning of the entries are taken from the sources where the loan etymologies have been suggested, and they are supplemented with reconstructions that appear in more recent etymological dictionaries and other relevant works.

4.1. Etymologies that manifest PU *$ć$ ← PIE *$ǵ(^h)$

SaN *čuonji, čuonjá*: GEN *čuotnjága* 'goose' (only in Saami; distribution SaN–SaT) < PSa *$ćuońēk$ < ? PreSa *$ćanak$ ~ *$ćanat$ ← PIE/Pre-G *$ǵ^han\text{-}ud\text{-}$ (> PG *ganuta[n]-* 'gander') (Koivulehto 2001: 244; Napol'skikh & Engovatova 2000: 230)

The Saami word is possibly an Indo-European loan, but it does not necessarily represent a borrowing of this "Pre-Germanic" form. Koivulehto assumes that the Saami suffix -Vg- (< *ak or *at) reflects here the suffix *ud- that can be reconstructed for a form ancestral to Proto-Germanic *ganutan- (see Kroonen 2013 s.v. *ganuta(n)-*). However, Rédei (2002: 226) has noted that the Saami suffix *$ēk$ does not have to reflect an Indo-European suffix, and instead the word could be a Saami derivative. There is a productive derivational suffix -a(t) : -aga in North Saami (going back to PreSaami/Finno-Saamic *ek), but it is uncertain whether we are dealing with this same suffix here, as the stem vowel -i, -á in the North Saami word is aberrant. The origin of Saami -á(g) in this word remains uncertain.

If we could analyze the word as a Saami derivative, we would not have to assume a donor form reconstructed on the basis of the Germanic word that has the suffix *ut. In this case the Saami word might be borrowed from some satem language, even though also this explanation involves some phonological problems. It has been suggested by Napol'skikh & Engovatova (2000) that the word could be a later satem loan rather than a Proto-Indo-European loanword.

Reflexes of the Proto-Indo-European word *$ǵ^hans$ 'goose' (or *$ǵ^heh_2ns$, see Pronk 2019), are attested (in different derivatives) in both Balto-Slavic (for example, Lithuanian *žąsìs* < Baltic *žansis*) and Indo-Iranian (OI *haṁsá-* < PII *$j^hansá$-), so technically either of them could be a possible donor. However, it is somewhat problematic that the Indo-European word is an *s*-stem, and there is no trace of an *s* anywhere in Saami. The Indo-European case endings such as masculine nominative *os* are usually not reflected in loanwords, but in this case the *s* is part of the stem, and there is no obvious reason for the lack of it. In this respect, Koivulehto's Pre-Germanic etymology is unproblematic. However, it can be noted that the cluster *ns* is absent from Proto-Uralic vocabulary (words with this cluster are not found in the entries of UEW or the wordlist of Sammallahti 1988), contrary to *nć* that can be reconstructed for several words. It is possible that *s* was dropped when borrowed due to this phonotactic rule, but it is impossible to prove this without parallel examples. In later loans *ns* was possible, cf. SaN *guossi* < PreSa *kansa* ← PG *hansa-*.

Rédei is very critical towards Koivulehto's etymology in general, arguing that it is improbable that the linguistic ancestors of the Saami would have borrowed a word for 'goose' from the Indo-Europeans. However, many other words for 'goose' in the Uralic languages were borrowed from various Indo-European languages. Komi *ǯoǯeg* and Udmurt *ǯaźeg* 'goose' were probably borrowed from Indo-Iranian[5] (Koivulehto 2001: 244), and Finnic *hanhi* (> Fi *hanhi*, Estonian *hani* etc.) is a borrowing of Baltic *žansis* (Thomsen 1869: 63; SSA s.v. *hanhi*) – the latter form goes back to a Balto-Slavic form *źansis* that might have been the donor of the Saami word. Among the phonological problems that Rédei mentions, a more pressing problem is the origin of the palatal *ń* (= SaN *nj*) in the Saami word.

The distribution of the word is, of course, suspicious for a very early borrowing. It is impossible to say whether the word would have had a wider distribution in Uralic originally. It is interesting that both Finnic and Mordvin, geographically and probably genealogically the closest branches to Saami, have borrowed the proper Baltic word for 'goose': Finnic *hanhi* is certainly a Baltic loan, and Erzya Mordvin *šenže* 'duck' (< ? Pre-Mordvin *šänšä*) may also be traced back to the same Baltic source (see Heikkilä 2014: 286; Junttila [manuscript] s.v. *hanhi*).

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5. Rédei (2002: 226) is also critical towards the Indo-Iranian origin of the Permic words. It is true that the Permic affricate *ǯ does not appear in many early loanwords, but otherwise the etymology is not problematic. The vocalism points to a late borrowing (Proto-Permic *a does not correspond to Indo-Iranian *a in the earliest loanwords). The origin of the Permic 'goose' requires further research. It seems that also new tentative etymologies showing a Permic voiced affricate *ǯ corresponding to the palatal affricates/sibilants of the satem languages could be found, such as Udmurt *ǯar-* 'Morgendämmerung' that might be derived from some reflex of Balto-Slavic *źoriˀ 'dawn, aurora' > Lith. *žarà* 'dawn, sunset; hot coal', Old Church Slavonic *zorję* (Derksen 2008 s.v. *zorà*). UEW and Csúcs (2005: 327) connect the Udmurt word and its assumed Komi cognate *ǯor* 'grey, greyhaired' to PU *ćerV* 'grey', but this is an uncertain etymology as the Permic voiced affricate is an irregular reflex of PU *ć.

Fi *salko* 'long pole or rod' (also in Karelian); SaN *čuolggu* 'rod for pushing nets under ice' (< Proto-Saami **ćuolkōj*, distribution SaS–I); Mordvin E *śalgo*, M *śalga* 'stick, thorn, stinger'; Komi *śul*, Udmurt *dẹd'i-śul* 'sled runner'; Khanty *saɣλ*; Mansi *sāɣla* 'slat'; Hungarian *szálfa* < PU **ći̮lkaw* (UEW s.v. *śalkɜ*; Aikio 2015b: 60; Zhivlov 2014: 119) ← PIE (?) **ǵʰalgʰo, *ǵʰalgʰā* or **ǵʰolgʰo, ǵʰolgʰeh₂* (Kroonen 2013 s.v. **galgan-*; Derksen 2015 s.v. *žalgas*) > Lith *žal̃gas, žalgà* 'long thin pole', OHG *galgo* 'pole of a draw-well; gallows' (Koivulehto 1983; 2001: 238; Napol'skikh & Engovatova 2000: 228; van Linde 2007: 149; Bjørn 2017: 57)

The Indo-European origin of the Uralic word is convincing in the light of both semantics and phonology, and it has been widely accepted (van Linde 2007: 149; K. Häkkinen 2004 s.v. *salko*; SSA s.v. *salko* accepts the etymology with a question mark). However, this Uralic word could rather have been borrowed from Balto-Slavic **źalga,* as has been suggested by both Napol'skikh & Engovatova (2000: 228) and Kallio (manuscript). Bjørn (2017: 57) also suggests that the Uralic word was rather borrowed from some daughter language of Indo-European. This is a similar case to Saami *čuorpmis*, for which Koivulehto himself had suggested both Proto-Indo-European and Proto-Balto-Slavic etymologies (see below). In the case of **ći̮lkaw*, there is no reason to assume that the donor form still retained **ǵh*.

Kroonen (2013 s.v. *galgan*) and Derksen (2015 s.v. *žalga*), as well as Simon (2020: 252–253) doubt the IE status of the word due to its limited, European distribution (it is uncertain whether Armenian *jaɫk* 'rod, stick' belongs here[6]). This is a further argument in favor or a later, post-PIE loanword. If the word is indeed restricted to some of the European branches of Indo-European (Germanic, Balto-Slavic), it is more convincing to assume that the word was borrowed from Balto-Slavic like Kallio assumes, rather than from a hypothetical Proto-Indo-European form. Even if the Balto-Slavic and Germanic words are not true cognates but borrowed from some substrate source, as assumed by van der Heijden (2018: 33), it can still be assumed that Baltic **žalga-* reflects an earlier **źalga,* which would be a plausible donor form for the Uralic word.

Simon (2020) notes that the Uralic **i̮*-vocalism makes the Indo-European etymology unlikely. The Uralic vowel **i̮* appears as the substitution of Indo-Iranian **a* in a number of etymologies, and we can assume that this would have been plausible in the case of Balto-Slavic as well, even if no certain parallels are known. This substitution could be explained through the fact that Proto-Balto-Slavic in any case had a much simpler vowel system than Proto-Uralic. A borrowing from a Proto-Indo-European form with **o* would certainly be unlikely, as no parallels for such a substitution have been suggested. It has also been assumed that the forms in the Permic and Ob-Ugric languages (Linde 2007: 149) are not related to Finnic **salko*, Saami

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6. Armenian *jaɫk* could reflect earlier **ǵholgʰ*, meaning it is not a regular cognate of the Baltic and Germanic words. There is also Armenian word *joɫ* 'pole', whose relationship with *jaɫk* is unclear; it is possible that it is a cognate to Lithuanian *žuolis*, but the exact connection of these words with **ǵholgʰo-* remains uncertain. (Martirosyan 2009 s.v. *jaɫk*; van der Heijden 2018: 33).

ćuolkōj and Mordvin *śalgo*. The vocalism of these western languages could also be derived from Proto-Uralic *a*, whereas the Ob-Ugric cognates point clearly to *i̮*. Kallio (manuscript) only discusses the West Uralic forms, and his Balto-Slavic etymology for the West Uralic word can certainly be maintained, regardless of the origin of the eastern forms.

It should also be noted here that the Ob-Ugric words can also be derived from a Proto-Uralic verbal root *ćili-* 'to chop' according to Metsäranta (2020: 157–158). This root has reflexes also in Finnic (Fi *salia* 'to chop'), and SSA mentions the possibility that *salko* and its cognates represent derivations from this verb rather than borrowings. The derivational process *ćili-* > *ćil̮ka-* remains unclear, however. In the light of semantics, it seems more plausible to assume that at least the West Uralic words are loans from Balto-Slavic, but the Ob-Ugric and perhaps the Permic words might well be connected to this Proto-Uralic verb. The issue requires further research, however.

The non-initial-syllable labial vocalism in Saami and Finnic points to *aw*, but it cannot be considered certain that this *w* suffix appeared already in the Proto-Uralic (or Proto-West Uralic) word, and it can be a later derivative in West Uralic or the pre-forms of Finnic and Saami, although the function of the *w* suffix remains uncertain in this case (see Kuokkala 2018: 64–65 for the discussion of this suffix). A similar suffix appears also in some other loanwords, such as PU *počaw* 'reindeer' (> SaN *boazu*) ← Proto-Iranian *patsu-* (> Av *pasu-* 'cattle'; Koivulehto 2007: 251–254; Kuokkala 2018: 49–50), so this suffix is no obstacle to the etymology.

Fi *Suomi, suoma-* 'Finland, Finnish' (only in Finnic) < ? Pre-Fi *ćami ← Pre-Baltic (~ Balto-Slavic)/Pre-Germanic *ǵʰm-on 'human', cf. Lith *žmuõ* / ← Pre-Baltic (~ Balto-Slavic)/Pre-Germanic *ǵhom-yā- 'earth', cf. Lith (dial.) *žãme* (< PIE *dʰǵʰom-yah₂-) (NIL s.v. **dʰéǵʰom*; Derksen 2015 s.v. *žeme* < PIE **dʰǵem*) (Kallio 1998: 615–18)

Various competing etymologies exist for this ethnonym (cf. Kallio 1998; SSA s.v. *Suomi*). As the etymologies of ethnonyms are often highly complicated, assessing this etymology is a rather difficult task. However, an argument against a very early loan is the limited distribution of this word in Finnic. It is well known that the ethnonym and place name *Suomi* originally denoted the south-western parts of Finland, meaning that it was only a tribal name, and it is not very likely that a group of Finnic speakers would have used a word meaning 'country' or 'human' for themselves: if the word was a very old Indo-European loanword in the meaning of 'country' or 'human', one would expect traces of this word to have been retained in other branches of Finnic, too.

The relation to the ethnonym (SaN) *sápmi* 'Saami' (< Pre-Saami **šämä*) adds to the difficulties of this etymology. Formally, both *Suomi* (Proto-Finnic **soomi*) and *sápmi* could reflect a West Uralic form **sämä*. If the Saami and Finnic words are indeed cognates, the Finnic word cannot reflect earlier **ć* but only **s*, which makes Kallio's (1998) etymology impossible – in fact, Kallio (2014) himself rejected the

etymology in time. The tribal name *Häme* 'Tavastia, Tavastian' (which points to early Proto-Finnic **šämä*) has occasionally be considered a cognate of the Saami ethnonym (SSA s.v. *häme*), but according to Kallio (2014) this was rather borrowed from PreSaami into Finnish (see also Pystynen 2018: 83). For both *sápmi* and *Suomi*, a proper Baltic etymology (a borrowing from Proto-Baltic **žeme* 'land') has been suggested too, but it has not been widely accepted (see SSA s.v. *Suomi*).

4.2. Etymologies that manifest PU **ć* ← PIE **ḱ*

4.2.1. Substitution in anlaut

Fi *sanka* 'handle' (cognates in Votic and Estonian), ? Mordvin E *śango*, M *č'angă* 'handle' < ? PWU **ćanka* ← PIE **ḱanku-* (? **ḱonku-*) > OI *śaṅkú*, Lith *atšankė* (Derksen 2015 s.v. *atšankė*; EWAia II: 604, s.v. *śaṅkú-*) (Koivulehto 1983: 114–5)

This is, again, a convincing Indo-European etymology, but there is no reason to suppose that this West Uralic word was borrowed from the stage where **ḱ* was still retained: PII **ćanku-* would be a completely plausible origin (see Holopainen 2019b: 245–247). Similarly, a Proto-Balto-Slavic form **śanku-* would be phonologically a plausile donor form. If the vocalism of the Indo-Iranian and Balto-Slavic words reflect Proto-Indo-European **o*, as is reconstructed by Derksen (2015), the Finnic and Mordvin forms can only be loans from a later form that displays the sound-change **o* > **a*. Proto-Indo-European **ḱonku-* would be a more probable pre-form for the Indo-Iranian and Balto-Slavic forms, as the vowel **a* was famously very rare in Proto-Indo-European (Mayrhofer 1986: 170–171) and some, notably the Leiden school of Indo-European (see Lubotsky 1989; Beekes 2011: 141–143; Pronk 2019), consider it to not have existed outright.

However, at least the Finnic word can also be from Proto-Germanic **stangō* 'Stange' (> Old Norse *stǫng*), as has been argued earlier (see LÄGLOS s.v. *sanka* with references). It is difficult to argue in favor of either the Germanic or Indo-Iranian etymology on phonological or semantic grounds. In the case of a Germanic origin, the Finnic word obviously would not reflect earlier **ćanka*, but the **s* would be the substitution of the Germanic cluster **st-*. This is a well-established sound-substitution among the Germanic loanwords in Finnic (LÄGLOS I: XX). The Mordvin word E *śango,* M *č'angă*, on the other hand, cannot be from Germanic: there are no good examples of Germanic loans in Mordvin, and Mordvin palatal *ś*, *č'* cannot reflect Germanic plain **s*, not to speak of the cluster **st-*. The most probable source for the Mordvin word would be an Indo-Iranian donor form akin to Indic *śanku,* so it seems that even if Finnic *sanka* was borrowed from Germanic, the Mordvin word reflects a reflex of the Indo-European word **ḱanku-* (~ ? **ḱonku*). In any case, neither the Finnic nor the Mordvin word gives any evidence for a donor language that maintained a palatal stop.

SaN *čearda* 'tribe' (only in Saami; distribution: SaS–SaN) < PSa *ćeartę̄ < ? PreSa *ćertä ← PIE *ḱerdʰos 'army' (Lubotsky 2001: 53: *skerdʰos > PII *śćardhas) (Sammallahti 2001: 399)

Sammallahti's etymology is convincing per se, but the word can rather be derived from "Pre-Indo-Iranian" form *sćerdʰo-* (> OI *śardha-* 'strength; army'), if we follow Lubotsky's (2001) reconstruction of Indo-Iranian consonantism. See Holopainen (2019b: 78–79) for further arguments regarding the Indo-Iranian etymology. The only problem with this etymology is the Saami stem vowel, as this vowel combination is not usually found in inherited words. While this indeed points to a loan origin, it also means that the word cannot be earlier than Proto-Saami, and thus a very early Indo-European origin becomes unlikely.

SaN *čearru* 'peak of a fell' (only in Saami; distribution: SaL–SaT) < PSa *ćearō < ? PreSa *ćero ← PIE *ḱerew, *ḱerh₂ 'head' (Nussbaum 1986: 139–157) (Sammallahti 2001: 402)

Sammallahti assumes that the word was borrowed from either Proto-Indo-European or Proto-Indo-Iranian. The Proto-Indo-Iranian form for 'head' would be in modern reconstruction*ćr̥Ha (> OI *śira-* 'head'). However, the non-initial syllable *o is of unclear origin (Holopainen, Junttila & Kuokkala 2017: 117), which casts doubt on the early age of the Saami word. This labial vowel has to be a later development, but it does not appear to be a transparent derivative element here. As the semantic connection between the Saami and Indo-European words is also not unproblematic, it remains possible that we are dealing with only accidental similarity here. Note that the absence of a laryngeal reflex is not an obstacle to this etymology, as there are only very few possible examples of Indo-Iranian laryngeals being substituted in loanwords into Uralic (Holopainen 2019b: 331–332). Many terms related to mountains and terrain are substrate words in Saami (Aikio 2004), and this word could belong to the same group of words.

Mari (W) *šŝr*, (E) *sər*; Komi *śer*; Mansi *sir*; Khanty *sür, sir*; Hu *szer*; Tundra Nenets *śer"* 'Sache, Angelegenheit; schlechte Sache; auf Weise, wie', Enets *śieʔ* 'Sache', Nganasan *sier* 'id.' < PU ? *ćerä ? (Katz 2003: *ćērə) ← PII (?) *ḱerdʰom 'strength, army' (= PIE *skerdʰo- > PII *śćardʰa, see SaN *čearda* above) (Katz 2003: 292–93)

This etymology involves several problems that make it unconvincing. First of all, as the Uralic etymology is notoriously irregular (UEW s.v. *śerₓ), the connection between the various Uralic words and PU reconstruction is uncertain. The reconstruction *ćerV does not account for all the forms (see Holopainen 2019b: 248–249). If the word was borrowed from the Indo-European word, a cluster *rt would be expected on

the Uralic side, but now there is no trace of this. The sematic connection between the Uralic and Indo-European forms is also not very convincing.

At least the Hungarian word has a competing etymology, as it is probably borrowed from West Old Turkic *śer (cf. Turkish *yer* 'Erde, Boden; Ort'; Róna-Tas et al. 2011: 795–796). It remains unclear whether some of the other Uralic forms could also have been borrowed from Turkic.

Tundra Nenets *sĕr"* 'white' (+ cognates in Enets, Nganasan, Mator, Selkup) < PS *sĕr < PU *ćīrə ?? 'white' (Janhunen 1977 s.v. *sĕr) ← "frühurarisch" *ḱwitróm (= PII *ćwitra-) (Katz 2003: 86)

Although Katz (2003) claims that the Nenets word is derived from Proto-Uralic, this is not correct in the lack of convincing cognates in the related languages. The very early ("frühurarisch" = practically PIE) etymology is unconvincing. Theoretically the word could represent a borrowing of the later Proto-Indo-Iranian form *ćwitrá- (> OI *śvitrá-* 'white'), but the Proto-Samoyed word may well be related to Proto-Samoyed *sirå 'snow' and *sĕr 'ice', which makes the etymology more complicated and the loan-etymology more unlikely.

According to Aikio (UED draft s.v. *ćĕrki), the Samoyed word can be derived from Proto-Uralic *ćĕrki = *ćĭrki 'grey; white', with cognates in Mansi (South *sajraŋ 'white' etc.) and Saami (Ume Saami *tjuar'gada* 'gray' etc.). This is a further argument against the etymology, as deriving this PU form from the Indo-Iranian reconstruction of Katz would be very difficult. (This also speaks against the relationship of the Samoyed word with 'snow' and 'ice', which can then be of different origin; in any case everything speaks against the Indo-Iranian loan.)

Fi *solki* (: *soljen*) 'Spange', Estonian *sõlg* (cognates in all Finnic languages except in Veps); SaN *čulggon* (< Proto-Saami *ćulkumę-; distribution SaS-SaK); Mordvin *śulgamo*, *śulgam*; Mari E *šolkama*, W *šǝ̂lkama* <? PU *ćolki ← PIE *ḱolh₂-o- (Koivulehto 2001: 243; Napol'skikh & Engovatova 2000: 230)

This is a rather complicated etymology. First of all, the Uralic forms connected in the UEW and SSA and Koivulehto cannot regularly be derived from any Proto-Uralic reconstruction. At least the vowel correspondence between the Finnic and Saami words is irregular, and it is uncertain what relationship there is between the Finnic *e-stem (< Uralic *i-stem) and the trisyllabic forms in Saami, Mordvin and Mari. This, of course, makes it probable that they are loanwords from somewhere, but it is not easy to derive them from the Indo-European forms that Koivulehto has suggested. Some of the Uralic words might be borrowed from reflexes of PII *ćalā́-kā > OI *śalā́kā- 'rod', but the Indo-European etymology of this word is unclear (EWAia II: 620, s.v. *śalā́ka) and the Indo-Iranian word is not necessarily from earlier *ḱolh₂o. It is thus certain that we are not dealing with contacts between Proto-Uralic and Proto-Indo-European here. Napol'skikh & Engovatova (2000: 230) have noted that

the Uralic word could be rather have been from some satem language, rather than Proto-Indo-European, but they do not take the problems of the Uralic reconstruction into account.

As said, the irregular relationship of the various Uralic words could point to parallel borrowings from Indo-Iranian, but it is also possible that the Uralic and Indo-Iranian forms are completely unrelated (Holopainen 2019b: 252–254). The etymology is doubted also by Aikio (UED draft).

Fi *suoli*; SaN *čoalli*; Mordvin E *śulo*, M *śula*; Mari E *šolo*, W *šol*; Udmurt *śul*, Komi *śuv*; Khanty *sol* 'intestine, guts' < PU *ćali ← PIE *ḱoleh₂ or PII *ćālaH > OI *śālā́* 'house, room' (EWAia II: 631, s.v. *śālā́*-) (Koivulehto 1999a: 217)

The reconstruction *ćali that is based on Aikio's (2015b) new sound laws (instead of the traditional *śola that is found in sources like UEW) makes the loan etymology somewhat unlikely; at least a PIE form with *o could not have produced a Uralic form *śali. Also the Uralic *i-stem remains unexpected, as most of the early loans are *a-stems. Furthermore, the reconstruction of the Indo-European word is uncertain: Beekes (2010: 735, 739) and De Vaan (2008: 150) doubt the IE etymology of Greek κολέον 'sheath', κόλος 'large intestine' and Latin *culleus* 'leather sack' (cognates of *śālā* according to Koivulehto). It should also be mentioned that the Uralic word probably has had a cognate in Samoyed that was borrowed into Yukaghir as Old Yukaghir <*šolje*> (Aikio 2014b: 75), which means that the borrowing from Indo-European should be very early and should have originally had a very wide distribution. The Indo-European loan etymology is doubted also by Aikio (UED draft).

The possibility of a later Indo-Iranian etymology also suffers from the same problems: although the Uralic *a-vocalism would be better explained from Indo-Iranian *ćālā or *ćārā, the stem vocalism is still slightly problematic. The Uralic *l is also unexpected, as early loanwords generally reflect the Indo-Iranian change *r < *l (see Holopainen 2019b: 216–217, 335).

To conclude, this word cannot be an early Indo-European loanword, and the possible Indo-Iranian etymology is likewise problematic. It is possible that the Indo-European and Uralic words show only an accidental similarity.

Fi *sora* 'sand-grain'; Mordvin *śuro*, *śora* 'grain' < PU *ćora or *ćari (UEW s.v. *śora) ← **PIE *ḱoro- 'grain'** (Koivulehto 1983: 117–18) / ← **PBSl *śara- or *śoro- (> Lith *šãras*)** (Koivulehto 1999b: 236; Kallio manuscript)

Koivulehto argues that the Finno-Mordvin word *ćora is borrowed from a Proto-Indo-European form *ḱoro- that can be reconstructed on the basis of Lithuanian *sóra* and Latvian *sáre*. This Indo-European etymology is accepted by Linde (2007: 152–153) and cautiously by SSA (s.v. *sora*). However, a Balto-Slavic etymology is suggested by Kallio (manuscript), and one can indeed argue that Uralic *ć in this case can be the substitution of Balto-Slavic *ś. As the formation *ḱoro- is reflected only

in Balto-Slavic and Greek, the Balto-Slavic etymology is clearly the most convincing option (the root *$\hat{k}er$- itself is attested elsewhere in Indo-European too, as Koivulehto 1999b: 236 notes). As the Finnic and Mordvin words can reflect either West Uralic/ Proto-Uralic *$\acute{c}ora$ or *$\acute{c}ari$, it is not at all certain whether the donor form had *a or *o in the first syllable. A form *$\acute{c}ora$ would be more likely, as most early loanwords are *a-stems, though *i-stems are also found.

It remains unclear what the relationship of Eastern Mari *šürö* 'Suppe', Hill Mari *šəräš* 'Grieß, Graupe, Grütze, Brei' is to the Finnic and Mordvin forms. The Mari words are listed as uncertain cognates by the UEW, and Linde (2007: 153) notes that despite semantic differences, the Mari word can be regularly connected to Finnic *sora* and Mordvin *śuro*, *śora*. However, this is not correct, as the vocalism of the Mari word cannot be derived from earlier *o (or *a) like the Finnic and Mordvin forms. This also makes it unlikely that they could be independent borrowings from the same Balto-Slavic word (and moreover this would be semantically unlikely). The etymology of the Mari word remains unclear for now. Katz (2003: 214–215) argues that both the Mari and Mordvin words are loans from Indo-Iranian *$\acute{c}ukra$- 'white' (> OI *śukra*), but this etymology is impossible in the light of phonology (both the vocalism and the absence of the *kr cluster in Mordvin and Mari would be very difficult to explain from this Indo-Iranian donor form), and also not very convincing semantically (regarding this Indo-Iranian word, see the discussion about East Khanty *kul* below).

SaN *čuorpmas* 'hail' (only in Saami, distribution: SaP –SaT) < PreSa *$\acute{c}armis$ or *$\acute{c}ormis$ ← PIE *$\hat{k}ormo$- > Lith *šarmas* 'Raureif'
(Koivulehto 2003: 297; 2006: 188–89; Napol'skikh & Engovatova 2000: 230)

Although Koivulehto (2003: 297) initially argued that this word is an Indo-European loan, a Balto-Slavic source proper (PBSl *$\acute{s}arma$- in Koivulehto's reconstruction) was later supported by Koivulehto himself (2006: 188–89). The idea of a Proto-Indo-European loanword was criticized already by Napol'skikh & Engovatova (2000: 230), who likewise argued in favor of a Balto-Slavic donor. The latter explanation is clearly more convincing: a Balto-Slavic form *$\acute{s}arma$- or *$\acute{s}ormo$- can be reconstructed for Balto-Slavic on the basis of the Saami word, but there is not much evidence for Proto-Indo-European *$\hat{k}ormo,$ as this derivative is not attested outside of Baltic, even if the root itself is more widely attested (Derksen 2015 s.v. *šarma*). Finnic *härmä* 'hoarfrost' (< *$\check{s}ärmä$) is a well-known borrowing from a later Baltic reflex (cf. Lith *šarmas*) of this Balto-Slavic form (SSA s.v. *härmä*).

Fi *susi* 'wolf' (cognates in Karelian, Votic, Estonian, Livonian) < ? Pre-FI *$\acute{c}unti$ ← PIE/Pre-G *$\hat{k}w\underset{.}{n}to$- 'dog' (> PG *hunda-* > ON *hundr* 'dog') (Koivulehto 1983)

This etymology is uncertain because of the irregular disappearance of *n* in the Finnic word, as Rédei (2002: 230) has noted. Koivulehto attempted to explain the loss of *n through analogy, but this explanation is problematic in the light of modern views of

Proto-Finnic phonology. According to Koivulehto, the nasal *n would have regularly been lost in the nominative form (*ćunti > *susi) and then later the *n would have been dropped from forms where it would have been regularly retained (such as the genitive *ćuntin > Proto-Finnic *sunden > Fi suden). Koivulehto mentions the development of Uralic *ńć clusters as parallels, for example Fi osa < PU *ońća. However, this development is not an exact parallel, as *ńć is a different cluster, and it is not probable that the Proto-Finnic *ti > *ci change went through an intermediary form *ći (Kallio 2007: 235–236; see also Metsäranta 2020: 234). This means that we have no certain evidence of any *ci sequence in Finnic reflecting an earlier cluster *ńć.

It is also not clear why the Finnic word would have become an *i-stem, as the Germanic word is an old *o-stem, so one would rather expect *a-stems in Finnic (this is the case with most of the early loans from Indo-European into Uralic: Holopainen 2019b: 330–331). In the light of these problems, the Proto-Indo-European etymology of the word should be rejected.

4.2.2. Substitution in Inlaut

Fi *kasa* 'tip, edge', South Estonian *kadza*; SaN *geahči* 'end, point; out-of-the-way place, outskirts; top; into, on to, up to, the end of sth' (cognates in all Saami languages) < ? PWU *kaća ← *h₂aḱya- (> PG *agjō- 'point, edge' > ON *egg* 'edge') (Koivulehto 2001: 240–241)

There is no known alternative loan-explanation to Koivulehto's etymology. UEW cautiously connects Hungarian *hëgy* (in the modern literary standard *hegy*) 'mountain' to the Finnic and Saami words, but this equation is impossible due to both the Hungarian vocalism (*a > *ë would be completely irregular) and the sound-change *ć > *gy that has no convincing parallels.

However, the lack of competing explanations does not mean that the etymology is convincing. A derivative corresponding to Germanic *agjō- is not attested in any satem language, so an Indo-Iranian or Balto-Slavic etymology cannot come into question. However, the Proto-Indo-European/Pre-Germanic source that Koivulehto suggests is problematic in that it features a substitution of a Proto-Indo-European laryngeal with Uralic *k. Although there are several possible examples of the Indo-European laryngeals being reflected by Uralic velars, none of these examples is compelling, and the laryngeal etymologies have been criticized (Lindeman 1993; Campbell & Garrett 1993; however, the substitution of the laryngeal with *k is supported by Hyllested 2014: 21–22). Probably the last word has not been said regarding the substitution *k ← *h₂, and I agree with Koivulehto that this substitution would be phonetically plausible. However, due to the lack of compelling evidence for the substitution of the laryngeal and the palatovelar, this etymology remains uncertain.

SaN *gárži* 'narrow, cramped, scanty' (only in Saami) < PSa **kārćē* < PreSa ? **kärśä* ← PIE **kerḱ, *karḱ-* 'einschrumpfen, magern', cf. Lith *karšéti, káršti* 'alt werden', OI *kr̥śa-*'slim, thin, weak', root *karś-* 'abmagern' (Fraenkel 1962–1965: 225 s.v. *káršti*; EWAia I: 318–319, s.v. *KARŚ*, 395–396, s.v. *kr̥śa-*; IEW: 581) (Sammallahti 1999: 78; 2001: 399; Álgu s.v. *gárži*)

Semantically this is not an obvious etymology, but otherwise the etymology is convincing. However, as the Indo-European word is well-attested in both Baltic and Old Indic, it could also have been borrowed from Balto-Slavic **karś-* or Indo-Iranian **kr̥ća*; semantically either of these would be a fitting donor for the Saami word, although in Balto-Slavic the word is attested only as a verb. In any case, there is no reason to assume that the word is a very early loanword from a form with retained Proto-Indo-European **ḱ*.

SaN *guoržžu* 'one who has the evil eye, a bird of ill-omen' < PSa **kuorćōj*; ? Fi *karsea* 'hideous', *karsas* 'squint-eyed' < ? PWU **karćV* ← ? PIE **gargó-* 'grausig, wild' > Greek Γοργώ 'name of a monster', Latvian *gręzuot* 'drohen' (IEW: 358) (Sammallahti 1999: 78)

Sammallahti assumes that the Finno-Saamic word was borrowed from a Proto-Indo-European word **gargo* that is reconstructed in the IEW with reflexes in several branches such as Greek (Γοργώ), Balto-Slavic (Latvian *gręzuot*, Old Church Slavonic *groza* 'horror') and Celtic (Middle Irish *garg* 'rough'), but in the light of modern studies this cannot be upheld (Frisk 1960 s.v. γοργός; Chantraine 1968 s.v. γοργός; Matasović 2009 s.v. **gargo-*; Derksen 2008 s.v. **grozìti*), as it is not at all certain that the Greek and Baltic words mentioned by Sammallahti are related. Since the Proto-Indo-European background of the Baltic word is uncertain, there is no reason to suppose that **ć* in this Finno-Saamic word would be a substitution for PIE **ǵ* here, even if the Finno-Saamic and Latvian words are somehow related. In this case, a Proto-Balto-Slavic loan remains a possibility, although a Balto-Slavic form **groź-* (as is reconstructed by Derksen 2008) would probably have resulted in Uralic **korćV*, not **karćV*. In any case, the possibility of a Balto-Slavic borrowing into Proto-West Uralic remains a possibility, but the Indo-European origin of this word cannot be considered certain.

Furthermore, the matter is also complicated by the fact that the relationship of Finnic *karsea, karsas* to Proto-Saami **kuorćōj* is not completely clear. While both words could be derived from Finno-Saamic (or West-Uralic) **karćV*, the Finnic word also has an alternative Baltic etymology (SSA s.v. *karsea*). While the Saami word has a more specific meaning, the Finnic word denotes 'schief, scheel, schielend; verbittert, neidisch', and it has been considered a loan from Baltic **skersas* (> Lith *skeřsas*). In this case *karsas* would be the primary stem, and *karsea* (Proto-Finnic **karseta*) would be derived from it. If the Baltic etymology of the Finnic word is correct, the

relationship with Saami *kuorćōj* cannot be upheld. The Finnic *a*-vocalism makes the Baltic etymology problematic, however.

To sum up, the Indo-European origin of the Finnic and Saami words is possible but far from certain, but in this case a Balto-Slavic donor would be more likely than a Proto-Indo-European source.

Fi *osa* 'part, luck'; SaN *oažži* 'flesh'; Mari E *užas* 'part', W *üžas*; Mansi N *ūńś* (< PMs *ūńć) 'buttocks'; Hu *ágyék* 'loins' (Aikio 2015b: 61) **< PU *ońća ← PIE ? $h_2$onḱo- or ← PII *anća (> OI *aṃśa-* 'Anteil, Teil')** (Rédei 1986: 45)

Rédei argues that this is an Indo-Iranian loanword but borrowed from a very early stage that still retained *ḱ*, so this stage would be practically identical to Proto-Indo-European. Also Koivulehto (1991: 107) considers this a Proto-Indo-European loanword. This explanation is not convincing, as there is no reason to support this idea, rather than an etymology from (Proto-)Indo-Iranian proper, as has been suggested already by Sköld (1955–1957; the Indo-Iranian etymology is usually accepted: see Joki 1973: 298; Katz 2003: 285). The latter is clearly more likely, and Koivulehto himself (1999a: 230) also later supported this.

Fi *porsas* 'piglet' < PFi *porcas < PU/Pre-Finnic *porćas ←PIE *porḱos
(Joki 1959; Koivulehto 2001: 243; Napol'skikh 2015: 147, 160; Kallio manuscript)

The Indo-European origin of the Finnic word is convincing. However, contrary to Joki's and Koivulehto's views that the word is an Indo-European loan, it could have been borrowed from Balto-Slavic *parśas* (or *porśos*), as has been suggested by Napol'skikh 2015: 147, Hyllested 2014: 85 and Kallio (manuscript). The ending -*as* can equally well reflect Proto-Balto-Slavic **as* as Indo-European **os*, as in non-initial syllables **o* probably did not exist in Proto-Uralic and only became possible later in Proto-Finnic and Proto-Saami (see Kuokkala 2018: 13–18; this is also noted in this connection by Koivulehto 2001: 243), and also **o* in the initial syllable could reflect either **a* or **o*.

The Finnic word has also frequently been considered an Indo-Iranian loanword (Jacobsohn 1922: 136–223; Mayrhofer 1984: 251; SSA s.v. *porsas*; Mallory & Adams 2006: 82). The UEW (s.v. **porśas*) considers this a loan from Pre-Indo-Iranian **porśos*; **ś* would instead be **ć* in the modern reconstruction of Indo-Iranian (see Beekes 1997: 7; Lubotsky 2018: 1880–1881). This remains also a possibility (a Proto-Indo-Iranian form **parćas* would likewise result in Pre-Finnic **porćas*), although the word is better attested in Balto-Slavic than in Indo-Iranian (Holopainen 2019b: 190–193). Mordvin *purtsos* and Permic Udmurt *parś*, Komi *porś* are considered parallel loans from Indo-Iranian by Koivulehto (2001), and this might well be the case, although the Permic palatal sibilant can hardly be explained from later Iranian forms. In any case their vocalism cannot be directly derived from the same form as Proto-Finnic **porcas*. In the light of chronology and a lack of parallel examples, the Mordvin

and Permic words are unlikely to be Balto-Slavic loans. Their Indo-European origin seems undeniable, but further research on details is needed.

Hyllested (2014: 84–85) has assumed that at least some of the Uralic words could be loans from Turkic *borsuq 'badger' (from which Chuvash *porъš*), but this etymology is problematic in the light of the Mordvin affricate and Permic palatal sibilants, which could not be explained from the Turkic form. Also, the vocalism of the Mordvin and Permic words could not be easily explained from this Turkic source.

Fi *sataa* 'to rain' (< PFi *satatak*, cognates in all Finnic languages), Nganasan *soru-* id. < PS *sårå-* < PU *ćada-* 'to rain' ← PIE *ḱad-* (? *ḱh₂d*) 'to fall' (Koivulehto 1991; 50; for discussion of the IE reconstruction, see EWAia II: 607, s.v. ŚAD; LIV² 318 s.v. *ḱad-*; de Vaan 2008: s.v. *cadō, cadere*)

This etymology is formally unproblematic, but there is no reason to consider a Proto-Indo-European source form more probable than a later, Proto-Indo-Iranian source (this has been noted by Holopainen 2019b: 224). This word can equally well be a loanword from Proto-Indo-Iranian *ćada-*(> OI *śada*). It is known that there are only very few examples of Indo-Iranian loanwords that have a cognate in Samoyed, but the same can be said of putative Proto-Indo-European loanwords as well, so the distribution is not an argument against the borrowing from Indo-Iranian.

4.3. Etymologies that manifest PU *j, *i ← PIE *ǵ(ʰ)

4.3.1. Substitution in Anlaut

Fi *ihme* 'wonder' (< PFi *imeh*, cognates in all Finnic languages except in Veps); SaN *amas* 'strange; wonder' (< PSa *ęmęs*; distribution SaS–SaK) < ? PWU *imeš ← PIE *ǵn̥h₃m-* (> Lith *žymė̃* 'mark, sign') (Koivulehto 1991: 80)

This etymology has recently been criticized by Aikio (2015a: 8–10), who rejects the Indo-European origin of the Finnic and Saami words in the light of the newly discovered Khanty cognate (Suryshkar *jim*, Obdorsk *jem* 'religious or social taboo'). The Finnic, Saami and Khanty words can regularly reflect Proto-Uralic *jemä (Finnic and Saami reflecting a later derivative), and this form cannot have been borrowed from Proto-Indo-European *ǵn̥h₃m. I agree with Aikio's arguments and see no reasons to support the Indo-European etymology.

Fi *ihminen*, *inehminen* 'human' (cognates in all Finnic languages); Mordvin E *inže*, M *indži* 'guest' (UEW s.v. *inše) < PWU *inši- ← PIE *ǵn̥h₁o-* (> OI *jā́h-* 'descendant') (Koivulehto 1991: 81)

The substitution lacks convincing parallels: here Proto-West Uralic *i would reflect the Indo-European palatovelar, which seems unconvincing. This is also one of the

etymologies that show *š as the substitute for the Indo-European laryngeal *h₁, yet many of these cases have been recently criticized by Hyllested (2014: 11–23), and it is dubious whether there are any convincing examples of this sound substitution. This adds to the problematic nature of this etymology. Furthermore, the semantic development from 'descendant' to 'human' or 'guest' would not be completely clear.

Fi *itää* 'germinate' (cognates in all Finnic languages) < Proto-Finnic *itätäk* < ? Pre-Fi *jitä-* ← PIE (?) *ǵeih₁, *ǵih₁-* > PG *kī-* > Gothic *keinan* 'germinate', Lith *žydéti* 'blossom'[7] (Koivulehto 1991: 51 footnote 23)

The Proto-Indo-European loan etymology could only explain *i,* not the rest of the stem. The probable cognates (see Aikio 2002: 24) of the Finnic word in Samoyed (*əte-* 'to become visible') and Khanty (*et-*) not mentioned by Koivulehto make the reconstruction *jitä* impossible, as traces of *j-* would have been retained in these branches. The relationship of the Finnic word to Proto-Saami *ęcē-* 'flood' (> SaN *ahcit*) is unclear, as the Finnic word could also be derived from a proto-form *ičă* that would also account for the Saami form. However, semantically the connection of the Finnic word with the assumed Khanty and Samoyed cognates is better.

An alternative Indo-Iranian etymology for the Uralic verb has also been recently suggested (Holopainen 2019a), deriving the Uralic verb from some reflex of Indo-Iranian *Hidh-* 'to inflame, burn' (the meaning 'clear' has been attested in its derivatives; Cheung 2007 s.v. *Haid*). Khanty *ätər* (> East, North and South Khanty *etər*) and Mansi *ätər* 'bright' (> East Mansi *ātər* etc.), sometimes considered derivatives of PU *itä-* (Aikio 2002: 24), are more likely to represent later borrowings from Iranian *wīdra-* (< *wiidhra-*; cf. Ossetic *ird*) 'bright', which is a reflex of the same Indo-Iranian root (Joki 1973: 84–86; Holopainen 2019b: 260).

Fi *jäädä* 'to remain' (cognates in all Finnic languages) < Proto-Finnic *jäätäk* < ? Pre-Fi *jäγi-* ← Pre-II *ǵeǵhe-* (> OI *jahāti* 'to leave') (EWAia II: 813–814, s.v. *HĀ*; LIV² s.v. *ǵheh₁*) (Koivulehto 1999a: 216–217)

The vowel substitution *ä ← *e is unexpected. Although Koivulehto argues that there were no words with word-initial *je-* in Early Proto-Finnic/Proto-Uralic, this has since been proven incorrect (see Aikio 2015a: 8), as several Uralic words with *je-* can be reconstructed, for example *jelma* 'air', *jemä* 'wonder'.

The loan etymology suggested by Koivulehto is also semantically somewhat problematic. The original meaning of the Indo-Iranian words was probably 'to leave', based on the earliest attestation of the verb in Vedic and Avestan (LIV² s.v. *ǵheh₁*).

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7.   The Indo-European root is probably limited to Balto-Slavic and Germanic (even if this connection has also been doubted; see Bjorvand & Lindeman 2000 s.v. *kim*; Stang 1972: 65–66), with an uncertain reflex in Armenian *cil*, *cił* 'bud, sprout, piece of wood' (Martirosyan 2009 s.v. *cil*; van der Heijden 2018: 43).

Fi, Karelian *jäytää* 'to gnaw' < Proto-Finnic **jäütätäk* ← PIE (Pre-Slavic) **ǵyewye-* (> Old Church Slavonic *žьvati* 'to chew') (Stang 1972: 65)
(Koivulehto 2006: 191–192)

The Indo-European/Pre-Slavic etymology of Koivulehto can perhaps be interpreted differently. The semantic connection of the Finnic and Slavic words is rather close, but on the phonological level it cannot be claimed that Finnic **j-* has to reflect **ǵ-* here. **j-* can also simply reflect **y*: the initial cluster **ǵy-* of the Pre-Slavic (Balto-Slavic form) would be simplified anyway (as no consonant-clusters were allowed in word-initial position in Proto-Uralic or Proto-Finnic), and it can be argued that probably the same would have happened with a later Proto-Balto-Slavic cluster of **źy*. This means that the dating of the loanword is difficult, and theoretically the word could be also a later loan. However, it does not bear evidence for the retention of palatovelars in the donor language.

It is difficult to determine a precise donor form from later Slavic, however. Slavic forms like Old Church Slavonic *žьvati* reflect zero-grade forms, whereas Finnic **jäütä-* can only be explained from a donor form with a diphthong.[8]

4.3.2. Substitution in Inlaut

Fi *ajaa* 'drive'; SaN *vuoddjit*; Komi *vojnị*, Udmurt *ujịnị* 'run, chase'; East Mansi *wujt-* (< PMs **ūjt-* 'pursue, change' < PU **aja-* 'drive' (Aikio 2015b: 54) **← PIE **(h₂)aǵo-* (> Lat. *ago*, OI *ájati* etc. 'drive')** (LIV² s.v. **h₂eǵ*)
(Joki 1973: 247; Rédei 1986: 43; Koivulehto 1991: 80, 105; 1999a: 210)

The Indo-European origin of the Uralic word is almost universally accepted (see also UEW; SSA); the most critical voices seem to come from the supporters of Nostratic: Illič-Svityč (1971–1984 I: 243) noted that Uralic **aja-* cannot be an Indo-Iranian loanword due to the *j* (a sibilant would be expected), and his view is echoed by Dolgopolsky (2012: 854). However, their alternative etymology, inheritance from Nostratic **Haya-* 'pursue', is of course impossible. The assumed Nostratic cognates include Indo-Iranian **(H)ay-* 'treiben' (> OI *ay-* 'treiben', see EWAia I: 102–103, s.v. *ay²*, RIVELEX I s.v. *ay²*) and it would be tempting to derive the Uralic word from this Indo-Iranian verb as a loan. However, despite the similarity of the Indo-Iranian root and the Uralic verbal stem, no suitable donor form with full-grade **ay-* can be found: the present active forms have zero-grade *i,* for example OI *inóti*. Moreover, it is also

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8.   On the discussion on the entry **jäütä-* in *Suomen vanhimman sanaston etymologinen verkkosa-nakirja* <https://sanat.csc.fi/wiki/Etymologiadata_talk:imsm:jäwtä-/th>, Santeri Junttila has noted the problems with the Slavic diphthongs. He cautiously suggests as an alternative to the Slavic etymology that the word *jäytää* could have been borrowed from a later North Baltic form **žjeu*. The substitution of the word-initial consonant-cluster **žj-* would be similar as with the Slavic donor, and Finnic **jäü-* could be explained from Baltic **jeu* (in Late Proto-Finnic, there were no words with initial **je-*). The possibility of deriving the Finnic word from Baltic will be investigated further in a forthcoming publication by the present author and Santeri Junttila.

possible that OI ay^2- is originally the same root as *ay*- 'to go' (cf. EWAia), the primary meaning of which is rather far from the Uralic 'drive' (see also Cheung 2007 s.v. *HiH*, where ay^2- is cautiously connected with Avestan *i*- 'to grieve, offend, harm'). On the other hand, Höfler (2017) has noted that a root *$h_2eyh_{1/3}$- 'pull' can be reconstructed for Proto-Indo-European, and it is possible that Vedic third singular middle *áyate,* often interpreted as 'goes' or 'speeds' might be a reflex of this root, with a meaning 'being pulled'. This is semantically not very far from the meanings of the Uralic 'drive (animals)', and a verbal stem like Indo-Iranian *(H)ay(H)-a* would be phonologically a suitable origin for Uralic *aja*-. However, due to the uncertainty of the etymology of *áyate* this explanation remains just one possibility at this point.

To sum up, there is a lot of uncertainty around the possible Indo-Iranian root *(H)ay(H),* but future research might bring new insights that can be also shed light on details regarding the possible relationship with Uralic *aja*.

To get back to the widely accepted Indo-European etymology, it cannot be outrightly stated that there would be no connection whatsoever between Indo-European *(h_2)aǵ*- and Uralic *aja,* but it is problematic that no convincing parallel examples to this substitution are found. It has been noted by Simon (2020: 244–245) that as the Proto-Indo-European word probably had a word-initial laryngeal (see also LIV^2), one would expect some reflex of the laryngeal on the Uralic side. The lack of a laryngeal reflex could point to a slightly later borrowing from some daughter language of Proto-Indo-European (this possibility is also mentioned by Koivulehto 1991: 105). It has to be stressed, however, that since we have only fragmentary evidence of the reflexes of laryngeals in the early loanwords, it is possible that the donor form had a laryngeal but there is no trace of it on the Uralic side, as the Proto-Uralic consonant system did not possess a suitable consonant that could have served as the substitute for it.[9]

Another possible solution would be that since PU did not possess a voiced palatal affricate, the *$\acute{\jmath}$ of a later Indo-Iranian form *(H)aja*- could have been substituted by PU *j. However, there are parallel examples among PII loans that defy this, such as PU *woraći* 'boar' or *waćara* 'hammer' (Holopainen 2019b: 334). Bjørn (2017: 69) considers it possible that Uralic *aja*- is borrowed from Indo-Iranian, but it remains uncertain to me why this should be the case (cf. the criticism by Illich-Svitych mentioned above).

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9.   This would be similar to the situation of early contacts between (Pre-)Saami and Proto-Germanic: Proto-Germanic *h [χ ?] was not substituted by the Saami speakers as their sound system did not have a suitable phoneme for that (Aikio 2006: 9–15; Kallio 2009: 36–37). The same Germanic sound was substituted by *k in the earliest loanwords from Proto-Germanic to Saami and Finnic, but there is a layer of Saami loans showing the zero-substitution of *h. Also, the medieval or early modern loanwords from Chuvash into Mari display a similar lack of the substitution of Chuvash *x* in the word-initial position in Mari (for example, East Mari *ola* 'city' ← Chuvash (Viryal) *xola* id.; Róna-Tas 1988: 770–771). This is not to say that Proto-Indo-European *h_2 had to be a similar velar fricative as Proto-Germanic *h or Chuvash *x*, but the situation is in any case similar enough.

Fi *maja* 'house, hut' (cognates in all Finnic languages) ← PIE *maḱa- (> OHG *gimah* 'modest, suitable') (Koivulehto 2003: 290)

This etymology is problematic in the light of recent views on the Indo-European background of the Germanic word. Kroonen (2013 s.v. *maka-*) reconstructs plain *k for the preform of Germanic *maka, so the IE etymology for the Finnic word is unlikely. In any case, there are no other examples of palatal *ḱ substituted by Uralic/ Early Proto-Finnic *j. It seems best to reject any etymological connection between the Finnic and the Germanic words. Also the semantic distance is notable.

There is a competing loan etymology for Finnic *maja*, but it is also uncertain. Thomsen (1890: 198) assumed that *maja* is a loan from a Baltic word akin to Latvian *māja* 'house, dwelling place; family', but this etymology is doubtful because the Latvian word is isolated, having no cognates in Lithuanian, and it has also been considered a loan from Finnic to Latvian (SSA s.v. *maja*; K. Häkkinen 2004 s.v. *maja*). Liukkonen (1999: 93–94) has argued that the Lithuanian place name *Mósėdi* contains a cognate of Latvian *māja*, but this explanation remains hypothetical (K. Häkkinen 2004 s.v. *maja*).

For the time being, Finnic *maja* remains an uncertain origin, but it seems almost certain that it is not a very early Pre-Germanic or Proto-Indo-European loanword.

Fi *orja* 'slave, servant' (cognates in all Finnic languages); SaN *oarji* 'south, west' (cognates in all Saami languages); Mordvin E *ura*, M *uŕä*, Udmurt *var* 'slave' ← PIE *worǵó- 'worker' (root *werǵ- 'do') > Greek ωργός in compounds like γεωργός 'farmer', Mycenaean Greek *woko* in the compound *to-ko-so-wo-ko* [*tokso-worgos] 'fabricant d'arcs' (Koivulehto 1999b: 331)

This Proto-Indo-European etymology is unconvincing, as the Uralic words can better be explained from Proto-Indo-Iranian *(H)ā́rya- 'Aryan' (OI *ā́rya,* Av *airiia-* etc.), which is the commonly accepted etymology for this Uralic word (for a more detailed discussion of the Indo-Iranian loan etymology, see Holopainen 2019b: 164–166). Even in the absence of a competing etymology, the Uralic word could hardly be explained from a form *worǵo, as we would expect Uralic word-initial *w- in this case. Koivulehto himself (1999a: 227) also later favored the Indo-Iranian etymology.

Fi *ääri* (< ? *äjiri) 'edge' (cognates in Karelian, Ludic, Votic, Estonian) ← Pre-Balto-Slavic *eǵero- < PIE *eǵʰero- (Martirosyan 2009: *h₁eǵʰero-) (> Lith *ẽžeras* 'lake', Armenian *ezr* 'edge') (Martirosyan 2009 s.v. *ezr*; Derksen 2015 s.v. *ežeras*) (Koivulehto 2006: 190)

Koivulehto's idea of connecting this Finnic word with Indo-European *(h₁)eǵʰero- or its later Balto-Slavic reflex is semantically a convincing idea, if we assume that the meaning of the word was 'edge' already in Proto-Indo-European. From the point of view of vocalism, it would be possible to derive the Finnic word from an

Indo-European form *(h₁)eǵʰero, if we assume that Indo-European *e would have been substituted by *ä. Due to the absence of *ä in Proto-Indo-European and Proto-Balto-Slavic, this would be possible, even though there is a lack of convincing parallel examples.

The idea that Finnic *j could reflect Indo-European *ǵ is more problematic. However, *äjiri is not the only possible pre-form for the Finnic word: Pre-Fi *äɣiri would also yield Fi ääri, so this is not necessarily an example of *j ← *ǵʰ, as *ɣ ← *ǵʰ would be possible. Note that Fi sääri 'thigh', which Koivulehto mentions as a parallel to ääri < Pre-Finnic *äjiri, rather continues Uralic *säɣiri, not *säjiri (Juho Pystynen: personal communication). However, this latter substitution *ɣ ← *ǵʰ also lacks convincing parallels. In any case, if the word was borrowed from some reflex of *eǵʰero, the donor form would have had a retained velar and not a sibilant or affricate.

Fi voi 'butter, grease' (cognates in all Finnic languages); SaN vuodja (cognates in all Saami languages); Mordvin E oj, M vaj; Ma E ü, W üj; Komi vij, Udmurt vej; Hu vaj, Khanty East voj 'fat, butter, oil' (< PKh *waj); Mansi North wāj 'fat' (< PMs *wāj) < PU *waji ← "early PII" *āgya- (> OI ājya- 'melted butter used for libations') (Koivulehto 1999a: 217–218)

The Indo-European origin of the Uralic word is convincingly rejected by Aikio (2012: 236), who notes that the lack of *w- in the Indo-Iranian form makes the etymology impossible, as the Uralic *w- cannot be explained as secondary in any of the branches where it appears.

It must be noted that the donor form Koivulehto reconstructs is also problematic, as it supposes an Indo-Iranian "intermediary" form which shows a phase between Proto-Indo-European plain *g and Indo-Iranian *j. Since we do not know what this intermediary phase would have been phonetically, the idea that Uralic *j could reflect that sound is very difficult to prove.

4.4. Etymologies that manifest PU *ɣ ← PIE *ǵʰ

Fi jäädä ← Pre-II *ǵeǵʰe

See above for a discussion of this etymology; both the word initial *j ← *ǵ and Inlaut *ɣ ←*ǵʰ are problematic and lack convincing parallels.

Fi juoda; SaN juhkat; Mari E, W jüäš; Komi juni, Udmurt juṇṇ; Hungarian iszik; North Mansi aj- (< PMs *äj-); PS *er < PU *jiɣi- or *juɣi- 'to drink' (Aikio 2002: 38–40; 2015b: 65; Zhivlov 2014: 116, 127) ← **PIE *ǵuǵʰew- (> OI juhóti 'pours')** (Koivulehto 1991: 17, footnote 7)

This is a problematic etymology: the reconstruction of the Uralic verb, especially the initial syllable vocalism, includes various uncertainties, and moreover, the

Indo-European origin is semantically not very close and features the borrowing of the reduplicated syllable, which lacks convincing parallels. In the context of Indo-Uralic inheritance, the Proto-Uralic stem has also been connected to Proto-Indo-European *yuHs- 'Suppe, Brühle' > Vedic yū́ḥ (Kümmel 2009; see NIL s.v. i̯euHs for the IE etymology) as well as *Hyuh₂- 'to eat' > Vedic yávasa- 'pasture'[10] (Kümmel 2019: 126). However, the difficulties in the reconstruction of the vocalism of this Uralic word (Aikio 2002: 38–40; Aikio 2015b: 65) hinder the possibility of considering the Proto-Uralic word an inherited Proto-Indo-Uralic word. For similar reasons, it would be difficult to assume that the Uralic word could be borrowed from one of the Proto-Indo-European words mentioned above.

Recent attempts to consider this verb inherited from Proto-Indo-Uralic and cognate to Proto-Indo-European *h₁egwh- 'to drink' (Kassian, Zhivlov & Starostin 2015: 320; Peyrot 2019: 190–195) are likewise unconvincing, due to similar issues with the Uralic reconstruction (Kallio 2015a: 370; Holopainen 2020).

Fi *viedä* 'bring' (cognates in all Finnic languages); Sa (Skolt) *viikkâd*; Mordvin *vijems*, *vijəms*; Komi *vajni̮*, Udmurt *vaji̮ni̮*; Mansi South *wü*, East *wiɣ-* 'take'; Khanty East *wĕ*, North *wu-* 'take'; Hu *vi-* < PU *wiɣi-* ← PIE *weǵʰ-* 'schweben, fahren' (> OI *vahati* 'drive') (Rédei 1986: 48; Koivulehto 1999b: 336)

The Uralic predecessor of Finnic *viedä* is reconstructed as *wiɣi-* in traditional sources such as the UEW. It has been shown by Aikio (2013: 170–171) that two different verbs, Uralic *wiɣi-* (> Hu *visz* 'bring') and *weɣi-* (> *vesz* 'take') can be reconstructed, but they have often been mixed up in earlier research. For example, in the UEW and Rédei (1986), the cognates listed under *weɣi-* include the words like Finnic *vie-* that certainly continue the other variant, *wiɣi*.

In the case of *wiɣi*, the Indo-European etymology is unlikely due to the unexpected vowel substitution: from Indo-European *e* one would expect Uralic *e*, not *i*. However, the verbal stem *weɣi-* would be a much more likely candidate for a loan from Indo-European *weǵʰo-* or its reflex in some daughter language. On the phonological level, nothing really speaks against this etymology, except for the substitution *ɣ ← *ǵʰ that lacks convincing parallels. Together with Uralic *aja-* 'drive', this is one of the possible etymologies that cannot be rejected out of hand. However, if both etymologies are accepted, it remains unclear why there are different substitutions for *ǵʰ and *ǵ. Due to the small number of promising etymologies, the evidence is uncertain at best.

As noted by Simon (2020: 254), the semantic connection of the Indo-European and Uralic verbs is problematic. This, together with the uncertain substitutions, means that the etymology cannot be considered certain. It is also possible that Uralic *weɣi, *wiɣi- and Indo-European *weǵʰ- bear only a coincidental resemblance to one another.

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10.   This latter Indo-European etymology is a recent idea by Nikolaev (2014). Contrary to Kümmel's reconstruction in the meaning 'to eat', Nikolaev reconstructed the meaning of the IE root *Hyuh₂- as 'graze', which is semantically very far from Uralic 'drink'.

4.5. Etymologies that manifest PU *k ← *ḱ

In this section, those few examples are discussed which allegedly are borrowed from a word with a retained palatal stop but which show the Uralic velar *k as the substitution, instead of the affricate *ć.

Fi. *koipi* 'leg' (cognates in all Finnic languages except Veps) ← PIE *ḱoypo- 'stick', cf. Latin *cippus* (< *? ḱeypo) 'boundary stone', OI *śepa, śepha-* 'tail, penis' (Hyllested 2014: 80)

This etymology is semantically hazy: while it is not impossible to derive a word for 'leg' from a word for 'tail' or 'boundary stone', there is a discrepancy in that the Finnic word exclusively denotes 'leg', and this meaning is not found on the Indo-European side at all.

 Moreover, the Indo-European status of the Latin and Indic words that are grouped here is doubted at least and De Vaan (2008 s.v. *cippus*) and EWAia (II: 654, s.v. *śepa*) both consider the Latin and the Indic word, respectively, to be of uncertain origin. It is not at all certain that these words are cognates like Hyllested assumes. In Sanskrit there is also a variant *śepha-* 'scrotum', which has an unexplained aspirated *ph*. This variation makes the early origin of the Indo-Iranian word very uncertain. It is very doubtful whether a form *ḱoypo- can actually be reconstructed for Proto-Indo-European, so deriving Finnic *koipi* from such a form is impossible.

East Khanty *kul* 'Getreide, Korn' ← "früharisch *ḱuklɔ́m" ?? (= PII *ćukrá- 'white', OI *śukrá-* 'white') (Katz 2003: 215)

This etymology is not convincing due to ad hoc sound substitutions. While the substitution of Indo-European *ḱ by Uralic/Khanty *k would be phonetically completely unproblematic, there is no evidence that Khanty *l reflects an earlier *kl cluster. Almost all convincing examples of early Indo-Iranian loans in Uralic show Indo-Iranian *r, not the retained *l (see the discussion on *ćali above), which further makes Katz's idea of a "frühurarisch" etymology unlikely.

 Furthermore, semantically the etymology is far from convincing, as the Indic word simply means 'white', it is derived from a root that had the original meaning 'to gleam' or 'to burn' (EWAia II: 645, s.v. *śukrá-*; Cheung 2007 s.v. *sauč^l*), and nothing points to a meaning related to a 'cereal'.

 The distribution of the word in only one group of Khanty dialects is suspicious, if the word is a very early loanword. Most early loanwords from Indo-Iranian have a wide distribution within the Khanty dialects (and there are no known examples of loans from some other branch of Indo-European that would be confined to Khanty alone, with the exception of late loans from Russian).

5. Results

The following etymologies turn out to be too unconvincing for one to assume any connection between the Uralic and Indo-European forms:

> PU ? *ćerä* 'thing?'; PU *ćali* 'guts'; PU *ćolki* 'Spange'; PWU *imeš* 'wonder'; PU *inši* 'human'; PU *itä-* 'to germinate'; Fi *jäädä* 'to stay' (< *jäγi-*); PU *jïγi-* 'to drink'; PSa *kārćē* 'narrow'; PU *karćV* 'hideous'; Fi *maja* 'hut'; PU *orja* 'slave'; PS *sẹr* 'white'; Fi *Suomi* 'ethnonym'; Fi *susi* 'wolf'; PU *waji* 'butter'; Fi *ääri* 'edge' (< *äjiri*)

The following etymologies can rather be derived from an early form of Proto-Balto-Slavic (supporting Kallio's and Koivulehto's findings):

> PU *ćora* 'grain (of sand?)'; PSa *čuormẹs* 'hail'; PU *porćas* 'pig, piglet'; PU *ćïlkaw* 'pole'; Fi *jäytä-* 'to gnaw'

The following etymologies can more convincingly be derived from Indo-Iranian:

> PU *ćada-* 'rain'; PSa *ćearō* 'peak of a fell'; PSa *ćeartę* 'tribe'; PU *ońća* 'part, meat'

The following cases remain uncertain, that is, they may turn out to be loanwords but they include problems that are difficult to solve based on our present knowledge:

> PU *aja-* 'drive'; PSa *ćuońēk* 'goose'; PU *kaća* '? point'; PU *wiγi-* 'bring'

6. Conclusions

As almost all of the Indo-European etymologies discussed above turned out to have some problems or can be explained otherwise, mostly as later loans, there is no enough evidence to assume that there is a layer of loanwords in Uralic that would result from contacts with Proto-Indo-European or an early Indo-European language which still had the three-way system of velars.

Many of these loanwords are indeed borrowed from Indo-European languages, but the exact sources are open to different interpretations. In no cases is it compelling to assume that the donor form would have been Proto-Indo-European, but in almost all cases a real satem language source is more compelling.

It has to be stressed that this study did not involve a treatment of all the possible Proto-Indo-European loanwords into Uralic but only concerned the substitution of specific Proto-Indo-European phonemes in the potential loanwords, and thus it is not meant to argue against a layer of Proto-Indo-European loanwords in Uralic as such.

However, the results do support the conclusions reached by Simon (2020) and Aikio (in press), who have argued against many of the Proto-Indo-European etymologies, as well as with J. Häkkinen (2009) and Kallio (manuscript) who have reinterpreted many of the earlier loans as later borrowings from daughter languages of Proto-Indo-European. There are still some commonly accepted Indo-European loanwords whose status as a Proto-Indo-European loan can be doubted but whose precise original is yet to be determined, for example the well-known etymology of Uralic *orpa* 'orphan', which can be derived from Proto-Indo-Iranian *(H)árbha-* 'small, weak, young' but for which a semantically better source would be a language that developed the meaning 'orphan'; and *mośki-* 'wash' that can hardly be derived from Proto-Indo-Iranian *majj-a-* (> OI *májjati*) due to its *śk* cluster.[11] It can be said that we do not yet have a full picture of all the early Indo-European contact languages of Uralic.

Although aspects of prehistory cannot be discussed here in more detail, it should be noted that these results support the more recent research results of archaeology, such as those of Lang (2018), who assumes that the arrival of Finnic and Saami to the Baltic sea happened quite late (during the second and first millennium BCE) and through different routes that have been previously assumed (see also Kallio 2015b: 87–94 for recent discussion on this issue). The current ideas on the dispersal and spread of Indo-European (Parpola 2012: 148–162; see also Lang 2018: 52–53) fit well with the conclusions based on linguistic data in that many early loanwords are from Balto-Slavic or Indo-Iranian. These current views fit less well with Koivulehto's ideas from the 1980s and 1990s that assume that in the western part of the Uralic language-area, possibly in Finland or other areas near the Baltic sea, there were very early contacts between the predecessors of Finnic and Saami and between the Indo-European forms that later produced Germanic. This is not to say that Koivulehto's ideas were untenable at the time: they fitted well with the results of both archaeological and linguistic research of the late 20th century.

Another future task that can shed more light on the early contacts between Indo-European and Uralic and the reflexes of the Indo-European velars in the Uralic loanwords would be the re-evaluation of the so-called Pre-Germanic loans that occur in Finnic and Saami. Some of these loanwords look suspiciously like Proto-Indo-European, and in many cases the only characteristics that point to a predecessor of Germanic are the Uralic velars as the substitute of Pre-Germanic centum reflexes, and the distribution, and Kallio (2009: 36) has noted that many early Germanic loans could equally well stem from a "Proto-Centum" stage. These words include examples like Proto-Finnic *koneš* 'magic' (> Fi *kone* etc.) ← PIE/Pre-G *ǵṇh₃io-* 'wonder' (> PG *kunja-* 'omen'; Kroonen 2013 s.v. *kunja-* 2) or SaN *gahčča-* 'to fall' ← Pre-G *k(h₂)idye/o-* 'to hit upon' etc. (> PG *hittjan-*; Kroonen 2013 s.v. *hittjan-*) (Koivulehto 2003: 303, 305–306). If these etymologies are correct, they could point to a situation where Indo-European palatal stops were substituted by Uralic velars. These questions have to be investigated in future research.

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11. Problems of this Uralic etymology will be investigated in a future publication with Santeri Junttila.

Abbreviations

E	Erzya Mordvin	PI	Proto-Iranian
Fi	Finnish	PMs	Proto-Mansi
Hu	Hungarian	Pre-G	Pre-Germanic
Lith	Lithuanian	Pre-II	Pre-Indo-Iranian
Ma	Mari (E = East Mari,	PS	Proto-Samoyed
	W = West Mari)	PSa	Proto-Saami
M	Moksha Mordvin	PU	Proto-Uralic
NWIE	North-West Indo-European	SaK	Kildin Saami
OHG	Old High German	SaL	Lule Saami
OI	Old Indic	SaN	North Saami
PBSl	Proto-Balto-Slavic	SaS	South Saami
PG	Proto-Germanic	SaT	Ter Saami
PIE	Proto-Indo-European	PWU	Proto-West-Uralic
PII	Proto-Indo-Iranian		

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