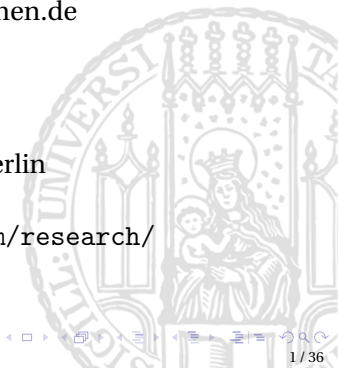# The morphophonology of Indo-European non-primary derivatives

Anthony D. Yates
Ludwig-Maximilians-Universität München
anthony.yates@lrz.uni-muenchen.de

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Slides available at: `www.adyates.com/research/`

Primary vs. non-primary derivation in Indo-European

(1) *Primary vs. non-primary derivation in IE*:

    a. PRIMARY: **R**oot + **S**uffix$_1$ + **E**nding

    b. NON-PRIMARY: **R**oot + **S**uffix$_1$ + **S**uffix$_2$ (+ **S**uffix$_3$ . . .) + **E**nding

▶ In Indo-European (IE) linguistics a distinction is traditionally drawn between two types of derivation in (1).

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    ▶ PRIMARY derivatives in (1a) consist of a root, exactly one (overt) derivational suffix, and an inflectional ending.

    ▶ NON-PRIMARY ("secondary") derivatives in (1b) contain multiple derivational suffixes.

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- In Indo-European (IE) linguistics a distinction is traditionally drawn between two types of derivation in (1).

  - PRIMARY derivatives in (1a) consist of a root, exactly one (overt) derivational suffix, and an inflectional ending.
  - NON-PRIMARY ("secondary") derivatives in (1b) contain multiple derivational suffixes.
  - Compare, e.g., primary (2a) with its non-primary derivative (2b):

(2) a. Ved. *śráv-as-ā*   (hear-N.NML-INS.SG)   'with fame'

      b. ⇒ *śrav-as-yá-ti* (hear-N.NML-VBL-3SG.PRS.ACT) 'seeks fame'

Morphophonology of IE (non-)primary derivatives

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► Distinction in (1) has shaped study of morphophonology of Proto-Indo-European (PIE) and its daughters — in particular, of the relationship between:

    ► STRESS: single word-level prosodic peak ("accent"), which was phonologically unpredictable and contrastive in PIE.

    ► ABLAUT: intramorphemic alternations in vowel quantity ($*\bar{V} \sim *V \sim *\varnothing$) or quality ($*e \sim *o$)

Morphophonology of IE (non-)primary derivatives

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▶ PIE NON-PRIMARY derivatives — like other categories outside scope of EM (thematic nominals, compounds, verbs, etc.) — have not yet been systematically incorporated into a theory of PIE morphophonology.

(3) PRETONIC MID VOWEL DELETION (PVD): */e, o/ → ∅ / ___ σ́
    "*/e, o/ is deleted when it precedes a stressed syllable." (iterative)

▶ Focus for today — operation of (3) in PIE non-primary derivatives.

Toward a general theory of (P)IE morphophonology

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▶ This phonological process — if reconstructible for PIE (Yates 2019a; cf. Kiparsky 2010) — would be important both as a:

  ▶ Component of a general theory of PIE morphophonology

  ▶ An argument why such a general theory is needed.

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  - ▶ An argument why such a general theory is needed.

- ▶ **Part 1** will provide evidence that:
  - ▶ (3) applied regularly in PIE primary derivatives and in non-root syllables of non-primary derivatives.
  - ▶ (3) applied variably in root syllables of non-primary derivatives, depending on properties of their base.

Toward a general theory of (P)IE morphophonology

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   ▶ Component of a general theory of PIE morphophonology
   ▶ An argument why such a general theory is needed.

▶ Deletion patterns in non-primary derivatives will be argued to show:

   ▶ (3) was synchronically operative in PIE.
   ▶ PIE also had a morphophonological process whereby root vowels were transferred cyclically from base to non-primary derivative.
   ▶ A general theory of PIE morphophonology is indeed necessary.

Pretonic mid vowel deletion in PIE primary derivatives

▶ Robust IE evidence that PIE mid vowels (*/e, o/) were regularly subject to deletion in pretonic syllables.

  ▶ Root */e/ in (e.g.) (4–6) — stressed in (a) vs. deleted in (b).

(4) a. */gʷʰen-ti/ → *[gʷʰén-ti] > Ved. *hánti,* Hitt. *kuēnzi* 'kills'
    b. */gʷʰen-énti/ → *[gʷʰn-énti] > Ved. *ghnánti,* Hitt. *kunanzi* 'kill'

(5) a. */ḱleu-´os-∅/ → *[ḱléw-os] > Ved. *śrávas,* Gk. κλέος 'fame'
    b. */ḱleu-tó-s/ → *[ḱlu-tó-s] > Ved. *śrutás,* Gk. κλυτός 'heard'

(6) a. */dyew-m̥/ → *[dyḗ-m] > Ved. *dyā́m* 'sky', Gk. Ζῆν 'Zeus'
    b. */dyew-ós/ → *[diw-ós] > Ved. *divás,* Gk. Διός 'of "'

Pretonic mid vowel deletion in PIE primary derivatives

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  ▶ Stem-final */e/ in (e.g.) (7–9) — stressed in (a) vs. deleted in (b).

(7) a. */ph₂tér-m/   → *[pəh₂térm̥]   > Ved. *pitáram,* Gk. πατέρα 'father'
    b. */ph₂tér-éi/   → *[pəh₂tr-éi]   > Ved. *pitré* (cf. Gk. πατρί) 'to/for "'

(8) a. */h₂uksén-es/   → *[h₂uksén-es] > Ved. *ukṣáṇas* 'oxen'
    b. */h₂uksén-ós/   → *[h₂uksn-ós] > Ved. *ukṣṇás* 'of the ox'

(9) a. */yeu-né-g-ti/   → *[yu-né-k-ti] > Ved. *yunákti* 'yokes'
    b. */yeu-né-g-énti/ → *[yu-n-g-énti] > Ved. *yuñjánti* 'yoke'

Pretonic mid vowel deletion in PIE primary derivatives

▶ Robust IE evidence that PIE mid vowels (*$/e, o/$) were regularly subject to deletion in pretonic syllables.

    ▶ Stem-final *$/o/$ in (e.g.) (10–11) — surfaces in (a) vs. deleted in (b).

(10) a. *$/\text{pentoh}_2\text{-es}/$ → *$[\text{péntoh}_2\text{-as}]$ >> Ved. *pánthās* 'paths'
                                                      (cf. YAv. *paṇtạm* 'path')

     b. *$/\text{pentoh}_2\text{-ós}/$ → *$[\text{pn̥th}_2\text{-ós}]$ > Ved. *pathás* 'of the path'
                                                      OAv. *paθō* 'of the path'

(11) a. *$/\text{d}^\text{h}\text{eĝ}^\text{h}\text{om-s}/$ → *$[\text{d}^\text{h}\text{éĝ}^\text{h}\text{ōm}]$ > Hitt. *tēkan* 'earth'

     b. *$/\text{d}^\text{h}\text{eĝ}^\text{h}\text{om-ós}/$ → *$[\text{d}^\text{h}\text{ə}\hat{\text{g}}^\text{h}\text{m-ós}]$ > Hitt. *taknāš* 'of the earth'

Pretonic mid vowel deletion in PIE primary derivatives

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  ▶ Stem-final */o/ in (e.g.) (10–11) — surfaces in (a) vs. deleted in (b).
  ▶ Stem-initial */e/ also in (10–11) — stressed in (a) vs. deleted in (b) — with **iterative** application of deletion.

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(11) a. */dʰeĝʰom-s/ → *[dʰéĝʰōm] > Hitt. *tēkan* 'earth'

   b. */dʰeĝʰom-ós/ → *[dʰə̯ĝʰm̥-ós] > Hitt. *taknāš* 'of the earth'

Pretonic deletion in PIE non-primary derivatives

(12) *PIE non-primary derivatives with suffix* */-ó-/ *and their IE reflexes:*

a. PIE **bʰudʰ-mén–* 'bottom' ⇒ **bʰudʰ-m̥n-ó–* 'having a bottom'
   > Gk. πυθμήν 'bottom'   Ved. *budhná–*, Lat. *fundus* 'ground'

b. PIE **wét-es–* 'year' ⇒ **wet-s-ó–* 'having a year'
   > Gk. ἔτος 'year'   Ved. *vatsá–* 'calf'

c. PIE **léuks-men–* 'light' ⇒ **leuks-m̥n-ó–* 'having light'
   > Lat. *lūmen* 'light'   YAv. *raoxšna–* 'bright'

d. PIE **(h₁)rot-eh₂–* 'wheel' ⇒ **(h₁)rot-h₂-ó–* 'wheeled'
   > Lat. *rota* 'wheel'   Ved. *rátha–*, YAv. *raθa–* 'chariot'

e. PIE **sokʷ-h₂-ói–* 'comrade' ⇒ **sokʷ-h₂-y-ó–* 'having comrades'
   > Ved. *sákhā(y)–* 'friend'   Lat. *socius*, ON *seggr* 'ally', 'warrior'

▶ Standardly reconstructed PIE non-primary derivatives given in (12).

(a) *EWA* II: 228–9, de Vaan (2008:250), Beekes 2010:1255, Weiss 2020:123, i.a.
(b) Stüber (2002:31, 187–8), Schaffner (2004:292–3), Meissner (2005:153 n. 82, 165), i.a.
(c) Schmidt (1895:101–2), Nussbaum (2010:270)
(d) *EWA* II: 429–30, de Vaan (2008:527), *NIL*: 575–8, Weiss (2020:126, 320), Meier-Brügger and Fritz (2021:126), i.a.
(e) Schindler (1969:164), *EWA* II: 684–5, Beekes (2010:112–3, 1089), Byrd (2015:210–1), Ringe (2017:131–2), Yates 2019b, i.a.

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▶ Non-primary derivative in (12a) appears to show same iterative deletion observed in primary derivatives:

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⇒ Both primary and non-primary derivatives provide evidence for (3) as
a synchronic, general phonological process in PIE:

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▶ But in (12b–e) only <u>mid vowel in stem-final suffix of the base</u> undergoes <u>pretonic deletion</u> in non-primary derivative.

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▶ But in (12b–e) only <u>mid vowel in stem-final suffix of the base</u> undergoes <u>pretonic deletion</u> in non-primary derivative.

▶ <u>Root mid vowel of the base</u> surfaces pretonically in non-primary derivative.

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○ **Why does deletion fail to apply iteratively to root vowel in (12a–d)?**

Toward a new account of PIE non-primary derivatives

▶ Significant but often overlooked observation of Schindler (1975b:260):

> "Es besteht dabei generell die Möglichkeit, dass spezifische Ablautstufen der zugrundeliegenden Primärbildungen auch in den sekundären Ableitungen erscheinen."

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▶ Two possible interpretations:

(i) Diachronically, PIE non-primary derivatives tend to be influenced by their bases, and so undergo post-PIE analogical changes to more closely resemble them phonologically.

(ii) Synchronically, PIE non-primary derivatives "inherit" phonological properties of their primary bases.

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(14)

SCHINDLER'S GENERALIZATION:

PIE non-primary derivatives preserve root vocalism of their base.

▶ **Proposal:** Building on Schindler (1975b), morphophonological generalization in (14) obtained synchronically in PIE.

Toward a new account of PIE non-primary derivatives

(14)

> **SCHINDLER'S GENERALIZATION:**
>
> **PIE non-primary derivatives preserve root vocalism of their base.**

- Generalization in (14) accounts for contrast in (12) above:
    - Pretonic deletion applies to root vowel (*$b^h eud^h$–) in non-primary (12a) because it is not present in base.
    - Pretonic deletion underapplies to root vowel in non-primary (12b) because it is present in base.

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      > Gk. πυϑμήν 'bottom' Ved. *budhná*– 'ground'
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   b. PIE *wét-es– 'year' ⇒ *wet-s-ó– 'having a year'
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▶ **Part 2** — further empirical and theoretical support for (14):

Toward a new account of PIE non-primary derivatives

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SCHINDLER'S GENERALIZATION:

PIE non-primary derivatives preserve root vocalism of their base.

▶ **Part 2** — further empirical and theoretical support for (14):

   ▶ Better accounts for phonological properties of certain IE formations as "covert" non-primary derivatives (i.e., no segmental exponent of S_1).

      ▶ Deverbal animate *–oi*-stems

      ▶ Internal derivatives ("τομός-type," *–mon*-stems).

Toward a new account of PIE non-primary derivatives

(14)

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- **Part 2** — further empirical and theoretical support for (14):
  - Better accounts for phonological properties of certain IE formations as "covert" non-primary derivatives (i.e., no segmental exponent of S_1).
    - Deverbal animate *–oi*-stems
    - Internal derivatives ("τομός-type," *–mon*-stems).
  - Analyzable as a CYCLIC effect of cross-linguistically common type.

Overt non-primary *–oi*-stems in Greek and Hittite

▶ PIE had an animate noun-forming suffix *–oi–*, which productively forms unambiguous non-primary derivatives in Greek and Hittite:

(15) *Greek non-primary *–oi-*stems and their bases*:
   a. κάμῑνος 'furnace' ⇒ καμῑνώ 'furnace-woman'
   b. μέλλω 'be about to' ⇒ μελλοῦς 'of hesitation'

(16) *Hittite non-primary *–oi-*stems and their bases*:
   a. *ḫullant–* 'defeated' ⇒ *ḫullanzāiš* 'defeat'
      [χolː-áːnt-]   [χolː-aːnts-áːi-s]
   b. *maniyaḫḫ–* 'administer' ⇒ [*man*]*iyaḫḫāiš* 'administrative
      [maniy-áχː-]   [maniy-aχː-áːi-s] district'

▶ In both languages *–oi*-stems consistently exhibit suffixal stress in their strong case forms, hence in PIE too (Yates 2019b).

Covert non-primary *–oi*-stems in Greek

(17) *PIE primary[?] *–oi-stems in Greek*:

    a. PIE *$b^h eid^h$–*   'persuade' ⇒ *$b^h eid^h$-ói–* 'persuasion'
          >   Gk. πειθώ 'P/persuasion'
    b. PIE *$b^h eid$–*   'split'   ⇒ *$b^h eid$-ói–* 'splitting'
          >   Gk. φειδώ 'sparing'
    c. PIE *leg^h–*   'lie (down)' ⇒ *leg^h-ói–* 'lying down'
                                       Gk. λεχώ 'woman post-childbirth'

▶ Greek also attests a few *–oi*-stems that — having just one overt suffix
  — could reflect PIE primary formations.

Covert non-primary *–oi*-stems in Greek

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a.	PIE	*$b^h eid^h$–*	'persuade'	⇒	*$b^h eid^h$-ói–* 'persuasion'
	>				Gk. πειθώ 'P/persuasion'
b.	PIE	*$b^h eid$–*	'split'	⇒	*$b^h eid$-ói–* 'splitting'
	>				Gk. φειδώ 'sparing'
c.	PIE	*leg^h–*	'lie (down)'	⇒	*leg^h-ói–* 'lying down'
					Gk. λεχώ 'woman post-childbirth'

► Greek also attests a few *–oi*-stems that — having just one overt suffix — could reflect PIE primary formations.

► Yet on morphological analysis in (17) failure of root mid vowel to undergo pretonic deletion is unexpected.

Covert non-primary *–oi*-stems in Greek

(17) *PIE primary[?] *–oi-stems in Greek*:

a.	PIE	*$b^h eid^h$–*	'persuade'	⇒	*$b^h eid^h$-ói–*	'persuasion'
	>				Gk. πειθώ	'P/persuasion'
b.	PIE	*$b^h eid$–*	'split'	⇒	*$b^h eid$-ói–*	'splitting'
	>				Gk. φειδώ	'sparing'
c.	PIE	*leg^h–*	'lie (down)'	⇒	*leg^h-ói–*	'lying down'
					Gk. λεχώ	'woman post-childbirth'

► Greek also attests a few *–oi*-stems that — having just one overt suffix — could reflect PIE primary formations.

► Yet on morphological analysis in (17) failure of root mid vowel to undergo pretonic deletion is unexpected.

    ► Root vocalism in (17) previously taken by EM as evidence for inherited root stress ("amphikinetic"; Rix 1992:146–7, Weiss 2020:259, *i.a.*), against convergent Hittite and Greek evidence for suffixal stress.

Covert non-primary *–oi*-stems in Greek

(18) *PIE non-primary deverbal *–oi-stems and their IE reflexes*:

a.	PIE	*bʰéidʰ-e/o–*	'persuade'	⇒	*bʰeidʰ-ói–*	'persuasion'
	>	Gk. πείθω	'persuade'		Gk. πειθώ	'persuasion'
		Lat. *fīdō*	'trust'			
b.	PIE	*bʰéid-e/o–*	'split'	⇒	*bʰeid-ói–*	'splitting'
	>	Gk. φείδομαι,	'spare'		Gk. φειδώ	'sparing'
		Goth. *beitan*	'bite'			
c.	PIE	*légʰ-e/o–*	'lie (down)'		*legʰ-ói–*	'lying down'
	>	Gk. λέχομαι,	'lie (down)'		Gk. λεχώ	'woman post-
		OIr. *laigid*	'lie (down)'			childbirth'

▶ These **–oi*-stems are better analyzed as in (18) — i.e., as covert non-primary derivatives of PIE thematic verbs likewise reflected in Greek.

   ▶ Suffix **–oi–* "replaces" thematic **–e/o–* in base verb (like other **–i*-suffixes; Schindler 1980:390, Grestenberger 2014:89, i.a.).

Covert non-primary *‒oi*-stems in Greek

(18) *PIE non-primary deverbal *‒oi-stems and their IE reflexes*:

a.	PIE	*$b^h éid^h$-e/o–*	'persuade'	⇒	*$b^h eid^h$-ói–*	'persuasion'
	>	Gk. πείϑω	'persuade'		Gk. πειϑώ	'persuasion'
		Lat. *fīdō*	'trust'			
b.	PIE	*$b^h éid$-e/o–*	'split'	⇒	*$b^h eid$-ói–*	'splitting'
	>	Gk. φέιδομαι,	'spare'		Gk. φειδώ	'sparing'
		Goth. *beitan*	'bite'			
c.	PIE	*$lég^h$-e/o–*	'lie (down)'		*leg^h-ói–*	'lying down'
	>	Gk. λέχομαι,	'lie (down)'		Gk. λεχώ	'woman post-
		OIr. *laigid*	'lie (down)'			childbirth'

▶ These *‒oi*-stems are better analyzed as in (18) — i.e., as covert non-primary derivatives of PIE thematic verbs likewise reflected in Greek.

  ▶ Phonologically irregular pretonic root vowel is then due to (14):

(14) **PIE non-primary derivatives preserve root vocalism of their base.**

Internal derivation in PIE

(19) *PIE* τόμος- *and* τομός-*type nominals and their IE reflexes*:

a.	PIE	*$tómh_1$-o–*	'slice'	⇒	*$tomh_1$-ó–*	'cutting'
	>	Gk. τόμος	'slice'		Gk. τομός	'cutting'
b.	PIE	*$wólh_1$-o–*	'choice'	⇒	*$wolh_1$-ó–*	'choosing'
	>	Ved. *vára–*	'choice'		Ved. *vará–*	'suitor'
c.	PIE	*$\hat{k}óuh_x$-o–*	'swell'	⇒	*$\hat{k}ouh_x$-ó–*	'swelling'
	>	— (⇒ Sp. *cueva* 'cave')			Lat. *cavus*	'hollow'

▶ Broad agreement that PIE had thematic nominal pairs like (19) related by INTERNAL DERIVATION (ID).

  ▶ See, e.g., Schaffner (2001:98), Widmer (2004:32), Fortson (2010:122), Nussbaum (2014:243–51, 2017:237–9), Jasanoff (2017:21–2), Lundquist and Yates (2018:2108–9), Weiss 2020:287 (cf. Benveniste 1935, Krasukhin 2000:133–4); on (17c) see Vine (2006:235–7).

Internal derivation in PIE

(19) *PIE* τόμος- *and* τομός-*type nominals and their IE reflexes*:

a.	PIE	**tómh₁-o–*	'slice'	⇒	**tomh₁-ó–*	'cutting'
	>	Gk. τόμος	'slice'		Gk. τομός	'cutting'
b.	PIE	**wólh₁-o–*	'choice'	⇒	**wolh₁-ó–*	'choosing'
	>	Ved. *vára–*	'choice'		Ved. *vará–*	'suitor'
c.	PIE	**ḱóuhₓ-o–*	'swell'	⇒	**ḱouhₓ-ó–*	'swelling'
	>	— (⇒ Sp. *cueva*	'cave')		Lat. *cavus*	'hollow'

► Broad agreement that PIE had thematic nominal pairs like (19) related by INTERNAL DERIVATION (ID).

   ► ID ≈ derivation marked by changes only in prosodic properties (stress, ablaut); no overt ("external") affixation.

   ► Derivations in (19) would involve stress shift from root to stem-final σ (for possible implementations see Kiparsky 2010, Keydana 2013).

Internal derivatives as covert non-primary derivatives

(19) *PIE* τόμος- *and* τομός-*type nominals and their IE reflexes*:

a.	PIE	*tómh₁-o–*	'slice'	⇒	*tómh₁-ó–*	'cutting'
	>	Gk. τόμος	'slice'		Gk. τομός	'cutting'
b.	PIE	*wólh₁-o–*	'choice'	⇒	*wólh₁-ó–*	'choosing'
	>	Ved. *vára–*	'choice'		Ved. *vará–*	'suitor'
c.	PIE	*ḱóuhₓ-o–*	'swell'	⇒	*ḱouhₓ-ó–*	'swelling'
	>	— (⇒ Sp. *cueva*	'cave')		Lat. *cavus*	'hollow'

▶ Analyzing τομός-type nominals in (19) as covert non-primary derivatives explains irregular pretonic root mid vowel via (14):

(14) **PIE non-primary derivatives preserve root vocalism of their base.**

Internal derivatives as covert non-primary derivatives

(20) *PIE neuter *–men- and *–mon-stem nominals and their IE reflexes*:

    a. PIE **dʰér-men–* 'support' ⇒ **dʰer-món–* 'supporting'
        > Ved. *dhárma* 'foundation'   Ved. *dharmā́nam* 'support(er)'

    b. PIE **dʰéh₁-men–* 'establishment' ⇒ **dʰeh₁-món–* 'establishing'
        > Gk. ϑῆμα 'tomb'   Gk. ϑημών 'heap'

    c. PIE **h₂éug-men–* 'growth' ⇒ **h₂eug-món–* 'growing'
        > Lat. *augmen* 'increase'   Ved. *ojmā́nam* 'strength'
                            Lith. *augmuõ* 'sprout'

► Broad agreement that PIE had **–mon*-stem nominals formed by ID from neuter **–men*-stems like (20).

    ► See, e.g., Schindler (1975a:63–4), Widmer (2004:69), Rau (2009:134), Fortson (2010:122–3), Nussbaum (2014:244, 248), Weiss (2020:281–2).

Internal derivatives as covert non-primary derivatives

(20) *PIE neuter *–men- and *–mon-stem nominals and their IE reflexes*:

a.	PIE	*d^hér-men–*	'support'	⇒	*d^her-món–*	'supporting'
	> Ved.	*dhárma*	'foundation'		Ved. *dharmā́nam*	'support(er)'
b.	PIE	*d^héh₁-men–*	'establishment'	⇒	*d^heh₁-món–*	'establishing'
	> Gk.	ϑῆμα	'tomb'		Gk. ϑημών	'heap'
c.	PIE	*$h_2$éug-men–*	'growth'	⇒	*$h_2$eug-món–*	'growing'
	> Lat.	*augmen*	'increase'		Ved. *ojmā́nam*	'strength'
					Lith. *augmuõ*	'sprout'

▶ Broad agreement that PIE had **–mon*-stem nominals formed by ID from neuter **–men*-stems like (20).

▶ Reconstruction of suffixal stress (rather than root per EM) in strong cases of PIE **–mon*-stems supported by (Yates 2020, to appear):

  ▶ Consistent suffixal stress in Vedic.

  ▶ (In)direct traces of suffixal stress in Greek, Lithuanian, and Anatolian.

Internal derivatives as covert non-primary derivatives

(20) *PIE neuter *–men- and *–mon-stem nominals and their IE reflexes*:

    a. PIE *d^hér-men–* 'support'   ⇒ **d^her-món–* 'supporting'
        > Ved. *dhárma* 'foundation'   Ved. *dharmā́nam* 'support(er)'

    b. PIE *d^héh₁-men–* 'establishment' ⇒ **d^heh₁-món–* 'establishing'
        > Gk. ϑῆμα 'tomb'   Gk. ϑημών 'heap'

    c. PIE *$h_2$éug-men–* 'growth'   ⇒ **$h_2$eug-món–* 'growing'
        > Lat. *augmen* 'increase'   Ved. *ojmā́nam* 'strength'
                                      Lith. *augmuõ* 'sprout'

▶ Analyzing **–mon*-stem nominals in (20) as covert non-primary derivatives explains irregular pretonic root mid vowel via (14):

(14) **PIE non-primary derivatives preserve root vocalism of their base.**

(14)

> **SCHINDLER'S GENERALIZATION:**
>
> **PIE non-primary derivatives preserve root vocalism of their base.**

► SCHINDLER'S GENERALIZATION can be analyzed as a case of CYCLICITY ("synchronic analogy" per Kiparsky 2015:3).

  ► CYCLICITY ≈ a phonological property is transferred from a base to its derivative, resulting in opaque under- or overapplication of an active phonological process in this derivative.

Cyclicity in cross-linguistic perspective

▶ Cyclic effects are cross-linguistically common — e.g., in present-day American English (Hayes 1982, Pater 2000,Bermúdez-Otero 2012, *i.a.*).

  ▶ When a word contains a sequence of three pretonic light syllables (/LLLσ́/), the first regularly receives secondary stress ([L̀LLσ́]).

(21) *Non-cyclic stress in American English (monomorphemic nominals)*:

   àbracadábra

   dèlicatéssen

   Mèditerránean

   Kàlamazóo

Cyclicity in cross-linguistic perspective

- ▶ Cyclic effects are cross-linguistically common — e.g., in present-day American English (Hayes 1982, Pater 2000, Bermúdez-Otero 2012, *i.a.*).

  - ▶ But derived nominals like (22) preserve primary stress of their base as secondary stress, blocking its regular assignment to initial syllable.

(22) *Cyclic stress in American English (derived nominalizations)*:

a.	*imágine*	⇒	*imàginátion*	ˣ*ìmaginátion*
b.	*oríginal*	⇒	*orìginálity*	ˣ*òriginálity*
c.	*divísible*	⇒	*divìsibílity*	ˣ*dìvisibílity*
d.	*phenómenon*	⇒	*phenòmenólogy*	ˣ*phènomonólogy*

Schinder's Generalization and cyclicity

▶ PIE pretonic vowel deletion works similarly.

　　▶ Primary derivatives lack independent bases, thus show regular
　　　(iterative) pretonic mid vowel deletion:

(23) *Pretonic deletion in PIE primary derivatives:*

　　a. PIE */g^{wh}en-énti/ → *[g^{wh}n-énti] > Ved. *ghnánti* 'they kill'
　　　　　　　　　　　　　　　　　　　　　　　 > Hitt. *kunanzi* 'kill'

　　b. PIE */ph$_2$tér-éi/ → *[pəh$_2$tr-éi] > Ved. *pitré* 'to/for father'
　　　　　　　　　　　　　　　　　　　　　　 >> Gk. πατρί 'to/for father'

　　c. PIE */pentoh$_2$-ós/ → *[pn̥th$_2$-ós] > Ved. *pathás* 'of the path'
　　　　　　　　　　　　　　　　　　　　　　 > OAv. *paθō* 'of the path'

Schinder's Generalization and cyclicity

► PIE pretonic vowel deletion works similarly.

    ► Non-primary derivative in (24a) also appears to show regular <u>iterative deletion</u>, since its base in (24b) contains no root mid vowel:

(23) *Pretonic deletion in PIE (non-)primary derivatives*:

    a. */<u>bʰeudʰ</u>-mén-ó-s/ → *[bʰu<u>dʰ</u>-n-ó-s]   > Ved. *budhnás* 'ground'

                                                 > Lat. *fundus*   'ground'

                                  ⇑

    b. */<u>bʰeudʰ</u>-mén-m/ → *[<u>bʰudʰ</u>-mén-m̥] > Gk. πυθμένα 'bottom'

Schinder's Generalization and cyclicity

▶ PIE pretonic vowel deletion works similarly.

   ▶ But in non-primary derivatives like (25), root mid vowel is transferred cyclically from base and thus fails to undergo regular pretonic deletion.

(25) *Cyclic underapplication of deletion in PIE non-primary derivatives*:

   a. PIE *wét-es–*   'year'   ⇒ *wet-s-ó–* 'having a year'
      > Gk. ἔτος   'year'   Ved. *vatsá–* 'calf'

   b. PIE *bʰéidʰ-e/o–*   'persuade'   ⇒ *bʰeidʰ-ói–* 'persuasion'
      > Gk. πείθω   'persuade'   Gk. πειθώ   'persuasion'
         Lat. *fīdō*   'trust'

   c. PIE *tómh₁-o–*   'slice'   ⇒ *tomh₁-ó–* 'cutting'
      > Gk. τόμος   'slice'   Gk. τομός   'cutting'

Conclusions & discussion

- Vowel deletion patterns in non-primary derivatives support reconstruction of:

    - Phonological process that deleted mid vowels in pretonic syllables.
    - Morphophonological process whereby root vowels were transferred cyclically from base to non-primary derivative.

- More broadly, non-primary derivatives provide additional arguments as to why a general theory of PIE morphophonology is necessary:

    - To economically account for similar vowel deletion patterns across a variety of (non-)primary morphological types.
    - To accurately identify (covert) non-primary derivatives in the IE languages, thereby distinguishing inherited features from innovations.

Conclusions & discussion

▶ Proposals advanced here offer a starting point for development of a general theory of PIE morphophonology.

▶ Major question for future research in this domain:

Conclusions & discussion

▶ Proposals advanced here offer a starting point for development of a general theory of PIE morphophonology.

▶ Major question for future research in this domain:

> ◦ **What else belongs in a general theory of PIE morphophonology?**

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i-suffixes "replace" the thematic vowel

(A1) Vedic non-primary derivatives formed with the suffixes /-ín-/, /-$\acute{\text{ī}}$-/:

THEMATIC BASE	⇒	NON-PRIMARY DERIVATIVE	
a. *ukthá–*	'praise-hymn'	*ukth-ín–*	'accompanied by praise-hymns'
b. *śŕṅga–*	'horn'	*śr̥ṅg-ín–*	'having horns'
c. *vájra–*	'mace'	*vajr-ín–*	'having a mace'
d. *sóma–*	'soma'	*som-ín–*	'having/bringing soma'
e. *áśva–*	'horse'	*aśv-ín–*	'having horses; Aśvín'
f. *hásta–*	'hand'	*hast-ín–*	'having hands'
g. *vŕ̥ka–*	'wolf'	*vr̥k-$\acute{\text{ī}}$–*	'female wolf'
h. *rátha–*	'chariot'	*rath-$\acute{\text{ī}}$–*	'having a chariot; charioteer (M/F)'

▶ On the derivational pattern see Brugmann (1906:285), Schindler (1980) ("ersetzt wird"), and Grestenberger (2014, 2019:89) with references.

Traces of "double zero-grade" in non-primary derivatives?

(A2) Possible PIE non-primary derivatives with "double zero-grade:"

a. PIE *wéd-es–* 'water' ⇒ *ud-s-ó–* 'having water'
   > Gk. ὕδος, Arm. *get* 'water', 'river' Ved. *útsa–* 'wellspring'

b. PIE *$h_1$reud^h-os* 'redness' ⇒ *$h_1$rud^h-s-ó–* 'red'
   > Gk. ἔρευθος 'redness' Lat. *russus* 'red(-haired)'

c. PIE *léuk-es–* 'light' ⇒ *luk-s-ó–* 'having light'
   > Ved. *rókas–*, OAv. *raocah–* 'light' Ved. *rukṣá–*, Pers. *ruxš* 'shining'

d. PIE *térh$_2$-men–* 'boundary' ⇒ *tr̥h$_2$-m̥n-ó–* 'having a boundary'
   > Gk. τέρμα, Lat. *termen* 'boundary' Gk. τρᾱνός (⇒ τρᾱνής) 'clear' ('id.')'

e. PIE *neк̂-(e)w–* 'death' *n̥к̂-w-ó–* 'having death'
   > — (⇒ Gk. νέκῡς, Av. *nasau–* 'corpse') — (⇒ TA *oṅk*, TB *eṅkwe* 'man')

▶ For arguments in favor see Widmer (2004:72–3), Nussbaum (2010:272–6), and Höfler (2015, 2017)