

# *Tavet Tat Satyam*

Studies in Honor of

**Jared S. Klein**

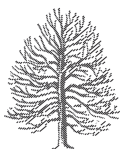
on the Occasion of His Seventieth Birthday

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# Stressful Conversions: Internal Derivation within the Compositional Approach\*

JOSEPH RHYNE AND ANDREW MILES BYRD



In the most widely accepted analysis of Proto-Indo-European (PIE) athematic nominal morphology (Schindler 1972, 1975), noun classes are divided along morphological lines, through shifts in accent and ablaut within the root, suffix, and ending. This system, which today is often called the paradigmatic approach (PA; Kiparsky 2010:2), typically proposes four basic classes: acrostatic, proterokinetic, hystero-kinetic, and amphikinetic. While all of the paradigms show a morphophonemic alternation between strong and weak stems,<sup>1</sup> each shows a different pattern for which morpheme receives the accent and vocalism:

	Acrostatic	Proterokinetic	Hystero-kinetic	Amphikinetic
Strong	ó Ø Ø	é Ø Ø	Ø é Ø	é o Ø
Weak	é Ø Ø	Ø é Ø	Ø Ø é	Ø Ø é
Strong	*póts	*méntis	*pah <sub>2</sub> tér	*dʰéǵʰóm
Weak	*péts	*mptéjs	*pah <sub>2</sub> trés	*dʰǵʰmés

Since different accent/ablaut classes are essentially different paradigms, this is—at its core—a morphological analysis. But as Kiparsky (2010, forthcoming) points out, the PA is not without problems: (1) it is a system found solely in the athematic nouns;<sup>2</sup> (2) it is typologically unusual with few if any comparable systems in other languages;<sup>3</sup> and (3) it is only descriptive in nature<sup>4</sup> and therefore is not predictive nor falsifiable.

To address these problems, Kiparsky has worked on an alternative for nearly half a century (cf. Kiparsky 1973). It is a framework that is mindful of both phonology and morphology within the PIE grammar, and one which he believes will lead to a more typologically

\*It is with great joy that we honor our friend, Jared Klein, who has made substantial contributions to the field of Indo-European linguistics, both in scholarship and teaching. As his students, one former and one current, we hope that he finds pleasure in reading this article. We are indebted to Jessica DeLisi, Ryan Sandell, Delphine Tributout, Mark Wenthe, and Tony Yates for their extremely helpful comments; all mistakes are our own.

<sup>1</sup>Cf. Fortson 2010:114.

<sup>2</sup>See Keydana 2013 for further discussion.

<sup>3</sup>See also Keydana 2012 and Kim 2013.

<sup>4</sup>Moreover, as Ryan Sandell points out to us (p.c.), the PA is not even descriptively adequate, as it predicts the presence of non-existent forms (such as *méntis* ‘mind’ [nom.sg.] vs. reconstructable *mptís*) and must assume a perhaps unhealthy amount of analogy to account for attested accent placement (for instance, the accent in Skt. *rājñas* ‘king [gen.sg.]’ [← \**h<sub>3</sub>reǵnós*] is explained as being analogical to \**h<sub>3</sub>reǵō[n]* ‘king [nom.sg.]’).

viable and accurate reconstruction of PIE. Kiparsky's framework, known as the Compositional Approach (CA), makes four basic assumptions:

- (1) Morphemes are underlyingly accented, unaccented, or trigger accents on other morphemes.
- (2) Morphemes are either dominant or recessive.
- (3) Only one accent surfaces in pronunciation, which is called the ictus.
- (4) Certain rules must be assumed to delete and insert accents to result in a single ictus.

As is typical of his scholarship, Kiparsky goes to great lengths to ensure that these assumptions have parallels in other languages. To cite a well-known example, in Northern Bizkaian Basque (Gussenhoven 2004:170–84), the majority of roots are unaccented, such as /sagar/ 'apple' and /ama/ 'mother', but there are also accented roots, such as /arbóla/ 'tree' and /léku/ 'place'. In addition, there are unaccented suffixes (such as the allative /-ra/) and pre-accenting suffixes (such as the instrumental /'-gas/), which trigger an accent on the previous morpheme.

Morphemes may be dominant or recessive in their accentual properties: dominant morphemes impose their accentual properties on other morphemes within the word, whereas recessive morphemes do not affect other accents. For instance, in the Gernika dialect of Northern Bizkaian Basque, the word *sagárretatik* is composed of the unaccented root /sagar/ 'apple', the plural morpheme /'-ata/, and the ablative ending /'-tik/. While both suffixes are pre-accenting, only one accent surfaces, as the left-most accent is by default the dominant one in Gernika. Similarly, while *lékuetara* derives from /léku/ 'place' + /'-ata/ (pl.) + /-ra/ (all.), which has two underlying accents, only the accent of the root surfaces, as it is the leftmost one (Gussenhoven, *ibid.*).<sup>5</sup> Note that these examples illustrate the third and fourth assumptions in our list above, namely that there may only be one surface accent, the ictus, and that phonological rule(s) will eliminate certain underlying accents to create that single ictus. Kiparsky's assumptions for PIE are therefore typologically grounded.

Kiparsky assumes a number of phonological rules that control the accent in PIE. The first is the OXYTONE RULE (OR), whereby a final accent is assigned to all inflected polysyllabic stems:

- (1) OXYTONE RULE  
 $\sigma \rightarrow ' \sigma / [ \dots \sigma ]_{Stem} Infl$

<sup>5</sup>For another instance of accentual dominance, cf. Tokyo Japanese (Tsujimura 1989):

Root	Rec. <i>-te</i> 'gerundive'	Dom. <i>-(y)óo</i> 'informal tentative'
<i>taó</i> 'fall'	<i>taó-re-te</i>	<i>tao-re-yóo</i>
<i>naó</i> 'mend'	<i>naó-t-te</i>	<i>nao-r-óo</i>
<i>ók</i> 'get up'	<i>ók-t-te</i>	<i>ok-i-yóo</i>

In each case the roots are underlyingly accented. But whether that underlying accent surfaces depends on the morphemes added. When one combines the root with the recessive gerundive ending *-te*, it does; however, if one adds the dominant suffix *-(y)óo*, then the underlying accent of the root is erased, with the surface accent appearing on said suffix.

The effects of the OR can be seen in the curious difference of accentuation in Sanskrit  $vṛt-ā́$  ‘turning’ vs.  $tri-vṛt-ā́$  ‘threefold’, where  $-ā́$  is an inflectional ending. The stem in  $vṛt-ā́$  is monosyllabic, and consequently the OR does not apply. However, the stem of  $tri-vṛt-ā́$  is polysyllabic, and hence the OR applies, resulting in an accent on the final syllable of the stem.

Kiparsky’s second rule should be a familiar one for Indo-Europeanists: VOWEL SYNCOPE (VS),<sup>6</sup> which states that a short mid vowel is deleted before an accented morpheme:<sup>7</sup>

- (2) VOWEL SYNCOPE (Final)  
 $* / e, o / \rightarrow \emptyset / \_ M.$

We may see VS in action through the comparison of PIE  $*/ph_2ter-s/ \rightarrow *pah_2tér$  (nom.sg.) and  $*/ph_2ter-és/ \rightarrow *pah_2trés$  (gen.sg.). In the latter form, the accented gen.sg. ending  $-és$  triggers VS when it is added, thereby creating the weak stem  $*pah_2tr-$ .<sup>8</sup> On the other hand, the nom.sg. ending  $-s$  is unaccented,<sup>9</sup> and therefore syncope does not occur.

The final rule within the Compositional Approach, the BASIC ACCENTUATION PRINCIPLE (BAP), is perhaps the most salient one. It consists of two parts, one which erases accents to create a single ictus, and one which inserts an accent should there be no underlying ones:

- (3) BASIC ACCENTUATION PRINCIPLE  
 a) The leftmost accented syllable of a domain retains the accent, while all other accents are deleted.  
 b) If there is no accented syllable in the word, place the ictus (surface accent) on the leftmost syllable.

The BAP enforces the requirement that there *must* only be one ictus in the surface form: accent(s) may be erased if there are multiple underlying accents and an accent may be inserted if there are no accents in the underlying form. We may observe the second part of this principle in the aforementioned stem  $*/urt-/:$  PIE  $*/urt-m/ >$  Skt.  $vṛtam$ . Both the root and the suffix are underlyingly unaccented, but, because of the BAP, an accent is placed on the leftmost syllable, hence the Sanskrit form. Working in tandem within the PIE grammar, the OR, VS, and the BAP successfully derive the correct forms for PIE for both unaccented and accented roots. As an illustration, note the complete derivations for the accent root  $*/b^hréh_2ter-/$  and the unaccented root  $*/ph_2ter-/$  (Kiparsky forthcoming):

<sup>6</sup>I.e.,  $\emptyset$ -grade.

<sup>7</sup>Cf. Byrd 2015:34–40, 162–77.

<sup>8</sup>For the assumption of schwa epenthesis as laryngeal vocalization, see Byrd 2015:27–34.

<sup>9</sup>Note, however, as Ryan Sandell reminds us (p.c.), Kiparsky (forthcoming:15 ex. 22) assumes that the nom.sg.  $-s$  is preaccenting, though we fail to see why this is a necessary assumption. It is simplest to assume that the suffix was unaccented.

(4) Derivation of “brother” and “father”<sup>10</sup>

(i) Accented Root

	*/b <sup>h</sup> réh <sub>2</sub> ter-/		
Inflection	b <sup>h</sup> ráh <sub>2</sub> ter-ṃ	b <sup>h</sup> ráh <sub>2</sub> ter-éh <sub>1</sub>	b <sup>h</sup> ráh <sub>2</sub> ter-sú
Oxytone	b <sup>h</sup> ráh <sub>2</sub> tér-ṃ	b <sup>h</sup> ráh <sub>2</sub> tér-éh <sub>1</sub>	b <sup>h</sup> ráh <sub>2</sub> tér-sú
Ø-grade	—	b <sup>h</sup> ráh <sub>2</sub> tr-éh <sub>1</sub>	b <sup>h</sup> ráh <sub>2</sub> tṛ-sú
BAP	b <sup>h</sup> ráh <sub>2</sub> ter-ṃ	b <sup>h</sup> ráh <sub>2</sub> tr-eh <sub>1</sub>	b <sup>h</sup> ráh <sub>2</sub> tr <sub>ṡ</sub> -su
(Sanskrit	<i>bhrātaram</i>	<i>bhrātrā</i>	<i>bhrātrṡsu</i> )

(ii) Unaccented Root

	*/ph <sub>2</sub> ter-/		
Inflection	pəh <sub>2</sub> ter-ṃ	pəh <sub>2</sub> ter-éh <sub>1</sub>	pəh <sub>2</sub> ter-sú
Oxytone	pəh <sub>2</sub> tér-ṃ	pəh <sub>2</sub> tér-éh <sub>1</sub>	pəh <sub>2</sub> tér-sú
Ø-grade	—	pəh <sub>2</sub> tr-éh <sub>1</sub>	pəh <sub>2</sub> tṛ-sú
BAP	—	—	pəh <sub>2</sub> tṛ <sub>ṡ</sub> -su
(Sanskrit	<i>pitāram</i>	<i>pitṛā</i>	<i>pitṛṡsu</i> )

As has been demonstrated above, the Compositional Approach is a typologically grounded hypothesis. However, as we will discuss in this article, it remains to be seen if the same holds true for Kiparsky’s analysis of Internal Derivation (ID). As is well known, the traditional paradigmatic approach assumes that both athematic and thematic nouns may create a derived nominal form by shifting the accent/ablaut class.<sup>11</sup> Thus, thematic nouns may shift from barytone to oxytone (\*tóm<sub>h1</sub>os ‘a cut’ → \*tomb<sub>1</sub>ós ‘cutting’); acrostatic nouns may shift to proterokinetic (\*krót-*u*- ‘power’ → \*krét-*u*- ‘strong’); proterokinetic nouns may shift to hysterokinetic (\*s<sub>1</sub>ie<sub>u</sub><sub>h</sub>-*mṃ* ‘band’ → \*s<sub>1</sub>ie<sub>u</sub><sub>h</sub>-*mén*- ‘membrane’); and acrostatic, proterokinetic, and hysterokinetic nouns may shift to amphikinetic (\*uód<sub>ḡ</sub> ‘water’ → \*ued-ór- ‘water (collective)’, \*kré<sub>u</sub><sub>h</sub>-*s* ‘raw meat’ → \*kré<sub>u</sub><sub>h</sub>-*os*- ‘gore’, \*pəh<sub>2</sub>tér- ‘father’ → \*h<sub>1</sub>su-pəh<sub>2</sub>tór- ‘well-bred’).<sup>12</sup> Of course, for Kiparsky (ibid.), no such shift in accent/ablaut class exists, as the classes themselves did not exist. For him, ID is a process whereby a “dominant unaccented null suffix erases the inherent accent of its barytone stem.” In other words, internal derivation is triggered by a *silent* morpheme, whose only phonological content is its dominant accentual property. Recall that dominant morphemes “trump” recessive morphemes. As Kiparsky argues, it is its dominant status that creates the shift in accent within the internally derived form. Thus, returning to many of the examples cited above, we find that in Kiparsky’s analysis, the zero morpheme first erases the original accent of the stem, with the BAP and Oxytone Rule applying to give the final surface accents: \*tóm<sub>h1</sub>-*o*-*s* ‘a cut’ →

<sup>10</sup>The table is based on Kiparsky 2010:146. Regarding the application of zero grade to accented syllables, Kiparsky (2010:145) writes that zero grade “applies both to accented and unaccented syllables, provided an accented morpheme follows, no matter where the ictus falls in the word.”

<sup>11</sup>Nussbaum 1986, Widmer 2004.

<sup>12</sup>Kim 2013.



\**tomb<sub>1</sub>-o-Ø-s* → \**tomb<sub>1</sub>-ós* ‘cutting’, \**uód-r̥* ‘water’ → \**uod-(o)r-Ø* → \**ued-ór-* ‘water (collective)’, \**siéh<sub>x</sub>-men-* → \**siéh<sub>x</sub>-men-Ø* → \**siuh<sub>x</sub>-mén-* ‘membrane’, \**pəh<sub>2</sub>tér-* → \**pəh<sub>2</sub>ter-Ø* → \**h<sub>1</sub>su-pəh<sub>2</sub>tór-* ‘well-bred’.

A number of questions arise in the proposal of such an analysis. To begin with, is such a silent morpheme even learnable by speakers of a language? One could perhaps determine learnability by conducting actual experiments, examining whether humans today would be able to learn the proposed features of our reconstructed language. Unfortunately, we have neither the time nor resources to conduct such an undertaking at present, though we hope that there will come a point in the near future of our field when such experiments are undertaken to bolster one’s hypotheses. As such, we can only look to parallels in other languages, leading us to the second question: does a dominant zero morpheme have any typological parallels? As argued above, Kiparsky’s claims have all been well-supported through cross-linguistic analysis. But is this true of a dominant zero morpheme? In the remainder of this article, we will explore the possible typological parallels and subsequently reach a verdict on the likelihood of the existence of a dominant zero morpheme within PIE.

Let us begin with the first, and perhaps most obvious solution: internal derivation was a productive case of conversion. Conversion is a morphological technique that is parallel to affixation and is a process that either links lexemes derivationally or creates a new derivative with the same form as its base (Bauer and Valera 2005a). To cite a familiar example: the verb *convért* (with unexpected accentuation) is created via conversion from the noun *cóvert* (with expected accentuation). There are three basic types of conversions in the world’s languages: **root-**, **stem-**, and **word-**based. Languages may utilize all three as we find in Italian (Manova and Dressler 2005:67–71):

Root-based: *ritard-a* ‘he delays’ → *ritard-o* ‘delay’  
 Stem-based: *revoc-a-re* ‘to revoke’ → *la revoc-a* ‘revocation’  
 Word-based: *sapere* ‘to know’ → *il saper-e*, *i saper-i* ‘knowledge’

Inflecting languages (such as Italian) tend to have more instances of root- and stem-based conversion, whereas isolating languages (such as French and English) employ more word-based conversion: (*to*) *jump* (v.) → (*a*) *jump* (n.). Since PIE was a highly inflectional (fusional) language, one would expect there to be mostly root- and stem-based conversions.

In general, the majority of instances of conversion involve a change in word-class, most commonly from noun to verb or from verb to noun. Of course, this is not always true of internal derivation, which may derive a noun into another noun. Though less common, cross-linguistically conversion may trigger changes in secondary word-class, of the types which are semantically closer to what we see in PIE. For instance, in Macedonian (Vaneva 2013) a countable singular noun such as *jabolko* ‘apple’ (5) may be converted into an uncountable plural as in (6):

- (5) Zdravo e                      da se    jade po edno jabolko na den  
 healthy be.PRES.3SG TO PART eat    on one    apple    on day  
 “It is healthy to eat one apple a day.”

Without any change in form, *jabolko* may be parsed as an uncountable plural.

- (6) Iname            sok od jabolko  
 have.PRES.IPL juice of apple.NONCOUNT  
 “We have apple juice.”

Compare this with an internally derived amphikinetic collective in PIE: \**uódōr* ‘water’ (sg.) → *uedōr* ‘water’ (coll.). There are of course additional semantic functions of internal derivation, which include the shift from an abstract to a concrete noun (Skt. *bráhman-* (nt.) ‘sacred formulation’ → *bráhmán-* (m.) ‘priest’, Gk. *ψεῦδος* ‘lie’ → *-ψευδής* ‘lying’)<sup>13</sup> and the shift from a noun to an adjective (Gk. *τόμος* ‘cut’ → *τομός* ‘cutting’; Ved. *yásás-* ‘splendor’ → *yásás-* ‘splendid’).<sup>14</sup> We therefore find that there are certain semantic commonalities between internal derivation and conversion.

In order to determine that one word has been converted from another, the two words must be “related in meaning to a sufficient degree” (Bauer and Valera 2005:13). For this reason, we cannot predict what the exact meaning of a converted word will be, only that it will be sufficiently semantically related. We thus may contrast (*a*) *hammer* ~ (*to*) *hammer* with (*a*) *plane* ‘aircraft’ ~ *to plane* ‘to smooth a piece of wood’. Despite being phonetically (and phonologically) identical, the latter pair is not linked by conversion, as they are not sufficiently semantically related. Additionally, while by no means common, there are certain phonological parallels to internal derivation in conversion, in which we observe accentual shifts and/or vocalic alternations. We may see both processes in the aforementioned pair *convert* ([<sup>h</sup>kʰan.vɾt]) ~ *convért* ([<sup>h</sup>kʰɪ.vɾt]), with vowel reduction triggered by an accentual shift. For a more complex example, observe that for certain speakers of the Baltimore dialect of American English, the singular of ‘police’ is [<sup>h</sup>pʰə̃.lis] (referring to one police officer), with a collective [<sup>h</sup>pʰlis], with the vowel of the first syllable being lost and accentual shift (cf. \**uódōr* ~ *uedōr*).<sup>15</sup> It is important to note, however, that while the vowel is not synchronically predictable within certain cases of ID within PIE, in cases of vowel reduction/shift via conversion, it is *always* so. Thus, the reduction to a syllabic nasal in the first syllable that occurs in the shift from *convert* ([<sup>h</sup>kʰan.vɾt]) to *convért* ([<sup>h</sup>kʰɪ.vɾt]) makes sense, but one would never create a form such as \**canvórt* ([<sup>h</sup>kʰæn.vɔɾt]), comparable to what one finds in the conversion from \**uódōr* to \**uedōr*. As far as we can tell, such change in vocalism is not motivated by any synchronic rule within reconstructable PIE. In short, while conversion provides an excellent semantic parallel to internal derivation, it does not provide a very good phonological one, if the phonological variation is in fact driven by synchronic phonological rules.<sup>16</sup>

If phonology is indeed relevant here, perhaps our solution lies in processes of deaccentuation, whereby an accented morpheme loses its accent within the derivation. Kiparsky himself emphasizes the erasure of accent in ID: “the dominant null suffix erases the inherent accent of its barytone stem” (Kiparsky forthcoming). We may informally define deaccentuation as the deletion of an underlying or derived accent that would otherwise surface as the

<sup>13</sup>As Tony Yates reminds us (p.c.), it is likely that simplex *s*-stem adjectives were back-formations from compounds; see Meissner 2005:206ff.

<sup>14</sup>Kiparsky 2010:27–9.

<sup>15</sup>For other types of phonological alternations triggered by conversion (including changes of vocalism, insertion of consonants, etc.), see Tribout 2010.

<sup>16</sup>Moreover, one should note that the phonological changes that occur in these classes in PIE are restricted to nominal and adjectival bases, which would be surprising if internal derivation were strictly phonological.

ictus in the output. Typically in intonational languages like English, deaccentuation functions as a process to indicate new and given information within a sentence (Gussenhoven 2011). However, this is unlikely to be relevant here, as there is no indication that ID had a pragmatic function in PIE.

Perhaps more relevant is the use of deaccentuation to avoid stress clash. For example, when uttered in most contexts, one of the authors will proclaim that he hails from the state of *Tennessee*. However, in certain sequences the original primary stress is lost, with the secondary stress becoming primary: *Tennessee Titans* (Zsiga 2013:358). Of course, given that PIE was a pitch accent language (cf. Weiss 2009:108), it is very likely that only one pitch accent (the ictus) could be realized in the surface form, and it is for this reason that secondary stress is not reconstructable.<sup>17</sup> Moreover, instances of stress clash in examples such as *Tennessee Titans* occur across a word boundary, and processes of deaccentuation in ID are strictly found within the confines of the word.

However, certain rules can trigger deaccentuation within a word, a property that is often restricted to certain morphological formations. For example, in English one finds the process of INITIAL ACCENT DELETION, where all accents (both primary and secondary) are deleted except for the last one, occurring in compounds and before certain derivational affixes. This leads to contrasts such as: *un'kind* ~ *un'kindness*, *Rembrandt* ~ *Rembrandt'esque*, *Kiliman'jaro* ~ *Mount Kiliman'jaro*, and *sixty-one* ~ *Route Sixty-one*. It is especially common for deaccentuation to occur within compounds. For instance, in Japanese, a compound containing *gogaku* + *kyooshi* results in *gogaku kyooshi* ‘language teacher’, while *hitori* and *musume* results in *hitori musume* ‘single daughter’ (Itô and Mester 2007:99). Cf. also Modern Greek: *spirto* ‘match’ + *ku'ti* ‘box’ results in *spirto'kuti* ‘match box’ (Nespor and Ralli 1993:201).

As is the case in English, Japanese, and Modern Greek, deaccentuation also occurs in PIE compounds (Kiparsky forthcoming), a process continued faithfully by Sanskrit. For instance, in bahuvrihi compounds the accent is erased in the second member via the BAP, as the accent of the leftmost member is the dominant one: /sahásra/ + /dákṣiṇa/ → *sahásra-dakṣiṇa*- ‘worth 1000 (cows)’, /gó/ + /vápus/ → *góvapus*- ‘having the form of a cow’. Moreover, dominant suffixes such as pre-accenting /-ta/ will erase any underlying accent, as seen in *aprajásta*- (← /á/ + /prajás/ + /ta/) ‘lack of progeny’ and *ādityádevata* (← /á'ditya/ + /devá/ + /ta/) ‘having the sun as a deity’, with accent assignment via the OR. Clearly deaccentuation processes are at work here in Sanskrit and PIE—there is no other way to explain the single accent within the compound forms. That said, after an extensive typological survey, we have been unable to find a single language with a silent, dominant, unaccented derivational suffix that alters words in the ways proposed by Kiparsky.<sup>18</sup> Uncharacteristically, he

<sup>17</sup>Though, as Jessica DeLisi points out to us (p.c.), it is conceivable that multiple icti were allowed within a single PIE word due to tonal sandhi, as in Gk. *ἄνθρωποι τε θεοί τε* ‘both men and gods’.

<sup>18</sup>Mark Wenthe suggests to us (p.c.) that languages such as Etsako with “floating” tones (Katamba 1989:201) may provide useful comparanda to Kiparsky’s proposed zero dominant morpheme. In Etsako one finds certain constructions such as [ámèθa] ‘father’s water’, which are best analyzed as àmè ‘water’ + H ‘of’ + èθà ‘father’, where the morpheme signifying ‘of’ is devoid of any phonological content aside from a high tone. Note that this is quite different from the PIE situation, as a high tone contains some phonetic information (leading to the creation of a contour tone in the second syllable of [ámèθa]), whereas Kiparsky’s zero dominant morpheme is devoid of any such information—it simply “reboots” the accentual assignment within the stem.

himself offers no parallel examples from other languages of the zero dominant morpheme. All of this leads us to a firm conclusion: internal derivation must have been rooted (at least in part) within the morphology.

As discussed above, the traditional approach assumes that all accent/ablaut shifts were completely localized in the morphology. Supporters of the compositional approach have pushed back against this notion, demonstrating there to be a number of good reasons for the shifts to occur in the phonology. However, in our research we have been unable to find any phenomena in the world's languages that is comparable to Kiparsky's view of ID, leading us to conclude that synchronically there was no such thing in late PIE as a dominant zero morpheme. In the absence of an overt phonological trigger governing these shifts, we conclude that the process of ID was governed in late PIE completely by the morphology. As such, the forms and alternations would need to be memorized. Speakers simply learned the pattern that nouns of the shape *\*tómh<sub>1</sub>os* may form a derivative *\*tomh<sub>1</sub>ós*, just as English speakers have memorized the pattern *convert* → *convért*.

One might view our assertion that late PIE speakers memorized these forms to be an inelegant one, though one must recognize that memorization is a component entrenched in all human languages. Consider Sanskrit as a case in point. The declension of the Sanskrit noun is incredibly complex, with eight cases, three genders, three numbers, and multiple declension types (Stump 2015). And within these declensions, each noun may undergo an alternation in stem, depending on the case and number of the form in question. While many of these alternations may be explained within the phonology, such as /rājan/ → *rājñ-* 'king' (illustrating VS), a number of stem alternations, such as /vidvāms/ → *viduṣ-* 'knowing' and /pratyāñc/ → *pratiñc-* 'westerly' (Stump, *ibid.*), cannot. Since many of these alternations cannot be predicted synchronically by phonological rule, they would have had to be memorized as morphological alternations, as in our interpretation of ID.

This of course does not discredit the compositional approach entirely; indeed, we believe it to be the most sensible approach to Indo-European morphophonology, as it is more explanatory, more typologically grounded, and more easily falsifiable than the paradigmatic approach.<sup>19</sup> Our assertion that ID was purely morphological is entirely compatible with the

<sup>19</sup>While it is likely that a zero dominant morpheme did not exist in late PIE, this does not mean that ID was always a morphological process. Indeed, we may find the diachronic solution within Kiparsky's own analyses, where external derivation and compounds are constructed in nearly the same way as his proposed internal derivation. Most compounds are subject to the BAP, such as *bahuvrihi* (Skt. *parjányaretas* ← *parjánya-rétas* 'from Parjanya's seed') and *tatpuruṣas* (*sarvá-rohita*). In external derivation and synthetic compounds, affixes are added (Kiparsky forthcoming), which determine the accentual properties of the word. In external derivation, all the morphemes used are dominant morphemes: cf. the accent erasure of the stem in Skt. *pítár* 'father' → *pítymánt-* 'having a father', as *-mánt-* is a dominant accented morpheme. Synthetic compounds behave the same way, though not limited solely to dominant morphemes. In Sanskrit, [[sóma][pī]thá] → *somapīthá* 'soma-drinking', *-thá* is a dominant accented morpheme (Kiparsky, *ibid.*). Also in Sanskrit, we have [[sóma][pe]ya] → *somapéya-* 'soma-drinking', where *-ya* is a dominant pre-accenting morpheme. The proposal of a dominant morpheme governing ID is straightforward, but a *zero* morpheme behaving in such a way is not typologically compelling. This leads us to the tentative hypothesis that at one point in PIE, internal derivation was governed by an *overt* dominant morpheme, which we may call *\*-X-*, behaving just as the compounds cited above. While we are of course unable to ascertain the precise phonological makeup of this morpheme, we may assume that it underwent some phonological change whereby it was deleted or reanalyzed. After its loss internal derivation was in turn completely morphologized.

The morphologization of a lost suffix is not an outlandish proposal. To cite an example closer to home, Pre-Old English class 2 weak verbs had a stem-formative verbal suffix *\*-o/oj-* (Kastovsky 2005:44–5): *\*/wund-o-d-e/* 'wounded'

CA. In fact, we believe that it is the interaction between the morphology and phonology that creates the actual reconstructed forms. Internal derivation was merely a morphological shift of vocalism within the root in the underlying form, comparable to the nonconcatenative morphology of Arabic (though of course on a much smaller scale). Consider plural formation in Egyptian Arabic nouns (Winchester 2014). While nouns are typically marked for number suffixally (cf. *darf-a* ‘leaf of door’-F.SG → *darf-aat* ‘leaf of door’-F.PL), there is a minor but productive plural formation known as the broken plural. Broken plurals are “characterized by internal stem modification through the infixation of interweaving vowels, which vary in both vowel quality, length, and position between the consonantal roots of the stem” (Winchester 2014:3). These forms are much less predictable and would need to be memorized in much the same way that “irregular” plurals would need to be memorized in English (*man/men, goose/geese, ox/oxen*, etc.), as the broken plurals may not be associated with any one set pattern. We see many different patterns, the majority of which cannot be predicted phonologically in the synchronic grammar (Hammond 1988:253):

SINGULAR	PLURAL	GLOSS
ʃundab	ʃanaadib	‘locust’
sulṭaan	salaṭiin	‘sultan’
ʃankabuut	ʃanaakib	‘spider’
xaatam	xawaatim	‘signet ring’
ʃaamuus	ʃawaamiis	‘buffalo’
saaʃiq(at)	sawaaʃiq	‘thunderbolt’
šayṭaan	šayaṭiin	‘devil’
ʃaḥmariš	ʃaḥaamir	‘lazy old woman’
namuuḍaʃ	namaaḍiʃ	‘type’

In our mind, such a complex shift of vowels mirrors, in a way, what we see in internal derivation, especially for our proposed morphologized interpretation. While attempts have been and are still being made to understand the acquisition process of these unpredictable alternations (see Hammond 1988, Winchester 2014), one cannot overcome the notion that these are simply memorized morphological patterns.

Of course, these morphological variants are fed into the phonology and undergo all of the phonological rules of Arabic. In much the same way, we propose that our morphological envisioning of internal derivation is wholly compatible with the phonological rules assumed by Kiparsky. In other words, the Oxytone Rule (OR), Vowel Syncope (VS), and the BAP still apply for the individual morphological forms; they just do not govern those morphological shifts. For example, one might envision a synchronic rule for PIE such as “Root accented stems adopt the vocalism /e-o/ in the collective.” This rule would direct the vowel alternations:  $*/uódar/ \rightarrow */uedor/$ . As per the compositional approach, accent assign-

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3rd sg. preterite. Since there were no remnants of a stem-formant in the present tense, the morpheme *wund-* was relexicalized as a verbal root, and it is likely for this reason that already in attested Old English the derivational stem-formative *\*-o-* had been reanalyzed as part of the preterite marker: *wund-od-e*. In much the same way, the tentatively proposed affix *\*-X-* was reanalyzed with its original function ultimately lost: Pre-PIE  $*/uéd-or-/$  (later  $*/uódar/$ ) →  $*/ued-or-X-/$  >  $*/ued-ór-X-$  > PIE  $*/ued-ór-$ . The loss of the affix led to the morphologization of internal derivation, and therefore the forms and alternations would need to be memorized.

ment and VS take place: \*/uódr/ → \*uód̥r and \*/uedor/ → \*uedór- (with accent assignment via the OR). The morphology first shifts the vocalisms within the underlying forms, and then the phonology acts upon those forms in assigning the accent, syllabification, etc.:

Morphology	*/uódr/	→	*/uedor/
	↓		↓
Phonology	*uód̥r		*uedór-

To conclude, while a zero dominant morpheme works neatly within the compositional approach, it is not a typologically compelling solution. It is for this reason that we should not rely on such a suffix to generate a purely (morpho-)phonological analysis of ID but should instead accept that some parts of the grammar can only be viewed as morphological, which may be viewed as a set of instances of a number of productive types of conversion.<sup>20</sup> A reconstruction that focuses on the interaction between the two is the one that will be most successful. With these changes, we have made the compositional approach more plausible. Yet we maintain that the core assumptions of the compositional approach are both descriptively and typologically valid, as there is still much to be gained through its use in the analysis of Indo-European.

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<sup>20</sup>Note, however, if conversion does not require converted forms to be phonologically identical (or similar), as argued by Tribout 2010, it may be characterized as a derivational process that lacks an overt derivational morpheme. As the conversion of \*uód̥r to \*uedór involves the replacement of one set of theme vowels with another, this would indeed hold true. It is in this way that internal derivation may be viewed as a type of conversion.

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