Relative chronology and morphosyntactic change in Indo-European

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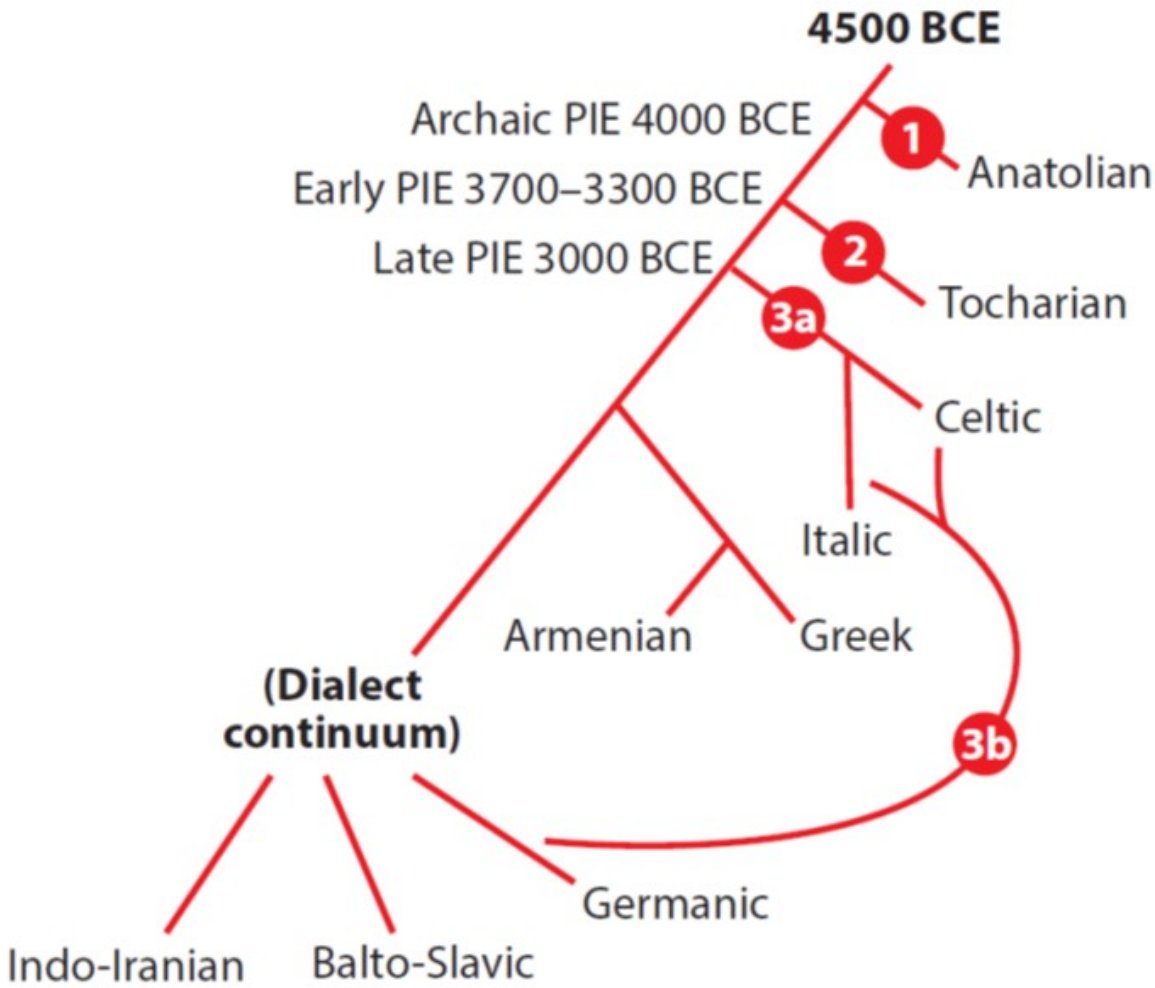
Univerzita Komenského v Bratislave, May 20, 2024

The problem

- Comparative reconstruction and phylogenetic trees of language families rely strongly on phono-lexical cognacy (the Comparative Method), which establishes genetic relationship through regular sound correspondences
- Morphological and morphosyntactic information is not systematically taken into account because of a lacking consensus as to how "regular correspondences" in the domain of morphology/morphosyntax (e.g., derivational morphemes, case markers, etc.) are to be defined
- With respect to relative chronology, chronology in the domain of morphology is therefore usually viewed from the perspective of phonology, in that it is possible to date a morphological change in relation to a sound change if the morphological change could not have occurred without it.
  - e.g., the Ancient Greek sigmatic aorist is characterized by a quasi-theme vowel *-a-* which resulted from the vocalization of syllabic nasals in 1sg. **-s-m̥* > *-sa* and 3pl. **-s-n̥t* > *-san* whence it spread by levelling through the whole paradigm.
  - This morphophonological innovation sets it apart from the *s*-aorist in other branches of Indo-European (IE) such as Indo-Iranian.

Relative chronology and the IE language family

(1) Subgrouping of the IE language family (Anthony and Ringe 2015)



The double cognacy condition

One reason why it is difficult to establish cognacy in morphosyntax is that the Double Cognacy Condition does not hold.

(2) **Double Cognacy Condition** (Walkden 2014: 50)
In order to form a correspondence set, the contexts in which postulated cognate sounds occur must themselves be cognate

= the lexical items in which the sounds occur must themselves be cognate in order to establish sound correspondences.

(3) English word-initial /t/ = High German word-initial /t^{s}/ ⟨z⟩/

a. Engl. ***t****en* : Gm. ***z****ehn*
b. Engl. ***t****ooth* : Gm. ***Z****ahn*
c. Engl. ***t****ell* : Gm. ***z****ählen*

There is no consensus as to what the morphosyntactic equivalent of "word-initial" etc. is.

The "pool of variants problem"

(4) The "pool of variants problem" (Roberts 2021: 504)

	I will sing
French:	*chanter-ai*
Italian:	*canter-ò*
Spanish:	*cantar-é*
Rumanian:	*voi cînta*
Sardinian:	*appo a cantare*
Salentino Calabrese :	no form

There is no consensus as to how to limit the possible set of variants to compare.

Today's goals

- As outlined in Grestenberger and Fellner (2024), we propose a formalization of morphosyntactic cognacy that takes variants (allomorphs) of different morphemes and their context into account, using **Distributed Morphology**
  - Assuming that morphosyntactic change is regular and directional, like sound change (Grestenberger 2023)
- We propose a working definition of morphosyntactic cognacy based on Meelen et al. (2022)
- We provide two case studies from the IE nominal domain relevant for subgrouping, namely 1) the development of the IE participial system and 2) the development of the individualizing suffixes
- We discuss how a relative chronology of the different morphemes discussed in these case studies can be established

Outline of the talk

- Introduction
- Background: Cognacy, Distributed Morphology
- Typology of morphosyntactic cognacy
- Case studies concerning morphosyntactic relative chronology
  - Participles in Indo-European
  - Individualizing suffixes in Indo-European
- Conclusion

Cognacy

(5) Definition of cognacy (Grestenberger 2021a: 315–6)

A form F_1 in language L_1 and a form F_2 in language L_2 are cognate if they go back to the same (proto-)form (*)F in the (reconstructed proto-)language (*)L, where (*)L is the ancestor of L_1 and L_2.

Cf. Trask (2000: 234–5), Meelen et al. (2022: 60)

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→ In the following, we adapt the cognacy typology of Meelen et al. (2022) for morphosyntactic cognacy, using the theoretical framework DM.

Background: Distributed Morphology

Distributed Morphology (**DM**; Halle and Marantz 1993; Harley and Noyer 1999; Embick 2010, 2015; Bobaljik 2017):

- a syntactico-centric, realizational framework of morphology in which complex word forms are generated in the syntax from abstract "terminal nodes" (syntactic heads) which are linearized (concatenated) post-syntactically and morphophonologically realized through a process of Vocabulary Insertion.

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(6) Vocabulary Items for T[+past] in English (Embick 2015: 169)

a. T[+past] ↔ -*t* / {$\sqrt{}$BEND, $\sqrt{}$LEAVE,...}⌢_

b. T[+past] ↔ -Ø / {$\sqrt{}$HIT, $\sqrt{}$QUIT,...}⌢_

c. T[+past] ↔ -*ed*

(7) M(eaning) ↔ F(orm) / C(ontext)

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- **Feeble morphosyntactic cognacy** (symbol: $\cong$, congruent): no correspondence of F, but M and C correspond.

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Example: **Strong morphosyntactic cognacy** (symbol: =, equal): phonological form, meaning and context correspond

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- Equivalent to an exact **word equation**:
  - Hittite 3sg.pres.act *kuen-zi* 'slays'
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(8) Strong cognates of PIE 3sg. *-*ti*

Hitt.	Agr[3,–PL]	↔	-*zi*	/	T[–PST]⌒_	=
Ved.	Agr[3,–PL]	↔	-*ti*	/	T[–PST]⌒_	=
PIE	Agr[3,–PL]	↔	-*ti*	/	T[–PST]⌒_	

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Example: **Moderate form-meaning cognates**

(9) Singular active forms of the *s*-aorist/preterit in Greek, Latin, Vedic, Tocharian, and Hittite

	Gk.	Lat.	Ved.	Toch. B	Hitt.
1	*(é-)deik-**s**-a*	*vē**x**-ī* /-k-**s**-/	*á-vāk-**ṣ**-am* /-k-**s**-/	*prek-wa*	*dā-ḫḫun*
2	*(é-)deik-**s**-as*	*vē**x**-istī* /-k-**s**-/	*á-vāṭ* /-k-**s**-/	*prek-asta*	*dā-tta*
3	*(é-)deik-**s**-e*	*vē**x**-it* /-k-**s**-/	*á-vāṭ* /-k-**s**-/	*prek-**sa***	*dā-**š***

- Marker *-s-* throughout the paradigm in Indo-Iranian, Greek and Latin, but only in the 3sg.act. in Tocharian and Hittite
- Form & meaning correspond, context has changed.

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(10) *s*-aorist

a. v/Asp[+PFV] ↔ -*s*- /_⁀T/Agr[3,–PL] ≙ (PIE; Hitt.; Toch.)

b. v/Asp[+PFV] ↔ -*s*- (Greek, Indo-Iranian, Latin)

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(11) Dative & locative singular in Vedic and Greek

a. Vedic:
   (i) [+DAT,−PL] ↔ -*e* /ai/ (< *-*e͡i*)
   (ii) [+LOC,−PL] ↔ -*i* ≙
b. Greek: [+DAT,−PL] ↔ -*i*

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Form (-*i*) and context (athematic/underspecified) correspond, but meaning differs (dat. vs. loc).

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(12) -*iṣ*-aorist

a. $v/\text{Asp}[+\text{PFV}] \leftrightarrow$ -*s*- $\widehat{=}$ (Greek, Avestan, Latin)

b. $v/\text{Asp}[+\text{PFV}] \leftrightarrow$ -*iṣ*- (Vedic)

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Meaning (aorist) and context (all person/number combinations) correspond, form differs due to analogy (NOT regular sound change).

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- PIE developed a morphosyntactic "split" in its middle endings, specifically in the 3sg. middle: in this context, the older "dentalless" ending *-*o-r* became renewed as *-*to-r* in analogy with the third singular active ending (cf. Jasanoff 2003; Fortson 2010)

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- Moreover, the middle non-past marker *-*r* was replaced by *-*i* in some IE branches due to analogy with the active, where *-*i* was the inherited "hic-et-nunc"-marker

A typology of morphosyntactic cognacy

Example: **Medium meaning cognates**

- PIE developed a morphosyntactic "split" in its middle endings, specifically in the 3sg. middle: in this context, the older "dentalless" ending *-*o-r* became renewed as *-*to-r* in analogy with the third singular active ending (cf. Jasanoff 2003; Fortson 2010)
- As the result of this split, *-*o-r* became contextually restricted to certain roots (Anatolian, Indo-Iranian, Old Irish) and certain syntactic contexts, e.g., passive (Indo-Iranian, Old Irish) or "stative" (Jasanoff 2003; Villanueva Svensson 2012; Grestenberger 2016)
- Moreover, the middle non-past marker *-*r* was replaced by *-*i* in some IE branches due to analogy with the active, where *-*i* was the inherited "hic-et-nunc"-marker

(13) 3sg.mid. medium meaning cognates

a. T/Agr[3,–PL,MID,–PST] ↔ *-e* (< *-*oi*)/{$\sqrt{}$ŚI, ...}⌒_ ≈ (Ved.)
b. T/Agr[3,–PL,MID,–PST] ↔ *-toi* (Gk.: Myc., Arc., Cypr.)
c. T/Agr[3,–PL,MID,–PST] ↔ *-tai* (Gk.: all other varieties)

Meaning corresponds, but form and context have changed.

A typology of morphosyntactic cognacy

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- Unlike the Vedic locative singular of athematic stems, the Vedic locative *plural* only stands in a medium cognacy relationship to the *dative plural* in Greek because this ending has undergone an analogical change compared to its Vedic comparandum, (14), namely the adoption of the vowel of the locative singular (that is, -*si* for inherited *-*su*).

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(14) Dative & locative plural in Vedic and Greek

a. Vedic
   (i) [+DAT, +PL] ↔ -*bhyas*
   (ii) [+LOC, +PL] ↔ -*su* ≈

b. Greek [+DAT, +PL] ↔ -*si*

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Meaning has changed, form has undergone non-phonological change, context (athematic/underspecified) corresponds.

A typology of morphosyntactic cognacy

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- **Weak morphosyntactic cognacy** (symbol: $\sim$, proportional)
  - **Weak formal cognates**: the phonological form corresponds, but the meaning and the context have changed
  - **Weak non-formal cognates**: the phonological form has undergone changes that are not only due to regular phonological change, but to additional reanalysis or analogical remodelling, the meaning and the context have also changed

A typology of morphosyntactic cognacy

Example: **Weak formal cognacy**: Form corresponds exactly, meaning and context differ.

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(15) Partial paradigm of Vedic *vṛkí-* "she-wolf" (*vṛ́ka-* 'wolf') < *-*iH*-

	Sg	Pl
Nom	*vṛkí-s*	*vṛk$_i$y-as*
Acc	*vṛk$_i$y-am*	*vṛk$_i$y-as*
Instr	*vṛk$_i$y-ā*	*vṛkí-bhis*
Dat	*vṛk$_i$y-e*	*vṛkí-bhyas*
Gen	*vṛk$_i$y-as*	*vṛkí-nām*

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(16) Italo-Celtic genitive singular -*ī*:

a. Lat. *virus* : *virī*

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Example: **Weak formal cognacy**: Form corresponds exactly, meaning and context differ.

(15) Partial paradigm of Vedic *vṛkī́-* "she-wolf" (*vṛ́ka-* 'wolf') < *-*iH*-

	Sg	Pl
Nom	*vṛkī́-s*	*vṛk$_i$**y**-as*
Acc	*vṛk$_i$**y**-am*	*vṛk$_i$**y**-as*
Instr	*vṛk$_i$**y**-ā*	*vṛkī́-bhis*
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a. Lat. *virus* : *virī*

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(17) Weak formal cognacy of the *-*ī*-morpheme

a. [+FEM] ↔ -*ī́-* / $n^{\text{TV}}\frown n_{[\_]}$ ∼ (Vedic)

b. [+GEN,−PL] ↔ -*ī* / $n^{\text{TV}}\frown \text{Infl}_{[\_]}$ (Latin)

A typology of morphosyntactic cognacy

Example: **Weak "non-formal" cognacy**: partial formal correspondence

A typology of morphosyntactic cognacy

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- But Greek has also innovated an allomorph -*thē*-; the origin of the dental in this variant is disputed but it must have been added through some form of resegmentation and reanalysis rather than through sound change.

A typology of morphosyntactic cognacy

Example: **Weak "non-formal" cognacy**: partial formal correspondence

- The Greek passive aorist suffix -$\bar{e}$- could reflect a reanalyzed athematic instrumental singular ending *-eh_1 (e.g., Grestenberger 2023 with refs.), continued in, e.g., Ved. -$\bar{a}$
- But Greek has also innovated an allomorph -$th\bar{e}$-; the origin of the dental in this variant is disputed but it must have been added through some form of resegmentation and reanalysis rather than through sound change.

(18) Weak partial cognacy of the *-$\bar{e}$-morpheme

a. v/Asp[+PFV,+PASS] $\leftrightarrow$ -$th\bar{e}$- $\sim$ (Greek passive aor.)

b. [+INSTR,−PL] $\leftrightarrow$ -$\bar{a}$ / $n^{a,b,c}\frown$Infl$_{[_]}$ (Vedic)

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(18) Weak partial cognacy of the *-$\bar{e}$-morpheme

a. v/Asp[+PFV,+PASS] $\leftrightarrow$ -$th\bar{e}$- $\sim$ (Greek passive aor.)

b. [+INSTR,−PL] $\leftrightarrow$ -$\bar{a}$ / $n^{a,b,c}\frown$Infl$_{[_]}$ (Vedic)

Partial formal correspondence, but meaning and context have changed.

A typology of morphosyntactic cognacy

- **Feeble morphosyntactic cognacy** (symbol: $\cong$, congruent): there is no correspondence of the phonological form, but meaning and context correspond.

A typology of morphosyntactic cognacy

Example: **Feeble morphosyntactic cognacy**

A typology of morphosyntactic cognacy

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- The Old Nordic "middle" voice marker, a verbal affix *-s(k)* (with person-marked variants in the first and second plural in Old West Nordic) goes back to the reflexive pronoun *sik*

A typology of morphosyntactic cognacy

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- In this new function, the Old Nordic voice marker constitutes a feeble meaning cognate to affixal voice morphology elsewhere in Germanic and in the older IE languages that have preserved the inherited middle inflectional endings

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- Both have been analyzed as exponents of (middle) Voice (e.g., Grestenberger 2018, 2021c, 2022; for Old Nordic Eythórsson 1995: 238–44).

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(19) "Middle voice" endings

a. T/Agr[ϕ,±past] ↔ MID /Voice[–D]⌒_ (IIr., Gk., Hitt., Lat.)
b. T/Agr([ϕ]) ↔ *-sk*/Voice[–D]⌒_ (Old Nordic)

Meaning and context correspond — but without a formal correspondence, we can't be sure that this is a genetic trait rather than a language universal or areal feature.

Summary: Typology of morphosyntactic cognacy

	F	M	C	Ex.
strong	✔	✔	✔	Hitt. *-zi* = Ved. *-ti* = Gk. *-si/ti*, etc., (8)
moderate (f-m)	✔	✔	✗	Toch., Hitt. 3sg.pret. *-s* $\widehat{=}$ inner IE *s*-aor., (10)
moderate (f-c)	✔	✗	✔	Ved. loc.sg. *-i* $\widehat{=}$ Gk. dat.sg. *-i*, (11)
moderate (m-c)	•	✔	✔	Ved. aor. *-iṣ* $\widehat{=}$ inner IE aor. *-s-*, (12)
medium (m)	•	✔	✗	Ved. 3sg.mid. *-e* ≈ Gk. 3sg.mid. *-toi*, *-tai*, (13)
medium (c)	•	✗	✔	Ved. loc.pl. *-su* ≈ Gk. dat.sg. *si*, (14)
weak (f)	✔	✗	✗	Lat. gen.sg. *-ī* ∼ Skt. *vṛkī́*-infl., (17)
weak (f')	•	✗	✗	Ved. instr.sg. *-ā* ∼ Gk. pass. aor. *-thē-*, (18)
feeble (m-c)	✗	✔	✔	IE mid. endings ≅ Old Nordic mid. *-sk*, (19)

Case study I: The IE participial system

Reconstruction of participial morphemes in IE

(20) Participial morphemes reconstructable for the "inner" IE languages (Fellner 2022: 44)

Morpheme	Voice orientation	Morphophonology	Morphosyntax
-(o)nt*-	active	ablauting	like finite forms
*-*mh$_1$no*-	middle	non-ablauting	like finite forms
*-*u̯os*-/-*us*-	perfect active	ablauting	like finite forms
*-*tó*-	theme-oriented	non-ablauting	resultative verbal adj.

Reconstruction of participial morphemes in IE

(21) Continuation of participial morphemes

	*-(o)nt-	*-mh$_1$no-	*-u̯os-/-us-	*-tó-
Hittite	✔	✗	✗	✗
Vedic	✔	✔	✔	✔
Avestan	✔	✔	✔	✔
Greek	✔	✔	✔	✔
Baltic	✔	✔	✔	✔
Slavic	✔	✔	✗	✔
Tocharian	✔	✔	✔	✗
Italic	✔	remnants	✗	✔
Celtic	remnants	remnants	✗	✔
Germanic	✔	✗	✗	✔
Armenian	remnants	remnants	✗	remnants
Albanian	✗	remnants	✗	✔

Reflexes of *-*nt*-

(22) Post-Anatolian IE: ***active*** (*)*nt*-participles

	transitive	intransitive
Ved.	*bhárant-* 'carrying', *ghnánt-* 'striking'	*róhant-* 'growing', *yánt-* 'going'
Av.	*xšāiiaṇt-* 'ruling', *γnaṇt-* 'striking'	*snaēžiṅt* 'snowing', *(a)iiaṇt-* 'going'
Gk.	*phérōn* 'carrying', *doús* 'giving'	*rhéōn* 'flowing', *iṓn* 'going'
Lat.	*ferēns* 'bringing', *amāns* 'loving'	*nivēns* 'snowing', *iēns* 'going'
Toch. B	*preñca* 'bringing', *täṅwaññeñca* 'loving'	*mäskeñca* 'being', *yneñca* 'going'

Reflexes of *-*nt*-

(23) Hitt. *ant*-participles

a. **stative-intransitive verb : stative-intransitive participle**
   (i) *ai*-^{ari} 'to be hot' : *ānt*- '(being) hot'
   (ii) *ar*-$^{tta(ri)}$ 'to stand' : *arant*- 'standing'

b. **non-stative-intransitive verb** (change-of-state, telic verbs of motion, etc.) : **stative-resultative participle**
   (i) *āk*-^{i}/*akk*- 'to die' : *akkant*- '(being) deceased, dead'
   (ii) *ār*-^{i}/*ar*- 'to come' : *arănt*- '(having) arrived'

c. **transitive verb : resultative/"passive" participle**
   (i) *ēp*-^{zi}/*app*- 'to take, seize' : *appănt*- 'taken, seized'
   (ii) *kuen*-^{zi}/*kun*- 'to kill, slay' : *kunant*- 'killed, slain'

Reflexes of *-mh_1no-

Essentially only in Indo-Iranian, Greek, Tocharian, Balto-Slavic.

- Not in Anatolian
- Remnants in Italo-Celtic, Armenian, Albanian

(24) Post-Anatolian middle *-mh_1no-participles

Ved.	*bháramāṇa-* 'taking for oneself', *smáyamāna-* 'smiling'
Av.	*barəmna-* 'taking for oneself'
Gk.	*pherómenos* 'taking, winning', *agómenos* 'being led; leading'
Toch. B	*premane* 'taking for oneself', *akemane* 'being led', *smimane* 'smiling'
OCS	*nesomŭ* '(what is) carried', *znajemŭ* '(what is) known'

→ tends to develop into a purely passive (rather than middle) participle.

Reconstruction of *-*nt*- & *-*mh₁no*-: Function

- We assume that participial morphology marks a type of ***state*** (resultative, etc.), hence aspect (**Asp**)
  - Fellner and Grestenberger 2018; Grestenberger 2020; Grestenberger and Fellner 2024; following Embick (2000); Alexiadou and Anagnostopoulou 2008; Alexiadou et al. 2015; Anagnostopoulou and Samioti 2014, etc.
- *-*mh₁no*- was specified for the context "middle Voice", (26a)
- To reconcile the Anatolian vs. Post-Anatolian evidence for *-*nt*- (passive/object-oriented vs. active/subject-oriented), we assume that it was originally a root-derived verbal adjective, (25).
  - Hence object-oriented to transitive verbs, but subject-oriented to intransitive (stative or COS) verbs

(25) Asp ↔ *-*nt*- / $\sqrt{}^\frown$ —

From this, the different functions of *-*nt*- in inner IE, (26b), vs. Anatolian, (26c), developed (Grestenberger 2020).

(26) Vocabulary Items for *-*(o)nt*- & *-*mh₁no*-

a. Asp ↔ *-*mh₁no*- / $\text{Voice}_{[-\text{D}]}{}^\frown$ — (IIr., Gk., Toch.)

b. Asp ↔ (*)-*(o)nt*- (IIr., Gk., Toch. ...)

c. Asp ↔ -*(a)nt*-/ $v^\frown$ — (Anatolian)

Reflexes of *-u̯os-/-us-

- Restricted to the *perfect* stem (in Toch.: preterit stem), unlike *-*nt*- and *-*mh*$_1$*no*-
- Mainly, Indo-Iranian, Greek, Tocharian
  - Not in Anatolian
  - Possible remnants in other branches? (Malzahn 2014: no)
- Perfect *active* in Indo-Iranian and Greek, but seems to be unspecified for Voice in Tocharian: both active and passive use possible, (27).

(27) a. *añcalī ṣarne* ***yāmu*** *araṇemi*
añcali hand.ACC.DU made.NOM.SG.M Araṇemi.NOM.SG
weṣṣä
speak.PRS.3SG
"Both hands **having made** 'añjali' (the 'añjali' gesture), Araṇemi speaks." (TB CEToM THT 92 a5)

b. . . . *aiṣṣe* *kärsaucaisa* *apākärtse* ***yāmusa***
world.ACC.SG knowing.PERL.SG visible made.NOM.SG.F
"(This path as the best one . . .) (which **was**) **made visible** by the one who knows the world." (TB CETom THT 30 a4)

Reflexes of *-u̯os-/-us-

(28) Vocabulary items for *-u̯os-/-us-

a. $\text{Asp}_{[\text{PF}]} \leftrightarrow$ {(*)-u̯ot-, -u̯os-, -us- } / $\{v, \text{Voice}_{[+\text{D}]}\}^\frown\_$ (IIr., Gk.)

b. $\text{Asp}_{[\text{PFV}]} \leftrightarrow$ -u- / $\{v, \text{Voice}\}^\frown\_$ (Toch.)

c. $\text{Asp}_{([\text{PF}])} \leftrightarrow$ -u̯os- / $\{v, \sqrt{}\}^\frown\_$ (PIE)

Reflexes of *-*tó*-

- All branches except for Anatolian and Tocharian have evidence for root-derived *-*tó*- ("verbal adjective")
- E.g., Ved. *kṛ-tá-* 'done', *ga-tá-* 'gone'; Gk. *do-tós* 'given', *sta-tós* 'standing'; Lat. *dic-tus* 'said', *fac-tus* 'done', etc.
- In Latin (> Romance), Germanic, and Modern Greek these develop into verbal passive participles
  - They can be derived from verb stems rather than the bare root for some classes of verbs
  - They can be transitive in Latin (to deponent verbs) → underspecified for Voice, like Tocharian -*u*-participles.

(29) Vocabulary items for *-*tó*-

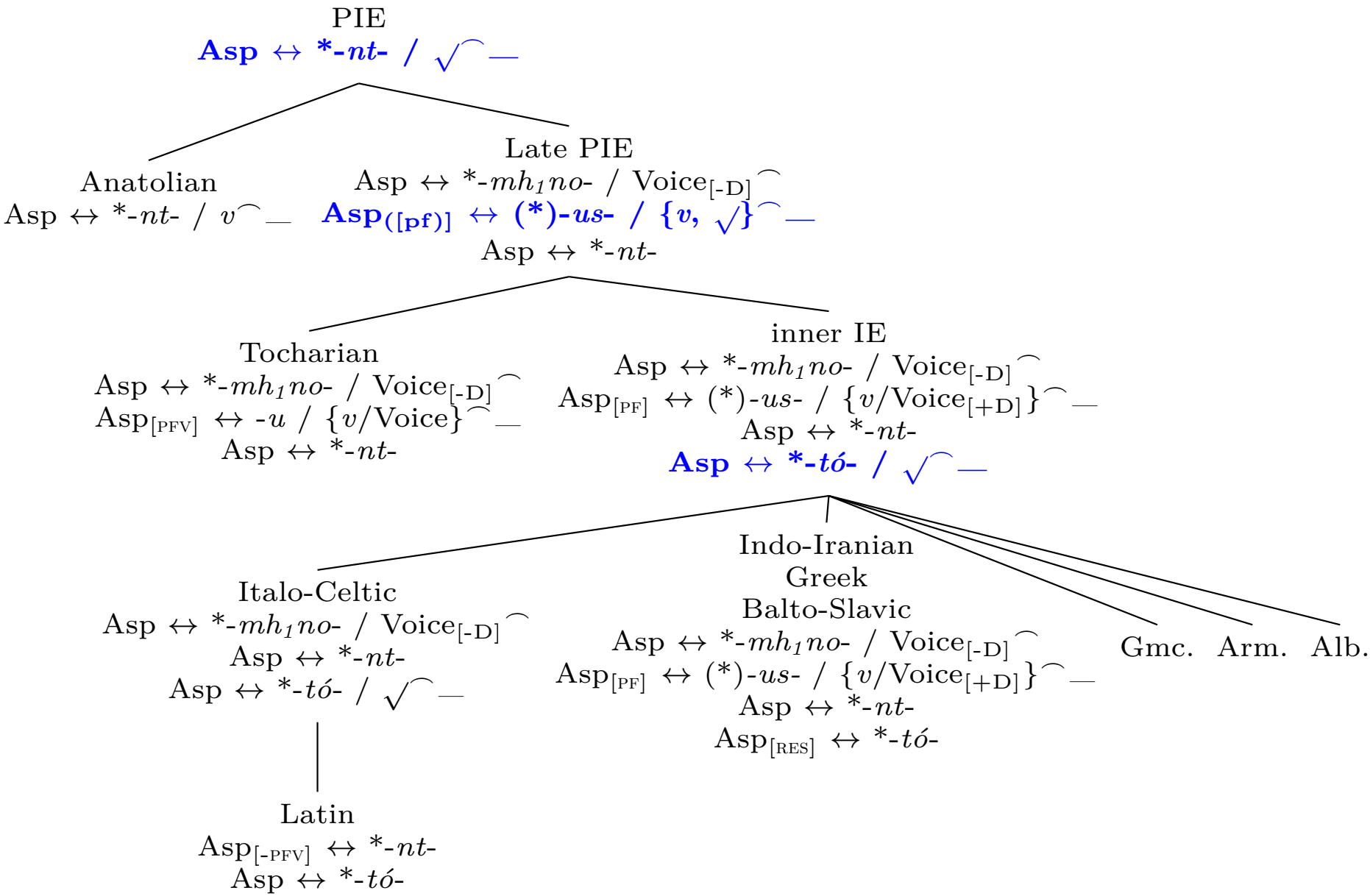
a. Asp ↔ *-*tó*- / $\sqrt{}$ ⁀ _ (Vedic, Avestan, AG)

b. $\text{Asp}_{[\text{RES}]}$ ↔ (*)-*tó*- / *v* ⁀ _ ≈ (Sanskrit caus., MG, ...)

c. $\text{Asp}_{[(\text{PF}(\text{V}))]}$ ↔ -*t(us)*-, -*tós* / Voice[–D] ⁀ _ ≈ (Romance, Gmc., MG ...)

d. Asp ↔ -*t(us)*- (Latin)

Relative chronology of participial morphemes in IE



Relative chronology of participial morphemes in IE

- The relative order of *-*nt*-, *-*u̯os*-/-*us*-, and *-*tó*- is crucial.
- All three suffixes had similar functions at one point, namely the formation of (root- or *v*-derived) **resultant states**/verbal adjectives.
- Since they don't seem to have been root-specific (or otherwise contextual) allomorphs of one another (unlike, e.g., *-*tó*- and *-*nó*-), they must be in a relationship of relative chronology to one another *in this particular function*, (30).

(30) Asp $\leftrightarrow$ *-*nt*- $>$ *-*us*- $>$ *-*tó*- / $\sqrt{\frown}$ —

Case study II: Individualizers in IE

Individualizers in IE

- Recent research has shown that PIE and the early IE languages had a set of nominal suffixes characterized as "individualizing" or "substantivizing" suffixes (e.g., Melchert 2014; Nussbaum 2014; Sasseville 2016, 2018; Fellner and Grestenberger 2016; Grestenberger 2017, 2021b).
- Original functions: derivational suffixes, formed animate substantives from adjectives and/or count nouns from mass nouns and collectives from count nouns.
  - *-*i*-
  - *-*(e)h*$_2$-
  - *-*(o)n*-
- endocentric substantivizations of (thematic) adjectives, which tend to become *re-adjectivized* (Nussbaum 2014).
- Hence some reflexes of this function are in fact adjectival
  - e.g., Germanic weak adjective inflection (*h_1*róud*^{h}*o*- 'red' → *h_1*róud*^{h}*ōn*- 'red (one)' : Gmc. strong adj. **rauda*- 'red' (cf. NHG *rote Sterne* 'red stars'), Lith. *radas*, etc. → Gmc. weak adjective **rauda**n*- 'red (one)' (cf. NHG *die rote**n** Sterne* 'the red stars').

Individualizing suffixes in IE

(31) Continuation of morphemes with individualizing function in Indo-European

	*-*i*-		*-*(e)h*$_2$			*-*(o)n*-
	ind	abst	ind	abst	coll	ind
Anatolian	remnants	remnants	✔	✔	✔	✗
Vedic	remnants	remnants	f	✔	✔	✗
Avestan	remnants	remnants	f	✔	✔	✗
Greek	remnants	remnants	f/✔	✔	✔	✔
Tocharian	remnants	remnants	f	✔	✔	✔
Armenian	remnants	remnants	f/✔	✔	✔	✗
Italic	remnants	remnants	f/✔	✔	✔	✔
Celtic	remnants	remnants	f	✔	✔	✔
Germanic	remnants	remnants	f	✔	✔	✔
Baltic	remnants	remnants	f	✔	✔	✗
Slavic	remnants	remnants	f/✔	✔	✔	✗
Albanian	✗	✗	f	✗	✗	✗

Reconstruction of *-*i*-

- Nominal *-*i*- formed animate (m.) individualizations and feminine abstracts from thematic adjectives, (32).
- This derivational relationship is attested in all almost branches, though with limited productivity and often just in remnants (Schindler 1980; Weiss 1996, 2012; Nussbaum 1999; Grestenberger 2014, 2017).
- Remnants/indirect reflexes in Anatolian branch
  - Proto-Luwic *i*-mutation (Rieken 2005)
  - common gender (mostly concrete) substantives such as $^{\text{GIŠ}}$*ḫurki-* 'wheel', $^{\text{GIŠ}}$*kalmi-* 'wooden log', *karpi-* 'anger', maybe also *aršī-* 'planting, plantation'
  - Caland-associated adjectives, e.g., *ḫarki-* 'white', *daluki-* 'long', *palḫi-* 'broad', *šalli-* 'great', etc.

Reconstruction of *-*i*-

Functions of *-*i*- in (inner) IE:

(32) **Individuation/substantivization**: **(C)o*-adjective → *-*(C)i*-individualization (m./animate)

a. Ved. *jīrá-* 'fast' → *jīrí-* (m.?) 'fast thing; rapids, river'

b. PIE *$h_2e\hat{k}$-*ró-* 'high, top-' (> Gk. *ákros*) → *$h_2ó\hat{k}$-*ri-* m. 'high thing' (> Lat. *ocris* 'mountain')

(33) **Abstracts**: *-*(C)o*-adjective → *-*(C)i*-abstract (f.)

a. Lat. *ravus* 'hoarse' → *ravis* f. 'hoarseness'

b. PIE *$h_2e\hat{k}$-*ró-* 'high, top-' (> Gk. *ákros*) → *$h_2é\hat{k}$-*ri-* f. 'height' (> Gk. *ákris* 'hilltop, -peak')

c. PIE *d^hub-ro-* 'deep' (> Toch. ^{A}*tpär*, ^{B}*tapre*) → *d^hub-ri-* 'depth' (> OCS *dŭbrĭ* f. 'abyss')

Reconstruction of *-eh_2

Functions of *-eh_2 in inner IE:

- Collective → neuter plural
- Abstract/nomina actionis
- Oppositional/derived feminine

(34) **collective**: *k^w*ék^{w}lo*- 'wheel' : k^w*ek^{w}léh$_2$* 'set of wheels' (Eichner 1985)

a. Skt. *cakrá-* : Skt. *cakrā́(ṇi)*
b. Gk. *kúklos* : Gk. *kuklà* (& count plural *kúkloi*)
c. Gmc. *χ^w*eχ^w*la- (e.g., ON *hvél*) : Gmc. *χ^w*eulō- (e.g., ON *hióll*)

Reconstruction of *-eh_2

(35) **abstract/nomina actionis**

a. *$\underset{\frown}{u}ēro$- 'true' : *$\underset{\frown}{u}ēreh_2$: 'truth'
   (i) Gmc. *$wēra$ (e.g., OHG $wār$) : Gmc. *$wērō$ (e.g., OHG $wāra$)
   (ii) Lat. $vērus$: —
   (iii) —: OCS $věra$ 'faith'

b. *$b^heu\underset{\frown}{g}^h$ 'flee' : *$b^hug^heh_2$ 'fleeing'
   (i) Gk. $phug\acute{e}$ 'flight'
   (ii) Lat. $fuga$ 'flight'

c. *$melh_2$ 'grind' : *$m(o)leh_2$ 'grinding'
   (i) Gk. $múlē$ 'mill'
   (ii) Lat. $mola$ 'millstone; ground grains'

Reconstruction of *-eh_2

(36) **oppositional feminine**:

a. m. *-*o*- : f. *-eh_2
   (i) Gk. *néos* : *néā*
   (ii) Lat. *novus* : *nova*
   (iii) OCS *novŭ* : *nova*

-(e)h₂* in Anatolian

Two of these functions of *-*eh₂* are also found in Anatolian, (a) collective nouns (/neuter plurals) and (b) animate abstracts/nomina actionis.

(37) Functions of *-*eh₂* in Anatolian

a. **collective**: *-*o*- : *-*(e)h₂*-
   (i) Hitt. *alpaš* 'cloud, *Wolke*' : Hitt. *alpa* 'cloudmass; *Gewölk*' (count plural: *alpeš* '(individual) clouds; *Wolken*')
   (ii) CLuw. *tāwa/-* 'eye' : Lyc. A *tawa* '(set of) eyes' (cf. Hitt. pl. *šākuwa*)

b. **abstracts/nomina actionis**
   (i) *h_2eh_1so- 'hot' : *$h_2eh_1seh_2$- : 'heat'
   Skt. *ása-* 'ashes, dust' : Hitt. *ḫāššša-* 'hearth' (cf. Lat. *āra*)
   (ii) **dem(h₂)* 'build' : **dom(h₂)eh₂* 'building'
   Lyc. A *tãma-* 'house, building'

-(e)h₂* in Anatolian

The suffix *-*eh₂* also has a third function in Anatolian. It serves as a derivational suffix to form animate substantives designating individuals, originally from thematic adjectives.

(38) Substantivizing/individualizing *-*eh₂* in Anatolian

a. *-*t͡io-* : *-*t͡ieh₂-* (Gusmani 1961; Hajnal 1994: 151–2, 2003: 193; Melchert 2014: 262)
   (i) **kumeze/i-* : Lyc. A *kumaza-* 'sacrificing priest' (cf. HLuw. */kummazza-/* id.)
   (ii) Lyc. A *mara-* 'law' : Lyc. A *maraza-* 'arbiter'

b. *-*lo-* : *-*leh₂-* (Sasseville 2016):
   (i) CLuw. *kummaiyalla/i-* : HLuw. */kummayalla-/* 'temple official'
   (ii) Lyc. **qidr-* 'animal' : Lyc. B *qidrala-* 'official in charge of sacrificial animals'

c. Proto-Luwic *-*sso-* : *-*ssā-* (Sasseville 2018)
   (i) CLuw. **Antaliyašša/i-* 'of the city A.' : ^{d}*Antaliyašša-* 'personification of the city A.'
   (ii) Lyc. B *xbadase/i-* 'of the river-valley(s)' : *xbadasa-* (c.) 'the one of the river-valley'

-(e)h*$_2$

We have argued elsewhere (Fellner and Grestenberger 2016) that this function of *-*(e)h*$_2$ is the exact equivalent of the masculine/common gender use of *-*ā* in verbal governing compounds of the type Lat. *indigena*, *agricola* and Gk. *bathudínēs*, *bouzúgēs*, etc., in inner IE.

(39) Derivation of compounds in *-*eh*$_2$- (Fellner and Grestenberger 2016)

a. *x-pod- 'x-footed'/*x-pod-o- 'x-footed' → *x-pod-eh$_2$ 'one who is x-footed'
   (i) Gk. -*pous* (/-*pedos*) → -*pódēs*

b. *x-i̯ug- 'x-yoked/yoking'/*x-i̯ug-o- 'x-yoked/yoking' → *x-i̯ug-eh$_2$(-) 'one who is x-yoked/yoking'
   (i) Gk. -*zuks* (Ved. -*yuj*-)/-*zugos* → -*zúgēs*

-(o)n*-

(40) Reflexes of individualizing *-*(o)n*- in inner IE: **(C)o*-adjective → (m./animate) *-*(o)n*-individualization (Olsen 2006, Pfaff 2020, Mascheroni 2024)

a. **k̂asó*- 'gray' (Ved. *śaśá*- 'hare') → **k̂asón*- 'grey one; hare' (> PGmc. **hasan*-/**hazan*- > OHG *haso*-, OE *hara*)
b. Lat. *catus* 'sly, sharp' → *Catō*, *-ōnis* 'sly one'
c. Gk. *strabós* 'squinting' → *Strábōn* 'squinter'
d. PGmc. *-nd*- (Go. *-nd*s) → PGmc. *-ndan*- (Go. *-nda*)

Individualizing morphology and relative chronology

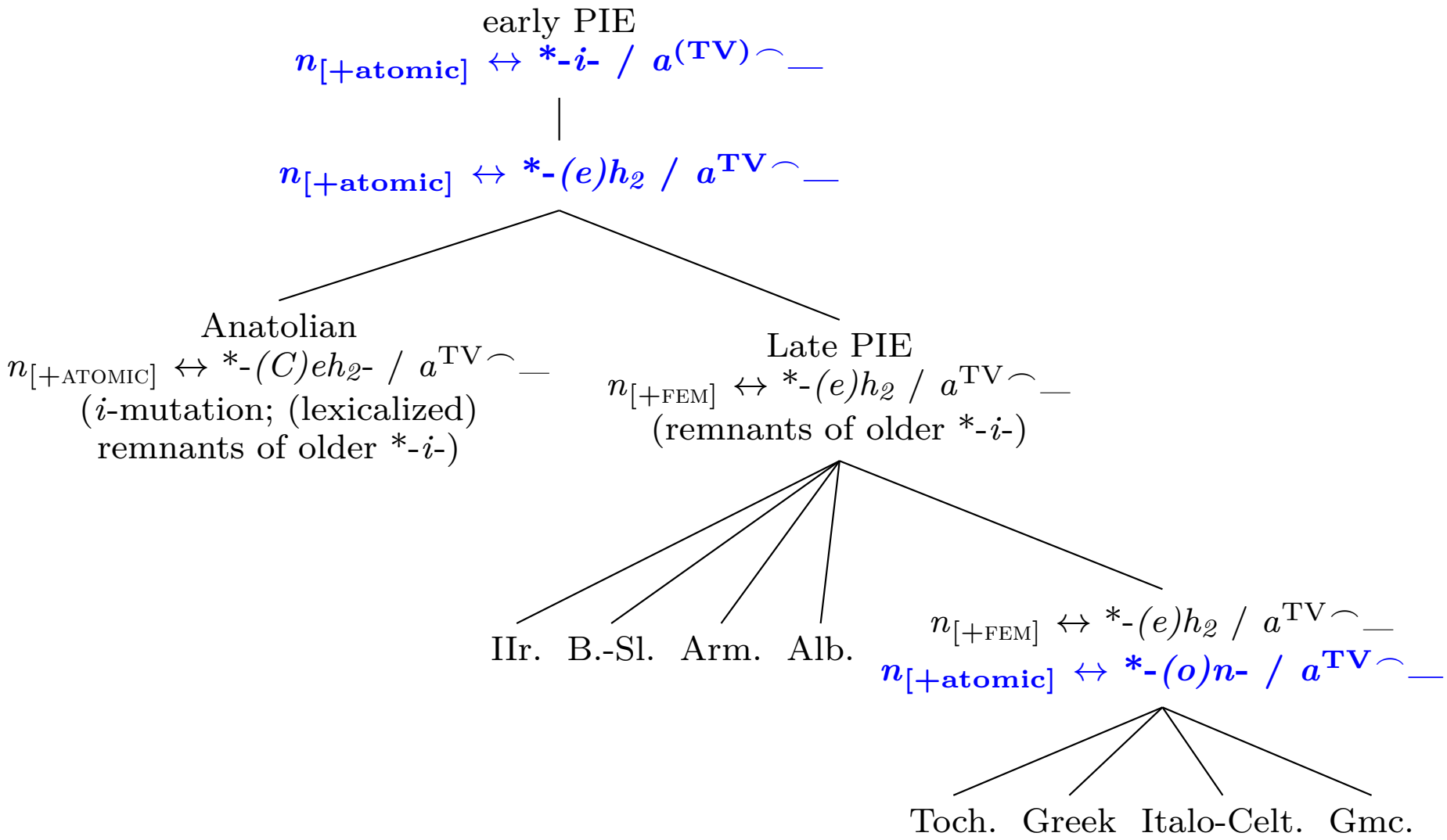
- *-*i*-, *-*(e)h₂*, and *-*(o)n*- all started out as deadjectival nominalizers to thematic adjectives
- We treat them as nominalizing suffix (n) which turned adjectives into individuals characterized by the property denoted by the adjective.
- We use the feature [+ATOMIC] to characterize this operation since it results in countable entities
- The context, a (adjective) must be specified as thematic (TV, theme vowel)

(41) $n_{[+\text{ATOMIC}]} \leftrightarrow \{$*-*i*-/*-*(e)h₂*/*-*(o)n*-$\}$ / $a^{\text{TV}}\frown\_\_$

- Furthermore, since these suffixes were not used in the same function at the same chronological stage, they must stand in a relative chronological relationship to each other, (42).

(42) *-*i*- > *-*(e)h₂* > *-*(o)n*-

Relative chronology of individualizers in IE



Conclusion

- We have proposed a formal typology of morphosyntactic cognacy couched in Distributed Morphology (DM)
- Using DM to formalize and generalize across abstract morphosyntactic entities ("morphemes") makes it easier to compare their form and function across different branches
- We can thus gain valuable insights into the relative sequencing of morphosyntactic change.
- This approach makes it possible to extend the "traditional" comparative method to morphosyntax and has the potential to contribute to establishing phylogenetic subgrouping by shedding light on non-trivial morphosyntactic innovations.

Ďakujeme vám za vaši pozornost'!

FWF V850-G "The diachrony of verbal categories and categorizers"
(`https://lauragrestenberger.com/categorizers-in-diachrony`)

FWF Y1044 "The characters that shaped the Silk Road: A database and digital paleography of Tarim Brahmi"
(`https://tarim-brahmi.univie.ac.at/`)

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