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Motivating Sievers' Law*

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1. Overview of Sievers' Law

Sievers' Law (SL) is one of the most perennially discussed phonological problems in Indo-European (IE) linguistics. While there is neither the time nor space to cover exhaustively the more than one hundred years of scholarship devoted to the topic at hand, it is necessary to provide the reader with a basic overview of the problem.[1] The original formulation of the law may be found in Sievers 1878:129, where in order to explain contrasting Vedic forms such as *ajuryá-* 'unaging' vs. *asūria-*'sunless' and *ávya-* 'woolen; coming from sheep' vs. *mártia-* 'mortal', Sievers proposed the following rule: "If, in Indic, unaccented (without svarita) *i* or *u* occurs before a vowel … then … this segment is realized as a consonant after a light syllable and as a vowel after a heavy syllable."[2] For Sievers, a heavy syllable consisted of a short vowel plus two consonants (*VCC*) or a long vowel plus one consonant (*V̄C*); a light syllable consists of a short vowel plus one consonant (*VC*).

Since Sievers' influential and now canonical observations, scholars have steadily proposed a number of parallels from within Indo-European which bolster his observation that this alternation between high vowels and glides may go back to PIE times. Furthermore, many scholars, beginning with Osthoff,[3] have extended SL to apply to the entire class of PIE resonants (**m*,**n*,**r*,**l*,**i̯*,**u̯*). While Sievers had originally conceived of the phonological process in question as being an alternation of high vowel and glide depending on the weight of the preceding syllable, the following analysis will assume SL to be a rule of vowel epenthesis,

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1 For a comprehensive review of the Indo-European scholarship I refer the reader to Seebold 1972:25ff., Horowitz 1974:11ff., Collinge 1985:159ff., Mayrhofer 1986:164–7, Meier-Brügger 2003:90–1, Sihler 2006, and Fortson 2010:71–2.

2 Translation by Collinge 1985:159.

3 Osthoff and Brugmann 1879:14–6n1.

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such that **tertio-* → **tertio-* and not **tertio-*,[4] since, as has long been recognized, there appears to have been a strong preference within PIE for syllables to contain at least one consonant in the onset.[5]

(1) SIEVERS' LAW (epenthesis)

$\varnothing \rightarrow \underset{\circ}{R}_1 / VXC\_\_R_1V\ (X = V, C)$

If a prevocalic non-syllabic sonorant follows a heavy syllable, epenthesize a corresponding syllabic sonorant before the sonorant in question.

In the following analysis, I will make use of three hypothetical "roots": **tert-*, **tēt-*, and **tets-*,[6] where *t* = any consonant, *e* = any short vowel, *ē* = any long vowel, *r* = any sonorant and *s* = any consonant of equal or higher sonority than the preceding *t*.[7] In the derivations, **-i̯o-* will represent any glide- or sonorant-initial suffix that may potentially participate in SL, such that **-i̯o-* may stand for **-i̯ah₂-*, **-u̯o-*, **-ri-*, etc. Though the present analysis assumes SL to have operated upon all resonants for simplicity of presentation, the core arguments of this paper by no means rest on this assumption. Those who prefer to restrict SL to the PIE glides (**i̯*, **u̯*), or even to just **i̯*, may easily do so through the assumption of additional markedness constraints in this paper's analysis, as given in n31 below.

1.1. Einzelsprachlich or inherited?

Languages that provide evidence for SL may be separated into two types: those where some semblance of the law is still productive and those where it is moribund and has been lexicalized. The former is only true in the oldest attested Germanic and Indic. In the Rig Veda we find that SL is most regularly attested in formations with the suffix *-ya-*. After a heavy syllable, there are 1,552 instances of *-i(y)a-* but only ninety-one instances of *-ya-*, a 17 : 1 ratio; after a light syllable there are 462 instances of instances of *-i(y)a-* and 1,747 instances of *-ya-*, a 5 : 19 ratio.[8] Other suffixes behave much less consistently. For instance, the dative/ablative case ending *-bhyas* occurs as expected *-bhiyas* only 38.5% of the time after a heavy syllable (Seebold 1972:35), and a resistance to Sievers' Law in the Rig Veda is also found in the dual ending *-bhyām* and the gerund *-tvā*. Moreover, while there is some indication that the 3rd pl. ending *-iré* (< **-r̥ré*) originated as a Sievers variant of **-ré* in prehistoric Sanskrit,[9] nowhere does **-tr̥ra-* occur as a variant of the instrumental suffix *-tra-* (< **-tro-*, **-tlo-*): see Sihler 2006:7. It thus appears that Sievers variants are more regularly attested for suffixes of the shape *-RV-* than among those of the shape *-CRV-* in Sanskrit. As we will see, this fact is significant.

In Germanic, I follow Kiparsky (1998) in assuming that SL was driven by a preference for moraic trochees, or feet of the shape (LL) or (H). This most easily accounts for the application of SL in both monosyllabic roots such as seen in Gothic *haird-eis* 'shepherd (gen.sg.)' (< **hairdijis* < **haird + jis*) and in disyllabic stems such as *ragin-eis* 'counselor (gen.sg.)' (< **raginijis* < **raginjis*). Should Kiparsky be correct in assuming that SL was driven by a preference for moraic trochees in Germanic, then it is clear that the function of SL in Germanic is not congruent with the function of SL in the other IE subbranches or in PIE itself. For this reason, a significant number of scholars[10] have suggested that the many different reflexes of SL in the attested IE languages prevent us from projecting SL back to the proto-language. Rather, they argue, we must view the several instantiations of "Sievers' Law" as separate phonological processes occurring individually in the daughter languages.

However, as Ringe (2006:120) correctly points out: "The reapplication of Sievers' Law is hard to understand if it was an ordered rule, fossilized within the phonology of the language but no longer operative on the postlexical phonetic level; but it makes sense if Sievers' Law was operating as a surface filter, applying to any derived input that met its structural description in much the same way as modern German obstruent devoicing." Thus, if SL was truly inherited from PIE, we should view it as a postlexical rule carried across the generations, rather than as a historical event. Postlexical rules are phonological processes that apply

4 Cf. Seebold 1972:29, Kobayashi 2001:93, and Weiss 2009:39.

5 Cf. Mayrhofer 1986:123–4n108.

6 Should one prefer attested roots, one may replace **tert-* with **derḱ-* 'see' (Gk. *dérkomai*, etc.), **tēt-* with **h₁ēd-* (Hitt. *ēdmi*), lengthened grade of **h₁ed-* 'eat' and **tets-* with **h₂u̯eks-* 'grow' (Av. *uxšiieitī*, Gk. *aúksomai*).

7 Such that an SSP violation occurs if syllabified in the same syllable; see §1.3 below.

8 Seebold 1972:31, citing Edgren 1885:78. Of course, not all instances of *-iya-* (especially after a light syllable) are to be attributed to SL; see Schindler 1977:58.

9 According to Praust, the original distribution was *-iré* (< **-r̥ré*) after heavy syllable (*īdhiré*, *ūciré*, *vavāśire*) and *-ré* after light (*riricré*, *nunudré*, *ānajre*, *jagṛbhré*). Praust also points to other possible examples of SL affecting non-glides, such as Ved. *índra-* (see Sihler 2006:98–100 for an opposing view) and the pair Ved. *cyautná-* 'work, deed', Av. *šiiaoθna-*, which at times must be scanned as three syllables. See Praust 2000:429–30 for further discussion and references.

10 Beginning with Kluge 1891:502 and followed most recently by Sihler 2006:188–91.

at the phrasal, or syntactic, level. They typically apply across the board with no regard to morphological boundaries, tend to be exceptionless, and frequently produce allophonic variation (see Kiparsky 1982). Ringe's implicit (and my explicit) claim is that Sievers' Law was a postlexical phonological process in PIE, which was lost, lexicalized, or continued in different guises in the IE daughter languages.

To illustrate my claim, let us take the example of final devoicing as a postlexical rule in some hypothetical language, which we will call Proto-XYZ. This process occurs across the board, meaning that no phrase-final obstruent can be realized as voiced in an utterance. Throughout the hypothetical years, Proto-XYZ evolves into three daughter languages: X, Y, and Z. Each language evolves independently as does the inherited post-lexical rule of final devoicing. In language X, final devoicing disappears altogether. Perhaps this is due to sociolinguistic factors, such that X is influenced areally by a speech community that lacks this particular phonological process. Perhaps the loss of this rule is driven by linguistic factors, such that the final sequence *-*DV*, where *D* = any voiced obstruent, undergoes apocope, reintroducing the phonemic status of voiced obstruents in absolute word-final position.[11] In language Y, only a handful of words show alternation of a stem ending in a final voiced obstruent (imagine the opposite of Eng. *wife* : *wives*). Here, too, the rule is lost entirely, with only a handful of traces in the lexicon. Lastly, in language Z, final devoicing persists, but its purpose is altered such that it is unrecognizable. To be on the exotic (and quasi-ridiculous) side, let us say that in language Z all syllable-final voiceless stops create a high tone (*-*VT*$ > -*V́*$),[12] and this high tone alternates with allomorphs containing a voiced stop (-*V́* ~ -*VDV*). Thus, we may say that final devoicing has continued as a (morpho)phonological process in language Z, but with a function entirely different from that of the proto-language.

It is in this fashion that Sievers' Law, which originally was a postlexical rule, evolved in the attested Indo-European languages. In some subgroups, such as Albanian, Armenian, and Slavic, SL was lost without a trace. In others, such as Greek, Iranian, and Italic, SL only persists through a handful of archaic forms. And lastly, in other subgroups, such as Indic and Germanic, SL persists to a greater or lesser extent as a synchronic process, which has been altered to suit the needs of the speakers of those languages. Our current task is to devise a postlexical rule that can conceivably evolve into each of the IE systems attested and to arrive at an independently motivated reason for the existence of Sievers' Law at the PIE postlexical level.

11 Such as Yiddish. See Albright 2008.

12 For a thorough discussion of "tonogenesis," see Matisoff 1973.

1.2. Schindler 1977

To the best of my knowledge, Schindler (1977), in his influential review of Seebold 1972, did not conceive of SL as a postlexical process in PIE. His paper arguably constitutes to date the most successful attempt in motivating the original conditions of SL in PIE; it has undoubtedly been the most widely held view in the literature since its publication.[13] In his review, Schindler points out two curious instances of SL not applying in Vedic. First, Schindler (1977:61) argued that words of the shape **tetti̯o-* are not realized as ***tetti̯i̯o-*, where *tt* = any sequence of two obstruents (regardless of sonority level). The best example is Ved. *matsya-* 'fish', which is never scanned as ***matsiya-* and must go at least as far back as Proto-Indo-Iranian, as is evidenced by its Avestan cognate *masya-* 'id.'. Ruijgh (1992:76) also points to a similar treatment of **tetti̯o-* in Ionic Gk., where *diksós* 'double' derives from **dikʰtʰi̯ós* (cf. *dikʰtʰá* 'in two'). If SL had occurred, one would expect ***dikʰtʰi̯i̯os*. Second, Schindler (1977:60–1) pointed out that the absolutive in **-tu̯V* (*-tvā́*, *-tvī́*, *-tvā́ya*), never shows Sievers variants, with forms such as *gūdhvī́*, *yuktvā́*, *bhūtvā́*, *jagdhvā́ya*, etc. never being scanned as ***gūdhuvī́*, ***yuktuvā́*, ***bhūtuvā́*, ***jagdhuvā́ya*, etc.

To prevent forms like *matsya-* and the absolutives from participating in Sievers' Law, Schindler (1977:60n4) proposes the following syllabifications of our three hypothetical forms: **ter.t̯i̯o-*, **tē.t̯i̯o-* and **tett.i̯o-* (= my **tets.i̯o-*). These syllabifications, he argues, were not chosen in an entirely ad hoc fashion, but rather confirmed Saussure's syllabifications (Saussure 1885) of the double dental clusters (**méd-t.ro-*), which I have disputed elsewhere (Byrd 2010). Once Schindler had parsed the syllabifications in the sequences **ter.t̯i̯o-*, **tē.t̯i̯o-* and **tett.i̯o-* (= my **tets.i̯o-*) he was able to define the targeted sequence as a syllable onset consisting of a consonant + non-syllabic sonorant. Thus, Schindler explains SL to be the result of an avoidance of a complex onset *C* + *R* (or *C* + *U̯*) in a word-medial syllable in PIE (so Meiser 1998:89–90). Schindler also notes that SL is frequently unattested in non-final syllables: for example, *vāiśvānará-* 'pertaining to all men' never scans in five syllables (i.e., ***vāiśuvānará-*). For

13 Cf. Peters 1980:129ff., Mayrhofer 1986:164–8, Meiser 1998:89ff., Praust 2000, Meier-Brügger 2003:90–1, Weiss 2009:39–40, and Fortson 2010:72.

Schindler, this frequent non-application of SL derives from the original restriction of SL to the onsets of word-final syllables. This allowed Schindler to collapse SL together with Lindeman's Law (LL), for which see Lindeman 1965, thereby viewing long Lindeman variants such as **diḭéu̯s* 'sky (god)' (← **diéu̯s*) as the result of SL in certain sandhi configurations.[14]

(2) SIEVERS'/LINDEMAN'S LAW (Schindler 1977:64)

$$\begin{bmatrix}+\text{son}\\-\text{syll}\end{bmatrix} \rightarrow [+\text{syll}] \,/\, \$[-\text{syll}]_1 \_\_\_ [+\text{syll}][-\text{syll}]_0\#$$

In the final syllable of a word, if a non-syllabic sonorant is preceded by a consonant and followed by a vowel, it is realized as [+syllabic].

There are two problems with Schindler's ingenious analysis, however. First, as Collinge (1985:165) points out, we have no reason to believe that a sequence **C + R* was disfavored in PIE onsets, as can be shown by a sizeable number of roots and words in PIE: **tḭegʷ-* 'withdraw', **tu̯erk-* 'cut', **tréḭes* 'three', **pleh₁-* 'fill', etc. Second, the syllabification of **tettḭo-* as **tett.ḭo-* (= my **tets.ḭo-*) is problematic, since there is no direct evidence for this type of syllabification attested in the IE languages. This renders Schindler's analysis completely circular. More seriously, however, I believe there is considerable evidence that the syllabification of **tettḭo-* as **tett.ḭo-* (= my **tets.ḭo-*) was in fact impossible for a speaker of PIE.

1.3. Indo-European Syllabification

To reconstruct syllable boundaries within the sequences **tertḭo-*, **tētḭo-* and **tetsḭo-* in a non-circular fashion, we must first understand how the process of syllabification functioned in PIE in general. As Kobayashi (2004:22) has discussed, it seems likely that PIE, like many languages of the world, follows the MAXIMAL ONSET PRINCIPLE (Sievers 1885:190, Clements 1990:300). This may be informally stated as follows:

(3) MAXIMAL ONSET PRINCIPLE (MOP)
Syllabify as many consonants as possible within the onset.

The MOP's function within PIE has been previously characterized in terms of "right to left" syllabification (see Schindler 1977:56), such that if presented with

14 Cf. Meier-Brügger 2003:142: "On the one hand, we have ## … *V̄*# **diḭéu̯s* and ## … *V̄R*# **diḭéu̯s*, on the other ## … *K*# **dḭéu̯s* …."

two adjacent segments that are potential syllable nuclei, the rightmost is always chosen, if it is not adjacent to a "true" vowel (**e*, **a*, **o*, etc.). However, as Kobayashi correctly points out, Schindler's "right to left" formulation leads to overgeneration in cases where the MOP does not (see Kobayashi 2004:22 for discussion). For this reason, the MOP will be assumed in the following analysis of SL.

In my dissertation (Byrd 2010), I address not only *how* a sequence syllabified in PIE but also *what* could be syllabified in a PIE sequence. Through the assumption that word-edge phonotactics plays a role in what constitutes a possible medial coda and onset, I believe to have shown that the largest medial syllable in PIE was of the shape *CCVCC*, where the onset,[15] but not the coda, could violate the Sonority Sequencing Principle (SSP).[16]

(4) PIE MAXIMUM SYLLABLE TEMPLATE (MAXST): *CCVCC*
The maximum PIE syllable consists of two consonants in the onset and two consonants in the coda. The onset may violate the SSP; the coda may not.

A strict ban of an SSP violation in medial codas spurs a number of syllabically-driven phonological rules of deletion ("Stray Erasure") in PIE. First, it prompts laryngeal loss in the rule *CH.CC* > *C.CC*: *[dʰug]$_\sigma$h$_2$[trés]$_\sigma$ > *[dʰuk]$_\sigma$[trés]$_\sigma$ 'daughter (gen.sg)'.[17] Second, we find loss of /t/ in the Indo-Iranian word 'eighty': *[h$_x$oǩ]$_\sigma$t[h$_x$tí]$_\sigma$ > *[h$_x$oǩ]$_\sigma$[h$_x$tí]$_\sigma$ > Skt. *aśīti-* (cf. *[h$_x$oǩ]$_\sigma$[toh$_x$]$_\sigma$ > Skt. *aṣṭā(u)* 'eight').[18] Lastly, we find that the reason the double dental rule is blocked in the configuration *VTTRV* (i.e., the "*métron* rule"), is because the resulting sequence would have violated the MAXST: **méd-trom* ↛ **[mét]$_\sigma$s[trom]$_\sigma$, thereby resulting in deletion of one of the dentals: *[mé]$_\sigma$[trom]$_\sigma$ (or *[mét]$_\sigma$[rom]$_\sigma$).

Should we follow the MAXST as the guideline for what constitutes a possible syllable in PIE, it becomes apparent that Schindler's syllabification of **tetsḭo-* as **tets.ḭo-* was actually an impossible one for a speaker of PIE, since an SSP violation was prohibited in a medial coda. The sequence **tetsḭo-* must have been syllabified as **tet.sḭo-*, and so we must come up with an alternate solution.

15 Cf. *[dʰug]$_\sigma$[h$_2$ter]$_\sigma$ 'daughter', *[s(u̯)eǩ]$_\sigma$[sto]$_\sigma$ 'sixth' and *[h$_1$et]$_\sigma$[sǩé/ó]$_\sigma$ 'eat (iterative)'.
16 "Between any member of a syllable and the syllable peak, only sounds of higher sonority rank are permitted" (Clements 1990:285).
17 See Schmidt 1973 and Hackstein 2002.
18 Following Rau 2009.

2. Motivating Sievers' Law: the avoidance of superheavy syllables

The MAXST, which dictates the largest possible syllable in PIE, predicts the following syllabifications of our hypothetical root shapes **tert-*, **tēt-*, and **tets-* to have been possible:

(5) */tert-/ → *[tert]$_\sigma$ (superheavy σ)
*/tēt-/ → *[tēt]$_\sigma$ (superheavy σ)
but */tets-/ → *[tet]$_\sigma$s (heavy σ, with an unsyllabified consonant)

The first two roots **tert-* and **tēt-* are both entirely syllabifiable and form a superheavy syllable, or a syllable consisting of more than two morae. The last root **tets-* must be syllabified as [tet]$_\sigma$s, since the second obstruent in coda position violates the SSP.

Let us assume that the syllabifications of these roots were continued as such into the derivational stage where SL occurred, driven by the desire for PIE speakers to keep morphemes syllabically distinct from one another. If so, the suffixation of **-i̯o-*, **-u̯o-*, etc. would have resulted in the following syllabifications:

(6) **tert-* + **-i̯o-* → *[tert]$_\sigma$[i̯o]$_\sigma$
**tēt-* + **-i̯o-* → *[tēt]$_\sigma$[i̯o]$_\sigma$
**tets-* + **-i̯o-* → *[tet]$_\sigma$[si̯o]$_\sigma$

Should we assume this typologically common tendency in the phonological derivation, it now becomes clear what the motivation was for SL in PIE: the avoidance of a superheavy syllable.

Unlike Schindler's explanation of SL above, the avoidance of superheavy syllables is extremely well founded typologically and is seen elsewhere in PIE and the attested IE languages.[19] In PIE, compensatory lengthening is blocked in medial position if it would result in a superheavy syllable: PIE **ĝenh₁mn-* → **ĝen.mnV-*, not ***ĝēn.mnV-*, as shown by Skt. *janmane*, Gk. *genná* (see Byrd 2010). Certain instances of Schwebeablaut, or the metathesis of a root sonorant from coda to onset position (**derk̂-* 'see' > **drek̂-*) suggest a dispreference for superheavy syllables as well.[20] Lastly, the avoidance of (super)heavy syllables may also have played a part in the analogical replacement of weak full-grade

19 Seebold 1972:132, Hoenigswald 1988:202–3, Kobayashi 2001:92ff., and 2004:26.
20 For example, Skt. *dṛś-* 'see' takes the shape darśa- in *darśati*, *dadarśa*, but *drak-* in *adrākṣīt* (not **adārkṣīt*) and *drakṣyáti* (not **darkṣyáti*). Cf. Anttila 1969:52ff.

forms with the zero-grade in roots of the shape **TeR(T)* (i.e., **ter(t)-* → **tr̥(t)-*): e.g., *[kom]$_\sigma$[h$_1$ei̯t]$_\sigma$s 'fellow traveller' → *[kom]$_\sigma$[h$_1$it]$_\sigma$s > Lat. *comes*, *-itis* 'companion'.[21]

Attributing SL to the avoidance of a superheavy syllable has been proposed elsewhere,[22] though with no explanation as to why there even existed a superheavy syllable in these sequences. If PIE speakers wanted to avoid superheavy sequences, then why was */tert- + -i̯o-/ even syllabified as *[tert]$_\sigma$[i̯o]$_\sigma$ in the first place? If we follow Ringe in assuming that SL was a postlexical process in PIE, then the answer is straightforward: when syllabified at the stem (and word) level, *[tert]$_\sigma$[i̯o]$_\sigma$, *[tēt]$_\sigma$[i̯o]$_\sigma$, etc. were the most optimal forms. Once these forms were fed into the postlexical level, however, there was a violation of a constraint that blocks superheavy syllables, prompting the epenthesis of a sonorant, whose quality is copied from the adjacent non-syllabic resonant.

2.1. Framework used in analysis

Our formal analysis of Sievers Law will employ the most widely used constraint-based phonological framework, Optimality Theory (OT), which proposes that grammars arise from the interaction of conflicting constraints. OT formalizes the concept of conspiracies, or the triggering of one or more phonological rules by the avoidance of a single phonological phenomenon.[23] More specifically, we will be using a Stratal Optimality Theory framework for this analysis of Sievers' Law, which assumes multiple stratified constraint systems in the grammar.[24] These strata are typically threefold and are arranged in the following order: *stem*, *word* and *postlexical* (or phrasal). By reintroducing the phonological cycle into the grammar, Stratal OT provides a response to the ever-vexing problem of opacity in OT. Unlike classical OT, where there is one level of constraint rankings, constraints may have different rankings at each phonological level in Stratal OT.[25]

21 See Jasanoff 2003:43ff. and Vijūnas 2006:90ff. for discussion with references.
22 Hoenigswald 1988:202, Fullerton 1992:85–6, Neri 2003:32n69.
23 For an introduction to Optimality Theory, see McCarthy 2008.
24 See Kiparsky 2000 and more recently Bermúdez-Otero, forthcoming.
25 Though this analysis adopts Stratal OT as its framework of choice, the reader should bear in mind it may be conducted using a ruled-based framework as well, though certain elements of the analysis, such as the "The Emergence of the Unmarked" (TETU) phenomenon inferred at the postlexical level, would be lost (see the end of §2.3 below).

The first stratum in the grammar, the stem level, is where roots combine with certain affixes, which are usually derivational.[26] The output produced at this level is not a morphological word and therefore is not uttered per se. To give a concrete example of a PIE form derived by Stratal OT, let us examine the hypothetical root **tert-* once again, which is derived as an adjective with the suffix **-i̯o-*.

(7) Stem level: **tert-* + **-i̯o-* → *[tert]$_\sigma$[i̯o]$_\sigma$

This form *[tert]$_\sigma$[i̯o]$_\sigma$ was never uttered by a PIE speaker, as some overt inflectional morphology was required.

The second stratum in the grammar, the word level, will not be addressed directly in our SL analysis, though it will become relevant in a lengthier discussion of Sievers' Law in my dissertation. Here, inflectional endings and certain derivational suffixes are likely to have been added:

(8) Word level: *[tert]$_\sigma$[i̯o]$_\sigma$ + *-s* (nom.sg.) → [tert]$_\sigma$[i̯os]$_\sigma$

It is this form that is fed into the postlexical grammar.

The last stratum in the grammar, the postlexical level, is where rules occur across the board with no regard to morphological category. It is here that SL is hypothesized to have occurred:

(9) Postlexical level: *[tert]$_\sigma$[i̯os]$_\sigma$ → [ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$

Note that at each level there is a syllabification cycle. At the stem level, the coalescence of the root and suffix produces an initial syllabification, which favors keeping morphemes syllabically distinct, if possible. At the word level the nominative singular case ending is added, which must be syllabified and therefore is adjoined to the nearest syllable [i̯o]$_\sigma$. Lastly, at the postlexical level, we find syllabic repartition as the result of SL, which is driven by the avoidance of the superheavy syllable *[tert]$_\sigma$.

2.2. The stem level

Let us now turn to the formal analysis of Sievers' Law. Strata that are relevant here are the stem and postlexical levels. The constraints used at the stem level are given in (10) below.

26 See Bermúdez-Otero, forthcoming, for discussion with examples.

(10) Constraints used at stem level

a. MAXST: The syllable in question cannot violate the PIE maximum syllable template *CCVCC*, where the coda cannot violate the Sonority Sequencing Principle.

b. PARSE: Syllabify all segments.

c. DEP-V(OWEL): Don't insert a vowel.

d. MAX-C(ONSONANT): Don't delete a consonant.

e. ALIGN: For every morpheme boundary, there must be a syllable boundary.

f. *SUPERHEAVY (*SPRHVY): No syllable may consist of three or more morae.

To conduct this analysis, we must rank these constraints in the grammar, postulating their positions as precisely as possible and providing external evidence whenever we can. This ranking is given in (11) below, with justifications presented in a footnote.[27]

(11) Stem-level constraint ranking
MAXST, PARSE ≫ DEP-V ≫ MAX-C ≫ ALIGN ≫ *SUPERHEAVY.

Let us now proceed to examine the predictions of these constraint rankings in this analysis of SL, beginning with the syllabification of */tert- + -i̯o-/* at the stem level. For reasons of brevity, only */tert- + -i̯o-/* will be discussed, since */tert- + -i̯o-/* and */tēt- + -i̯o-/* behave in an identical fashion.

In (12) we see that syllable and morpheme boundary are kept identical, due to the constraint ranking ALIGN ≫ *SUPERHEAVY.

27 MAXST ≫ all, as there is no sequence reconstructable for PIE (at any phonological level) that violates the maximum syllable template. MAXST ≫ DEP-V as well, since **ph$_2$trés* → *[pəh$_2$]$_\sigma$[trés]$_\sigma$. Next, PARSE ≫ all, since all segments that are not extrasyllabic must be syllabified in the derivation: **dʰugh$_2$trés* → *[dʰuk]$_\sigma$[trés]$_\sigma$ and not **[dʰug]$_\sigma$h$_2$[trés]$_\sigma$. DEP-V ≫ MAX-C, because **dʰugh$_2$trés* → *[dʰuk]$_\sigma$[trés]$_\sigma$ and not **[dʰu]$_\sigma$[gəh$_2$]$_\sigma$[trés]$_\sigma$ (or the like). Next, we should postulate that MAX-C ≫ ALIGN, because **dʰugh$_2$ter* → *[dʰug]$_\sigma$[h$_2$ter]$_\sigma$, not **[duk]$_\sigma$[ter]$_\sigma$ and **h$_2$uksto-* → *[h$_2$uk]$_\sigma$[sto]$_\sigma$, not **[h$_2$uk]$_\sigma$[to]$_\sigma$. Lastly, ALIGN ≫ *SUPERHEAVY, based on the assumptions of this analysis.

(12) Stem */tert- + -i̯o-/

/tert- + -i̯o-/	MaxST	Dep-V	Max-C	Align	*SpRhVy
a. ☞ [tert]$_\sigma$[i̯o]$_\sigma$					*
b. [ter]$_\sigma$[ti̯o]$_\sigma$				*!	
c. [ter]$_\sigma$[i̯o]$_\sigma$			*!		
d. [ter]$_\sigma$[ti]$_\sigma$[i̯o]$_\sigma$		*!		*	

In (13), because /s/ violates the MaxST in the root **tets-*, it cannot be syllabified in the same syllable as /tet/. The high-ranking nature of the constraint Parse requires that this /s/ be syllabified, and therefore it is syllabified with the following suffix.

(13) Stem */tets- + -i̯o-/

/tets- + -i̯o-/	MaxST	Parse	Dep-V	Max-C	Align	*SpRhVy
a. [tets]$_\sigma$[i̯o]$_\sigma$	*!					*
b. [tet]$_\sigma$s[i̯o]$_\sigma$		*!			*	
c. ☞ [tet]$_\sigma$[si̯o]$_\sigma$					*	
d. [tet]$_\sigma$[i̯o]$_\sigma$				*!		
e. [tet]$_\sigma$[si]$_\sigma$[i̯o]$_\sigma$			*!		*	

Finally, in our hypothetical absolutive form in (14), the candidate *[tr̥k]$_\sigma$[tu̯o]$_\sigma$ is chosen, which violates neither Align nor *Superheavy.

(14) Stem */tr̥k- + -tu̯o-/

/tr̥k- + -tu̯o-/	MaxST	Dep-V	Max-C	Align	*SpRhVy
a. [tr̥kt]$_\sigma$[u̯o]$_\sigma$	*!			*	*
b. ☞ [tr̥k]$_\sigma$[tu̯o]$_\sigma$					
c. [tr̥k]$_\sigma$[u̯o]$_\sigma$			*!		
d. [tr̥k]$_\sigma$[tu]$_\sigma$[u̯o]$_\sigma$		*!			

2.3. The postlexical level

Let us now proceed to the postlexical level, for which we must make two assumptions. First, since these are phonological processes at the phrasal, or syntactic, level, morpheme boundaries become irrelevant.[28] For this reason, Align is no longer a relevant constraint in the analysis. Second, the constraints Max-C and Dep-V must be re-ranked, as this is required for vowel epenthesis (SL) to occur and not deletion—we do not find **[ter]$_\sigma$[i̯os]$_\sigma$ from *[tert]$_\sigma$[i̯os]$_\sigma$, etc. Furthermore, two additional constraints become relevant at the postlexical level.

(15) Additional constraints at the postlexical level

a. Faith(σ): Do not alter the syllabification of the base form. Assign one violation for every instance in the output a segment is syllabified in a syllable different from that of the input.

b. *ComplexOnset (*CompOns): Onsets may not consist of more than one consonant in the output.

The first constraint, Faith(σ), is required to ensure that the winning candidates of the input forms [tet]$_\sigma$[si̯os]$_\sigma$ and *[tr̥k]$_\sigma$[tu̯o]$_\sigma$ do not satisfy the constraint *ComplexOnset.[29] The latter constraint, *ComplexOnset, is crucial in the choice of **tertii̯os*, and not **terti̯os*, as the winning candidate. The interaction of these newly added constraints is given in (16).

(16) Postlexical constraint ranking[30]
MaxST, Parse, Max-C ≫ *Superheavy ≫ Faith(σ) ≫ *ComplexOnset ≫ Dep-V.

28 Known as "Bracket Erasure"; see Kiparsky 1982:11.

29 Further evidence for Faith(σ) may also be found in the "exceptional" syllabification of nasal-infixed presents (e.g., **i̯ungénti* 'they yoke', not ***iu̯ngénti*) and certain accusatives in **-m(s)* (e.g., **méntim* 'mind (acc.sg.)', not **mentu̯m* (contra Keydana, forthcoming). See Byrd 2010.

30 The postlexical constraint ranking will be justified as follows. First, MaxST, Parse and Max-C ≫ all, since they are never violated in outputs produced at the postlexical level. Max-C ≫ *Superheavy, as we find *[ieu̯k]$_\sigma$[trom]$_\sigma$ 'yoke', not **[ieu̯]$_\sigma$[trom]$_\sigma$. More generally, it may be said that the constraint Max-IO (Max-C, Max-V) ≫ *Superheavy, since vowel shortening in a superheavy syllable ("Osthoff's Law") did not occur in PIE: **tērtrom* ≠ ***tertrom* (cf. *[mēm]$_\sigma$[sóm]$_\sigma$ > Skt. *māṃsám* 'flesh', not **[mem]$_\sigma$[sóm]$_\sigma$). *Superheavy ≫ Faith(σ), because *[tert]$_\sigma$[i̯os]$_\sigma$ → *[ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$, not **[tert]$_\sigma$[i̯os]$_\sigma$. Faith(σ) ≫ *ComplexOnset, because *[tet]$_\sigma$[si̯os]$_\sigma$ does not undergo SL. Max-C ≫ Dep-V, because SL is a process of vowel epenthesis, and not consonant deletion (*[tert]$_\sigma$[i̯os]$_\sigma$ → *[ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$, and not **[ter]$_\sigma$[i̯os]$_\sigma$). *ComplexOnset ≫ Dep-V, because *[ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$, and not **[ter]$_\sigma$[ti̯os]$_\sigma$,

The crucial constraint ranking is *SUPERHEAVY ≫ FAITH(σ) ≫ *COMPLEX-ONSET—their interaction is what drives Sievers' Law at the postlexical level.

Turning now to the tableaux, we find that for our hypothetical inputs *[tet]$_\sigma$[s̥ios]$_\sigma$ (17) and *[tṛk]$_\sigma$[tu̯o]$_\sigma$ (18), there is no change in syllabification at the postlexical level.

(17) Postlexical *[tet]$_\sigma$[s̥ios]$_\sigma$

/[tet]$_\sigma$[s̥ios]$_\sigma$/		MAXST	MAX-C	*SPRHVY	FAITH(σ)	*COMPONS	DEP-V
a.	[tets]$_\sigma$[i̯os]$_\sigma$	*!		*	*		
b. ☞	[tet]$_\sigma$[s̥ios]$_\sigma$					*	
c.	[tet]$_\sigma$[i̯os]$_\sigma$		*!				
d.	[tet]$_\sigma$[si]$_\sigma$[i̯os]$_\sigma$				*!		*

(18) Postlexical *[tṛk]$_\sigma$[tu̯o]$_\sigma$

/[tṛk]$_\sigma$[tu̯o]$_\sigma$/		MAXST	MAX-C	*SPRHVY	FAITH(σ)	*COMPONS	DEP-V
a.	[tṛkt]$_\sigma$[u̯o]$_\sigma$	*!		*	*		
b. ☞	[tṛk]$_\sigma$[tu̯o]$_\sigma$					*	
c.	[tṛk]$_\sigma$[u̯o]$_\sigma$		*!				
d.	[tṛk]$_\sigma$[tu]$_\sigma$[u̯o]$_\sigma$				*!		*

The input *[tert]$_\sigma$[i̯os]$_\sigma$ is correctly realized as *[ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$, as is given in (19). Here we find that the output **[tert]$_\sigma$[i̯os]$_\sigma$ is not chosen because the now highly-ranked constraint *SUPERHEAVY is violated. The candidate **[ter]$_\sigma$[ti̯os]$_\sigma$, with simple resyllabification, is avoided because of a violation of *COMPLEX-ONSET, i.e., the avoidance of onsets consisting of more than one consonant. The most optimal form is [ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$, with vowel epenthesis (Sievers' Law); this candidate avoids both a superheavy syllable and a complex onset in the output.[31]

is the winning output when *[tert]$_\sigma$[i̯os]$_\sigma$ is processed at the postlexical level. Lastly, *SUPERHEAVY ≫ *COMPLEXONSET for reasons of transitivity, because *SUPERHEAVY ≫ FAITH(σ).

(19) Postlexical *[tert]$_\sigma$[i̯os]$_\sigma$

/[tert]$_\sigma$[i̯os]$_\sigma$/		MAXST	MAX-C	*SPRHVY	FAITH(σ)	*COMPONS	DEP-V
a.	[tert]$_\sigma$[i̯os]$_\sigma$			*!			
b.	[ter]$_\sigma$[ti̯os]$_\sigma$				*	*!	
c.	[ter]$_\sigma$[i̯os]$_\sigma$		*!				
d. ☞	[ter]$_\sigma$[ti]$_\sigma$[i̯os]$_\sigma$				*		*

Thus we find that SL is motivated by the avoidance of a superheavy syllable (*SUPERHEAVY), coupled with the desire of the PIE speaker to avoid complex onsets (*COMPLEXONSET) at the postlexical level. We are now in a position to address the cogent objection by Collinge (1985:165) to the idea that SL is driven by an avoidance of a sequence $_\sigma$[TR- (or $_\sigma$[TU̯-): "But it is not totally clear why, if the first consonant of the cluster has become a syllable-coda, the sequence *$ty-* is then any less acceptable than the word initial *##ty-*." Sievers' Law is not driven by the avoidance of a complex onset in medial position; rather, Sievers' Law is driven by the avoidance of a superheavy syllable at the postlexical level, with the

31 Should one prefer to restrict SL to particular sequences of consonant + sonorant (such as **TU̯-*), one could assume a wide distribution of epenthetic constraints, such as DEP-[i], DEP-[u], etc. that are ranked accordingly at the postlexical level. So, in order to rule out **tert-ro-s* → **tertṛros* by SL, we would need to rank DEP-[ṛ] above *COMPLEXONSET, making *[ter]$_\sigma$[tros]$_\sigma$ a candidate more optimal than [ter]$_\sigma$[tṛ]$_\sigma$[ros]$_\sigma$. An alternate way would be to assume two constraints, DEP-V/C__R "don't epenthesize a vowel in a cluster of consonant + **m*, **n*, **r*, **l*" and DEP-V/C__U "don't epenthesize a vowel in a cluster of consonant + glide" (cf. Zuraw 2007:297, following Fleischhacker 2005), with the relevant constraint ranking in PIE: DEP-V/C__R ≫ *COMPLEXONSET ≫ DEP-V/C__U̯.

most optimal candidate avoiding a complex onset.[32] This is a classic example of "The Emergence of the Unmarked" (TETU), a key tenet of OT.[33]

3. Consequences of analysis

Let us now turn to the consequences of our analysis, of which there are many.

3.1. Advantages

There are a number of advantages to this analysis of SL. First, by assuming that SL was driven by the desire to avoid superheavy syllables at the postlexical level, we have provided a motivation that is well attested both in Indo-European and cross-linguistically. Unlike many studies of SL in the past, our analysis is not circular, since we have not based the syllabification rules of PIE upon our analysis of Sievers' Law itself. Rather, we have based them on the phonotactic analysis of edge consonant clusters, as I have discussed elsewhere (Byrd 2010). The adoption of the MAXST as the largest possible syllable shape in PIE neatly explains Schindler's two exceptions to SL discussed above: the absolutives and words of the shape **tets-i̯os*. SL does not occur in the absolutive **tr̥k-tu̯o-* ($[\text{tr̥k}]_\sigma[\text{tu̯o}]_\sigma$) because a superheavy coda never existed, as one was never created by the morphology. SL did not occur in words of the shape **tetsi̯os*, since the PIE MAXST did not permit it to be syllabified as $[\text{tets}]_\sigma[\text{i̯os}]_\sigma$ at the stem, word, or postlexical levels, because an SSP violation would have resulted in the coda. In both instances Sievers' Law was never triggered at the postlexical level because a superheavy syllable was never created at any point in the phonological derivation.

3.2. Disadvantages

To my knowledge, the sole downside to the above analysis is that it requires SL and Lindeman's Law (LL) to have been separate phonological processes in PIE. Whereas SL targets syllables of the shape **-RV-* that immediately follow a superheavy syllable such as $[\text{tert}]_\sigma$, LL targets the onsets of monosyllabic words of the

32 Upon careful inspection, we find that the solution presented above is too powerful: it predicts vowel epenthesis to arise in environments where it does not in fact occur. In fact, the present analysis demands that every superheavy syllable located at the postlexical level be "fixed" with vowel epenthesis, due to the constraint ranking *SUPERHEAVY ≫ DEP-V. This, of course, is clearly false (cf. n31 above), and I refer the reader to my dissertation for further discussion.

33 Cf. McCarthy (2008:24–5): "[A] preference for some universally unmarked structure, such as syllables with onsets, can emerge under the right circumstances even if the language as a whole permits the corresponding marked structure."

shape **#TRV-*: **di̯ḗu̯s* 'sky (god)' → **di̯i̯ḗu̯s*. Their structural descriptions are fundamentally different, and therefore the collapse of SL and LL as a unitary process is a mirage.

As discussed above, Schindler (1977:64) had assumed that both processes were restricted to the onset of the final syllable of a word. Of course, since LL only applied within monosyllables, his claim here is irrefutable. However, we do find instances of SL outside of this particular configuration, such as in the frequent scansion of Ved. *poṣyā́vant-* 'creating property' as *poṣiyā́vant-* (Sihler 2006:186). If this form is truly archaic, Schindler's formulation of SL cannot explain this form, whereas the above analysis can in a straightforward fashion: the verbal suffix *-ya-* → *-iya-* due to the preceding superheavy syllable *poṣ-* (from earlier **pauṣ-*).[34] Moreover, while Schindler (1977:62–3) must assume paradigmatic leveling as the source of SL in forms such as *kā́viyasya* 'prophetic; of a kavi (gen.sg.)', the present analysis predicts both *kā́viyas* 'prophetic; of a kavi (nom.sg.)' and *kā́viyasya* 'prophetic; of a kavi (gen.sg.)' to have been created equally by SL, prompted by the avoidance of a superheavy syllable at the postlexical level at the juncture of a superheavy root (*kāv-*) + a suffix of the shape *-RV-* (*-ya-*). As to why SL occurs so frequently in the onset of the final syllable of a word, this must be due to the fact that this position is the most common environment for the juxtaposition of a superheavy syllable (which is always a root) before a syllable of the shape **-RV-* (which is always a suffix).[35]

There is, in fact, another and perhaps more compelling reason to view SL and LL as separate phonological processes, one which is not theory-internal. As Craig Melchert has pointed out to me, should we continue to view SL and LL as the same process, we must accept one of two views: either (i) SL applied to all resonants in PIE or (ii) LL applied to only glides. Should we reject both positions, it would be impossible to view the two rules in question as a unitary phenomenon, since they would not target the same segments. Though some scholars (beginning with Osthoff and followed most notably by Edgerton 1934:257ff.) have proposed that SL extended to all sonorants,[36] most of the recent IE handbooks and

34 However, as Brent Vine points out to me, this form may simply be a later derivative of *poṣ(i)ya-* and therefore would provide no evidence of SL occurring in a non-final syllable. Further investigation of the application of SL in non-final syllables is required.

35 So also Peter Barber (p.c.). Unfortunately at this time I do not have a solution for why SL is frequently unattested in vr̥ddhi formations such as *vāiśvānará-* (Schindler 1977:62), and must assume for the time being that this non-application is a later (Indic?) innovation.

36 See most recently Ruijgh 1996 for Greek and Praust 2000 (cf. §1.1 above).

phonological treatments, such as Mayrhofer 1986:167 (which strongly reflects Schindler's views), insist that SL applied almost entirely to glides.[37] This problem deserves a thorough examination, as was recognized by Schindler himself (1977:64n6).[38]

The second alternative, restricting LL to glides, would be even more problematic. In addition to cases of LL occurring in clusters of the shape *C* + *U̯*, such as **d(i)i̯ḗu̯s* 'sky (god)', **d(u)u̯óh$_x$* 'two' and **k(u)u̯ṓ* 'dog', there are many well-established examples involving *C* + non-glide, such as Lat. *homō*, Goth. *guma* 'man' from **(dʰ)ĝʰm̥mṓ* 'earthling' (Weiss 2009:105), and Boeotian *bana*, Gk. *gúnē* 'woman' from **gʷm̥neh$_2$* (cf. Vine 1999:560ff.), to name a few. Eschewing solid examples of LL such as these for the sake of collapsing two phonological rules together is in my opinion (and likely in the opinion of many within the IE scholarly community) not the best route to take. Of course, if we accept the findings of my analysis above, which postulates that SL and LL could not have been the same process since Schindler's syllabifications of forms of the shape **tetsi̯os* were in fact impossible, such problems become irrelevant.[39]

3.3. Predictions

The above analysis provides us with a straightforward definition of Sievers' Law in PIE and makes clear predictions of what should be attested in the Indo-European languages. It proposes that SL originated as a phonological process that altered suffixes of the shape **-RV-*, and therefore all instances of SL occurring in

37 Meier-Brügger 2003:90–1, 141–2; Sihler 2006:183; Weiss 2009:39–40; Fortson 2010:72.

38 The IE facts aside, the restriction of SL to glides is understandable, since, as Fleischhacker (2005) shows, *TU̯*-clusters (*pi̯a*, *ku̯a*, etc.) are more "splittable" than *TR*-clusters (*pra*, *tma*, *kla*, etc.); in other words, *CUU̯-* and *CU̯-* are perceptually more similar to each other than are *CR̥R-* and *CR-* (cf. Sihler 2006:181). In fact, Fleischhacker has demonstrated there to be a gradient scale of "splittability": in order of least splittable to most, *CT* → *Cm* → *Cn* → *Cl* → *Cr* → *CU̯* (cf. Zuraw 2007:284). This raises the question, if non-glides did participate in SL, can any gradience be found, such that PIE suffixes of the shape **-rV-* were more likely to undergo SL than, say, those of the shape **-lV-*, **-nV-* and **-mV-*?

39 The problem of LL should be approached in much the same fashion as we have done for SL, attempting to answer the following questions: (i) What was the motivation for LL? Was it driven by an avoidance of a complex onset of the shape **TR-*, and if so, why did it only occur in monosyllables? (ii) If LL did create sandhi variants within a particular higher level constituent (intonational phrase? utterance?), can the exact conditions be ascertained? (iii) Can this phonological process be connected to broader prosodic phenomena in PIE such as foot structure or a minimal word requirement (see Byrd 2010)?

suffixes of the shape **-CRV-* must be secondary. This fact may explain why certain language groups, such as Germanic, Tocharian, Italic, and Baltic, do not provide evidence for SL in suffixes of the shape **-CRV-*. Furthermore, it would explain why instances of certain suffixes such as Ved. *-bhiyas* are actually rarer after a heavy syllable (*CVC*, *CV̄*) than are instances of *-bhyas*. Moreover, should one extend SL to apply to all sonorants, it would provide an answer to why no SL variants of the instrumental suffixes **-tro-*, **-tlo-*, **-dʰro-* and **-dʰlo-* are ever attested, despite the fact that there are certain cases of the perfect ending *-iré* in Sanskrit which may have originated as Sievers variants to *-ré*, as Praust (2000) has argued. Of course, if we follow Schindler in assuming that SL is to be explained as the avoidance of a complex onset **TR-* in medial position, there is in principle no reason why **-tro-*, etc. should behave any differently from **-ro-*, etc. in this regard.

4. Concluding remarks: implications for Indo-European syllabification

Earlier in §1.3 we characterized the process of PIE syllabification as following the MAXIMAL ONSET PRINCIPLE (MOP). The above study of Sievers' Law, however, has shown that this characterization is too simplistic overall and must be refined to explain the attested data. At the stem level, we find that onsets are maximized, though only within a given morpheme, in order to obey the highly-ranked ALIGN constraint. The syllabification generated at the stem level may then be modified at a higher stratum (word or postlexical) should the re-ranking of certain markedness constraints in the grammar demand it.

(20) General principle of PIE syllabification
Maximize onsets within a given morpheme at the stem level. Avoidance of marked sequences may change this formulation later in the derivation.

The principle given in (20) may be able to explain a curious fact of PIE syllabification—the division of medial *VCCV* sequences as *VC.CV*.[40] This syllable division is not predicted by a system of IE syllabification that maximizes all onsets with no consideration of morpheme boundaries, as suggested by Kobayashi. Aside from the Lallwörter such as **atta* 'daddy' and **kakka* 'poo-poo', disyllabic sequences of the shape *VCCV* were overwhelmingly dimorphemic in PIE.[41] Moreover, since the minimal root structure was of the shape *(C)VC* in PIE (cf.

40 See Hermann 1923:351ff., Marchand 1958:77ff., and Keydana 2004.

41 Trimorphemic and tetramorphemic sequences will not be discussed at this time.

Benveniste 1935:149ff.), it follows that a sequence *VCCV* would frequently consist of a root ending in *VC* plus a suffix beginning in *CV*. Following the principle of PIE syllabification given in (20), each such sequence would have been syllabified as *VC.CV*: *[h$_2$aǩ]$_\sigma$[ro]$_\sigma$ 'high' (Gk. *ákros*, OIr. *ēr*), *[put]$_\sigma$[lo]$_\sigma$ 'little one' (Ved. *putrá-* 'son', Osc. **puklum** 'id.'), etc. (Weiss 2009:280).

There are two other possible permutations of a dimorphemic *VCCV*, both of which are attested: *VCC* + *V* and *V* + *CCV*. The first, *VCC* (root) + *V* (suffix) must always be parsed as *VC.CV*: PIE *$b^heu̯d$-*'split' + *e.ti* → *$bheu̯.de.ti$*, not ***$bheu̯d.e.ti$*. This may be attributed to a requirement that a syllable onset be filled at the stem, word, or postlexical level (ONSET)[42] or to the avoidance of a superheavy syllable at the postlexical level, as discussed in detail above. The second, *V* (root) + *CCV*, (suffix) is trickier. Were words like *h_1i-tro-* (> OIr. *ethar* 'ferry boat') and *$tn̥$-tlo-* (> Lith. *tiñklas* 'net') syllabified as *[h$_1$i]$_\sigma$[tro]$_\sigma$ and *[tn̥]$_\sigma$[tlo]$_\sigma$, respectively, in PIE?[43] And if so, could there have existed a syllabic contrast between a hypothetical *$u̯r$-tro-*'repellent' (*[u̯r̥]$_\sigma$[tro]$_\sigma$)[44] and a hypothetical *$u̯rt$-ro-*'turned' (*[u̯rt]$_\sigma$[ro]$_\sigma$)? This analysis predicts that there would have been such a contrast.[45] Of course, a claim of this nature for PIE must remain highly speculative for the time being, though I hope to pursue such an account in further detail at a later date.

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42 See Keydana 2004.

43 Forms taken from Wodtko, Irslinger, and Schneider 2008.

44 Cf. *$u̯ertrom$- > Skt. *vártram* 'protective dam, pond', Av. *varəθra-* 'shield', Middle Welsh *gwerthyr* 'fortress' (Olsen 1988:7).

45 Though such cases are rare in English (as they probably would have been in PIE), note the difference in syllabification between Eng. *mistake* 'error' ([mɪsteɪk]) and *mis-take* 'accidentally pick up' ([mɪst^{h}eɪk]). The latter must be syllabified as [mɪs]$_\sigma$[t^{h}eɪk]$_\sigma$, due to the aspiration of /t/. Elsewhere in Indo-European we find similar constrasts in syllabification driven by morphology. In Greek, cf. *ek.lúei* '(s)he loosens' (Euripides, *Phoenissae* 695) vs. *é.kluon* 'they heard' (Euripides, *Phoenissae* 919); in Latin, cf. *ab.rumpō* 'I break off' vs. *tene.brae* 'shadows, darkness' (Plautus); see Devine and Stephens 1994:35 for further discussion.

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