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Putting *lyake* and *leke* to Bed

Thematic Abstract and Possessive Nouns in Tocharian B and Their Diachronic Development in Proto-Indo-European

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Dedicated to Elaine "Nannie" Rhoda Kramer (*1922–2016*)

Abstract

This thesis analyses (Proto-)Indo-European nouns of the type R-o. After introducing the various forms (with full-grade or zero-grade in the root) and functions (abstract nouns, active/passive adnominals) of primary and secondary simple thematic nouns, the Tocharian B evidence is summarised and compared to the (Proto-)Indo-European forms and functions. As a first, Adams's newly revised dictionary (DTB[3]) was consulted for this thesis, and new Tocharian lexemes were sought out and collected in a database. This data was then codified and sorted and, in a first effort, etymologised under the light of possibly hidden R-o formations. New minimal pairs are shown, and in light of this, the discussion on the origin of R-o formations is reintroduced. R-o formations share some morphological and semantic similarities to root nouns. Through an updated view of the Nussbaum-Schindler model of root nouns (Nussbaum 2004), R-o formations may be explained as primary derivatives from roots, thematised forms beside former root nouns, and as possessive derivations depending on their formation (i.e., their ablaut grade in the root). Thus, the productivity of R-o and the disappearance of root nouns can be better explained.

Keywords: Tocharian B, Proto-Indo-European, nominal morphology, thematic nouns, root nouns, derivation, possessive derivation

Abstract

In dieser Arbeit werden urindogermanische und indogermanische Nomina vom Typ R-o analysiert. Nach einer Einführung zu den verschiedenen Typen (mit vollstufiger und nullstufiger Wurzel) und Funktionen (Abstrakta, aktive/passive Adnominalia) von primären und sekundären einfachen thematischen Substantiven werden die Belege aus Tocharisch B zusammengefasst und mit den (ur)indogermanischenFormen und Funktionen verglichen. Zuerst wurde für diese Arbeit das neu überarbeitete Wörterbuch von Adams (DTB[3]) konsultiert, dann wurden neue tocharische Lexeme ausfindig gemacht und in einer Datenbank gesammelt. Diese Daten wurden dann kodifiziert und sortiert und in einem ersten Versuch unter dem Gesichtspunkt möglicherweise verborgener R-o-Bildungen etymologisiert. Neue Minimalpaare werden vorgestellt und vor diesem Hintergrund wird die Diskussion über den Ursprung der R-o Formationen wieder aufgenommen. R-o Bildungen weisen einige morphologische und semantische Ähnlichkeiten mit Wurzelnomina auf. Mithilfe eines versuchten Umbaus des Nussbaum-Schindler-Modells für Wurzelnomina (Nussbaum 2004) schlage ich vor, R-o Bildungen teils als primäre Derivate zu Wurzeln, teils als thematisierte Formen neben ehemaligen Wurzelnomina udn teils als possessive Ableitungen zu klassifizieren je nach Bildung. Auf diese Weise lassen sich die Produktivität von R-o und der Verlust der Produktivität von Wurzelnomina besser erklären.

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Abbreviations

†	Rejected R-o formation
‡	Possible R-o formation with non-thematic synchronic inflexion
[	Example not in the cited literature
act.	active [adnominal]
adj.	Adjective
adv.	Adverb
alt.	*genus alternans*
Arm	Armenian
Av	Avestan
BHS	Buddhist (Hybrid) Sanskrit
c.	*genus commune*
CEToM	Number of attestations on CEToM
f.	feminine
G	Germanic
Got	Gothic
Gr	Greek
Hitt	Hittite
L	Latin
Latv	Latvian
Lith	Lithuanian
m.	masculine
mf.	masculine and feminine
MI	Middle Irish

n.	neuter
OCS	Old Church Slavonic
OHG	Old High German
OI	Old Irish
OIc	Old Icelandic
OL	Old Latin
OPr	Old Prussian
OT	Old Turkic
P	Pāli
pass.	passive [adnominal]
PG	Proto-Germanic
PIE	Proto-Indo-European
PToch	Proto-Tocharian
Ru	Russian
R-o	R(o)-o, R(e)-o, and R(∅)-o formations
R(e)-ó	**temós* formation
R(e/∅)	Root noun with e-grade in strong and zero-grade in the weak stem
R(o)-o	Collective abbreviation for R(ó)-o and R(o)-ó formations
R(ó)-o	τόμος formation
R(o)-ó	τομός formation
R(∅)-o	**tmós* formation
R(o/e)	Root noun with o-grade in strong and e-/zero-grade in the weak stem
TA	Tocharian A
TB	Tocharian B
Ved	Vedic Sanskrit

Chapter 1

Introduction

This thesis aims to give an overview and new insights into the formation, diachrony, and origin of Proto-Indo-European simple thematic[1] nominal derivatives from roots and its reflexes in Tocharian B.[2] The most commonly referenced formations are classified here as R(o)-o formations, otherwise known as τόμος and τομός nouns with an o-grade in the root and a simple thematic suffix. Next to these o-grade thematic nouns, e-grade, i.e., R(e)-ó, and zero-grade, i.e. R(∅)-ó formations, are also found in individual IE branches to various extents of productivity. These formations are morphologically tightly aligned. On the other hand, their semantics are broad, ranging from abstract nouns to active, respectively passive adnominals to concrete and resultative nouns. This poses the question of to what degree these formations are related and if they were derived from each other. Traditional explanations have been insufficient in explaining the semantic

[1] For an overview on thematic nouns, see Mottausch 2001; Fortson 2010: §§6.43–67; Beekes 2011: §13.2.9.

[2] I am gratefully indebted to Melanie Malzahn, Hannes A. Fellner, Laura Grestenberger, Sergio Neri, Markus A. Pöchtrager and Stefan Schumacher for their precious time, valuable insights, and the multitude of fruitful discussions virtually and on campus throughout the ongoing COVID-19 pandemic on all things *Indogermanistik*, morphonology, and especially Tocharian. Furthermore, I would like to extend my sincere thanks to my fellow students, Sofia Alexei, Paige Anderson, Benedikt Baumgartner, Klara Bramhas, Nora V. Dehmke, Iris Kamil, Adrian Musitz, Gabriel Z. Pantillon, Emanuela Pinna, Vicky Reiter, Karolina Schiller, and Semih Torun, for their academic and moral support throughout the process of writing this thesis. I would be remiss in not mentioning the hours of support and discussion provided by A. Burka, L. Carzaniga, A. Hartman, D. Hartmann, G. Koumnakis, A. Lehner, and H. K. Wieser. Last but not least, I could not have undertaken this journey without my parents', Judith A. Herren and Juerg S. Herren, and sister's, Rachel J. Herren, endless love and support.

distribution and their ablaut patterns. In this thesis, I base myself on the model of Schindler and Nussbaum about thematic forms and further propose connecting R-o formations with PIE root nouns in form and semantics to a revised Schindler-Nussbaum root noun theory rather.

Currently, there is no database or an extensive collection of R-o formations. This poses the problem that the *einzelsprachliches* material needs to be collected individually through various grammars and partly outdated lexica.

Literature concerning R-o formations is generally found in language-specific grammars, e.g., Macdonell 1912 for Vedic Sanskrit and Risch 1974 for Homeric Greek. Introductions to Indo-European studies often also supply a superficial description of R-o formations, cf. Beekes 2011 and Fortson 2010.[3] A starting point for recent investigations into R-o formations is Nussbaum 2007. In response to this unpublished handout, Malzahn (2013) investigated R(e)-o formations within Tocharian B and found a remarkable amount of evidence that R(e)-o was more productive in Tocharian B than expected. In an effort to give an entire overview of R-o formations, Nussbaum (2017) elaborated on new evidence; however, there is no cogent theorey yet on the origins of R-o formations are yet to be tackled as there is no *communis opinio*, and with new advances in Tocharian studies, the Tocharian B lexicon needs to be reevaluated and investigated for new R-o formations.

R(ó)-o formations seem to be primary stems that align with a synchronic or PIE root, and alignment with verbal stems is also at least semantically for all other types. Such formations are abundant in IE branches. This thesis will restrict itself to specific criteria of R-o formations due to the extensiveness of the topic. It will not treat compounds or derivatives such as R-eh$_2$ formations.

It is widely accepted that masculine R(ó)-o formations are productive and describe action nouns to their corresponding roots. R(o)-ó formations are also productive (cf., e.g., Greek and Vedic) and form active and passive adnominals to R(ó)-o formations. R(e)-o and R(∅)-o formations include adnominals and nouns. The difference in root ablaut has to be considered as a derivational property since it is generally assumed that thematic nouns had no mobile accent and root ablaut in their inflectional paradigms. Accordingly, we cannot deal with a redistribution of former ablaut patterns. Thus, I

[3] Weiss (2009: 271f.) provides an overview of R-o.

propose that we separately analyse R(e)-o formations outside of Tocharian B, then in Tocharian B where they are productive, and then look for derivational models that may underlie them. One possibility is to look into PIE root nouns that also exhibit ablaut and can also have non-abstract semantics, e.g., agentives and iteratives.

The current research situation is unsatisfactory as R-o formations are rarely discussed despite the multitude of forms in various branches and are rarely displayed in a structured manner, even in introductions. This poses fundamental problems, such as reduced access to understanding the nominal system and the interaction between the nominal and verbal systems. This thesis aims to initiate the discussion of R-o nouns and their diachrony whilst supplying various theories on morphological and semantic development.

In light of initial research on this topic, I base myself on three hypotheses regarding R-o formations in PIE and Tocharian B:

(1) All R-o formations are related.

(2) Tocharian B R-o formations are productive.

(3) Tocharian B R(o)-o formations include both the semantics of abstract nouns and adnominals as in PIE.

In a second step, I propose a solution for the creation of the derivational chain of R-o formation that lie in comparison with PIE root nouns.

This thesis takes up the recent significant advancements and academic achievements of the 21st century in the field of IE and Tocharian studies. The publication of LIV² TVS, DTB³, and CEToM have enabled the collection and analysis of old and potentially new evidence of R-o formations both in Tocharian B and in other IE branches.

In Section 2, the principle R-o formations, i.e. R(o)-o, R(∅)-ó, and R(e)-ó outside of Tocharian with a focus on Homeric Greek and Vedic Sanskrit, are examined regarding form and function. In Section 3, the R-o formations and the *communis opinio* on their status within Tocharian B by means of examples are examined and summarised. The collection and a new analysis of possible thematic (and (newly) athematic) R-o formations elicited from DTB³ is examined in Section 4 and I classify them by R-o type. In Section 5, I tackle the question on the origin of R-o formations within early and late PIE

by analysing PIE root nouns that have multiple similarities in both morphology and semantics, while in Section 6, I summarise the final results.

The methodology of elicitation of all potential R-o nouns consists of (a) marking all lemmata in *-e* and *-i*[4], (b) discard forms with evident suffixation (e.g., TB *-ṣṣe*), (c) disregarding all lemmata of plausible BHS, Iranian, or Turkic origin, and (d) listing these forms in a database with data on gender, meaning, morphology, possible reconstruction, and cognates (TVS, and DTB[3] for TB verbs; LIV[2], and LIV[2] Add. for PIE verbs). This novel process made it possible to include all non-verbal word classes, all genders, and most compounds with possible R-o elements.

[4]This would catch all possible *pluralia tantum* and R-o formations only attested in the plural.

Chapter 2

The PIE basis of R-o formations

In his handbook of Indo-European linguistics, Beekes (2011: §13.2.9) characterises thematic nouns to have three essential characteristics that discern them from athematic nouns.

1. Thematic stems end in *-*o*-.
2. Thematic stems do not exhibit ablaut.[1]
3. Thematic endings can deviate from the athematic endings.

Thematic nouns are overwhelmingly inherited into IE branches either as masculine or neutrum. Both genders are productive. There are also feminine thematic nouns but they are both rare and seem not the be productive in the daughter languages; inherited feminines with sexus femininus such as PIE **snusós* (f.) 'daughter-in-law' can (a) remain thematic, cf. e.g., Gr νυός (f.) 'daughter-in-law', or (b) receive – *einzelsprachlich* – a *Motionssuffix*, e.g., PIE *-*eh*$_2$, cf. e.g., Ved *snuṣā́* 'id.'. (P)IE neuter thematic nouns differ only in endings of the nominative and accusative plural from those of the masculine. The nominative-accusative singular ending is *-*om* which not only differs from the nominative masculine singular in *-*os*, but also from the pronominal nominative-accusative neuter singular ending *-*od*, cf. ved. *tad*, L *istud* and Gr τό < **tod*. The nominative-accusative plural is identical to the athematic ending – *-*h*$_2$, e.g. *yugā́*, L *iuga,* Gr ζυγά

[1]This is challenged by various scholars, e.g., Peters (2022: 336).

'yokes',[2] which can be traced back to an early PIE collective (Beekes 2011: §13.2.9).[3]

Furthermore, we may add to Beekes's definition of thematic nouns the following observations that are relevant to R-o formations:

4. Thematic nouns are not restricted in gender, i.e., in early PIE, they were either *commune* or neuter and in late PIE either masculine, feminine, or neuter.
5. The suffix shows qualitative ablaut in S(o/e), with S(e) most notably in the vocative singular masculine, cf. Steer 2014: §3.
6. The paradigm presents columnal accent (i.e., no mobile accent) either on the root or suffix.
7. Thematic nouns from roots that are not V̥rdhhi derivates exhibit either an e-grade, o-grade, or zero-grade in the root, i.e., R(e)-o, R(o)-o, and R(∅)-o.

2.1 The significance of thematic nouns for reconstructing the PIE nominal system

All IE branches including Anatolian have inherited the system of thematic nouns and are well-attested. However, four points are of interest when reconstructing PIE R-o formations: (a) productivity, (b) semantics, (c) word class, and (d) gender.

Hittite – a member of the Anatolian branch, the first branch to split off from PIE – had inherited the thematic inflexion[4] for both nouns and adjectives. Kloekhorst (EDHIL:, §2.1.1) reiterates that "thematicization is a productive process within Hittite". Additionally, some thematic nouns in Hittite display mobile accentuation, which Kloekhorst (EDHIL:, §2.1.1) traces back to "recent thematisations of original root nouns or consonant stems" without, however, giving an example. Thus, it can be considered that mobile accentuation for thematic nouns is an innovation within Hittite or Anatolian rather than an archaism from PIE, since few other IE branches exhibit this feature.

From examples of Hittite thematic nouns, the following can be inferred:

[2] However, Gr ζυγοί is also attested (LSJ[9]: s.v.).
[3] For an overview on the relationship between the neuter plural and collectives, see Nussbaum 2014.
[4] Kloekhorst (EDHIL:, 103) specifically notes that thematic nouns were "a recent innovation".

(a) Root nouns and athematic stems tend to get thematised rather than vice-versa.

(b) Thematic nouns are either substantives or adjectives.

(c) Thematic nouns are either *commune* or neuter.

As in Hittite, many IE branches show the tendency of thematisation. There are – to my best of knowledge – no examples of athematisation besides the mechanism of *Motionssuffixe* such as *-*ih*$_2$ and *-*eh*$_2$. It is thus important to take a close look at thematic nouns and analyse when, how and why they became so productive and how they eventually, in some branches, pushed root and athematic nouns nearly out of existence.

Thus, significantly, researching thematic nouns gives insight on how the PIE nominal system shifted from an early stage – where we could even dare to assume that only root nouns existed – to a late stage with an abundance of thematic, athematic suffixal stems, and root nouns with the later near extinction and thematic nouns in flourish.

This thesis, however, as mentioned in Section 1, restricts itself to thematic nouns that have a strong alignment to the verbal system and may thus provide an insight into derivational processes. There is a multitude of thematic nouns that are not traceable to either a verbal root nor a root noun, e.g., Gr λύκος (m.) 'Wolf' to an inexistant root †*u̯elk*^{w}-. These nouns, however, rarely have an adequate or sufficient explanation and etymology, and do not offer any meaningful support for a derivational theory.

On the following pages, thematic nouns with corresponding roots will be noted as R-o. This thesis will follow Schindler's method of recognising two different types regarding (a) form and (b) function, i.e., semantics (Nussbaum 2004: §1) and, additionally, follow up with examples from at least two IE branches, e.g. especially Greek where the accent and various ablaut grades are well-preserved and Vedic where the on the one hand the accent is retained but the ablaut grades are regularly disturbed by analogy to corresponding roots and stems or by inconsistencies due to Brugmann's Law and analogy, cf. Hajnal 1994.

2.2 R(ó)-o – form and semantics

The first type of R-o formations are R(ó)-o nouns that – accordingly – have a verbal root with accented o-grade.

Regarding its age, it is undisputed that R(ó)-o is a PIE phenomenon, given the attestation of forms in nearly all branches, cf. Table 2.1.[5] However, as Nussbaum (2017) stresses, there is not a single R(ó)-o form that was inherited into various IE branches and thus can be dated as a PIE R(ó)-o noun. This suggests that R(ó)-o already had enjoyed some degree of productivity in PIE.

Table 2.1: Evidence of R(ó)-o in IE branches (Nussbaum 2017)

	R(ó)-o	Verb	LIV^2
Ved	*kṣáya-* ‘dwelling’	^{2}KṢÁY[6]	**tḱei̯-* ‘[...], siedeln, wohnen’
Av	*mada-* ‘intoxication’	MAD[7]	**med-* ‘voll werden, satt werden’
Gr	γόνος ‘birth, child’	γον-	**ǵenh$_1$-* ‘erzeugen’
OCS	*krovъ* ‘covering, roof’	*kryti*	**kreu̯H-* ‘aufhäufen, bedecken’
Lith	*tãnas* ‘swelling, tumor’	–	**ten-* ‘sich spannen, sich dehnen’
L	[*sonus* ‘sound, utterance’	*sonere*	**su̯enh$_2$-* ‘tönen, klingen’
OI	*gor* ‘heat, inflammation’	–	**g^{wh}er-* ‘warm werden’
Hitt	*ḫarga* ‘destruction’	*ḫark-*	**h$_3$erg-* ‘umkommen’

As mentioned above, regarding the accent, both Vedic and Greek are the only languages that display the original accentuation of the root vowel faithfully. As for other languages, they innovated their accent system, resulting in PIE R(ó)-o becoming unidentifiable by accent, thus being kept apart only by ablaut and semantics.[8] This fact is of relevance when it comes to discerning the type in R(ó)-o from the type in R(o)-ó.

Regarding their *o*-vocalism, all IE branches show phonological results of PIE **o*. As mentioned above, in Vedic – and in all of Indo-Iranian – the reflexes of **o* are subjected

[5] Forms that are not listed in Nussbaum 2017 are marked by an open square bracket ([).

[6] Cf. EWAia: 1, 427.

[7] Cf. EWAia: 2, 299f.

[8] There are however mechanisms in Proto-Germanic and Balto-Slavic that do indicate the position of the accent before restructuring, cf., e.g., Verner’s Law respectively Hirt’s Law.

to the outcome of Brugmann's Law. However, even when taking Brugmann's Law into account, the vocalism of attested forms does not always match the predictions.

Regarding semantics, R(ó)-o forms are especially straightforward in that they represent action nouns, i.e., *nomina actionis*, of the root where its meaning is derived from, see, e.g., Av *mada-* 'intoxication', OIr *gor* 'heat', and Hitt *harga* 'destruction' (cf. Table 2.1).

However, action nouns could develop into concrete nouns, i.e., *nomina concreta*, with no overt derivation. From the examples in Table 2.1, Lith *tãnas* leads as an example: the meaning 'tumor' is clearly secondary to the meaning 'swelling' since a tumour is a specific (i.e., concrete) case of "swelling". This development is more probable than broadening the semantics from 'tumor' to 'swelling'. The development of abstracts into concrete nouns is not restricted to R(ó)-o but can be seen with every kind of abstract, including root noun abstracts, e.g., PIE *b^h*or-* lit. 'carrier, bringer' to PIE *b^h*er-* 'tragen, bringen' (LIV^2: s.v.) > 'thief' as in Gr. φώρ.

Less straightforward semantically is Gr γόνος 'birth, child'. The act of giving birth is the abstract noun, thus, a "child" would be a result (i.e. *nomina resultativa*) rather than a concrete type of "birth".

Additionally, the meaning 'roof ' of OCS *krovъ* 'covering, roof' can be either seen as a concrete type of covering or as the result of covering, e.g., a house.

This suggests that abstract nouns were the base of PIE R(ó)-o and individual IE branches would either derive concrete (or even result) nouns from them.

It must be stressed that – next to late PIE – both Tocharian and Anatolian have reflexes of abstracts in R(ó)-o, thus strengthening the hypothesis that R(ó)-o is of old, i.e., early PIE.

These abstracts in R(ó)-o are masculine both in the IE branches as well as – as we must assume – in PIE. This is a peculiar and non-trivial fact: For late PIE, we see a clear tendency that abstract root and athematic nouns carry the feminine gender or neuter gender. The masculine gender of R(ó)-o abstracts has to be original since the R(o)-ó type could carry the feminine gender, hence, there was no restriction to apply other genders to thematic stems. In order to account for the masculine gender of R(ó)-o abstracts in late PIE one may theoretically assume:

1. **All R(ó)-o abstracts were once feminine either in every branch or in late PIE, they were collectively transferred (due to their morphology) to the masculine gender.** This seems to be very unlikely given the vast amount of abstract R(ó)-o formations and not a single shred of evidence of feminine R(ó)-o abstracts in any IE branch.

2. **Abstracts were only feminine in athematic and root nouns in order to distinguish them from adnominals, while R(ó)-o could be distinguished from adnominals by means of accent, i.e. R(o)-ó (see below).** In my opinion, this seems the most likely scenario since it takes both morphology and semantics into consideration and requires the least amount of steps (i.e., Occam's Razor).

Unrelated to these R(ó)-o abstract nouns are the Proto-Germanic possessive-derivates in R(ó)-o. Examples include PG *wanha-* 'bent' from PIE **uenk-* 'sich krümmen, sich biegen' (LIV²: s.v.). According to Verner's Law,[9] **uonk-ó-* would have resulted in unattested †*wanga-*. Thus, we must assume that the structure R(ó)-o is the basis of *wanha-*. However, we must take both form and semantics into account. The semantics – as can be seen in the following section – resemble that of a passive-resultative adnominal in R(o)-ó, i.e., *someone/something bent*'.

These can be explained in the following ways:

1. PG abstract nouns in R(ó)-o were first turned into concrete nouns which then shared the same function of active or passive adnominals and the accent was then collectively transferred. This seems, however, less plausible in my opinion, since the semantically redone class would win morphologically.

2. **PG adnominals in R(ó)-o are the result of accent retraction within PG before Verner's Law lost its effect.** This seems to be the most plausible case because we find the same accent retraction in PG adnominals in R(e)-ó (thus, R(é)-o), e.g., *steifa-* 'stiff' and *weiha-* 'holy'.

Thus, we can securely assume that these PG adnominals with root accent are not of PIE age but rather an innovation within PG.

[9] For an overview on Verner's Law, see Schaffner 2001: 57–68.

2.3 R(o)-ó – form and semantics

The second type of R-o formations are R(o)-ó nouns that have – in contrast to R(ó)-o – a verbal root with unaccent o-grade.

Regarding its age, it is suggested that R(ó)-o is a PIE phenomenon, given the attestation of forms in nearly all branches, cf. Table 2.2.

As with R(ó)-o, we can assume that there is not a single R(o)-ó form that was inherited into various IE branches and thus can be dated as a PIE R(o)-ó noun.

Table 2.2: Examples of R(o)-ó in the *Indogermania* (Nussbaum 2017)

	R(o)-ó	Verb	LIV^2
Ved	*ghaná-* 'killer, cudgel'	HAN	*$g^{wh}en$- 'schlagen'
	sắha- 'superior'	SAH	*$seǵ^h$- 'überwältigen'
Av	*vaēda-* 'accomplisher'	VID	*$\underset{\wedge}{u}e\underset{\wedge}{i}d$- 'erblicken'
	hắra- 'watching over'	HAR	**ser-* 'aufpassen auf'
Gr	τροφός 'nurse'	τρέφω	*d^hreb^h-[10]
	τομός 'cutting, sharp'	τέμνω	*$temh_1$- 'schneiden'
OCS	*drugъ* 'companion'		*$d^hre\underset{\wedge}{u}g^h$-[11]
Lith	*vãdas* 'leader'	*vedù*	*$\underset{\wedge}{u}ed^h$- 'führen'
L	*procus* 'suitor'	*poscō*	*$preḱ$- 'fragen'
OI	*roth-* 'wheel'	*rethid*	**ret-* 'laufen'
Hitt	*maya-* 'young man'	*māi-*	*$me\underset{\wedge}{i}H$- 'heranreifen'
PG	**rada-* 'fast, easy'	–	**ret-* 'laufen'

Regarding the accent, as we have already seen for R(ó)-o formations, only Greek and Vedic provide an adequate depiction of the oxytone form. Accordingly, since most forms in other languages correspond to R(ó)-o formations, these forms can only be assigned to R(o)-ó formations by semantics, the exception being only Germanic, where Verner's Law helps identify accent position if the form is inherited.

[10] On the semantic development from PIE to Greek, see LIV^2: 154 footnote 2.

[11] This connection is however rejected by EDSIL: 1, 121.

Regarding the o-grade in the root, it is evident that most languages inherit this grade including Avestan and Vedic, where R(o)-ó forms appear to have different vowel quantities (*a* vs *ā*), see Hajnal 1994.[12]

2.4 R(o)-o in Homeric Greek and Vedic Sanskrit

In order to give an overview of their synchronic appearance and productivity, examples of R(o)-o (i.e., R(ó)-o and R(o)-ó combined) are given for Homeric Greek and Vedic Sanskrit in the following Sections §§2.4.1–2.4.2.

2.4.1 Homeric Greek

Homeric Greek conserves the PIE nominal accent to a great extent,[13] thus proving suitable for an overview of the two R(o)-o in juxtaposition. The following table contains a non-exhaustive list of paroxytonic and oxytonic Homeric Greek nouns of the structure R(o)-o,[14] their frequency of occurrence in the Ilias and the Odyssey, the corresponding PIE verbal root, and their gender, if not (only) masculine. Their meanings are adopted from LSJ[9]. Additionally, the textbook examples τόμος and τομός are added to the list despite them not being attested in Homeric Greek.

[12] *sắha-* corresponds to the verbal root *sah* 'prevail', where both *sáhati* and *sắhati* are attested as present formations. (Whitney 1885: s.v. *sah*).

[13] Exceptions do apply, e.g., "The σωτῆρα Law" and "The Law of Limitation", cf. Probert 2004.

[14] The examples are taken from Risch 1974: §5a–b; Nussbaum 2017: 238.

Table 2.3: Homeric Greek examples of R(o)-o (Risch 1974, Nussbaum 2017)

paroxytonic	oxytonic
γόνος (m.$^{f.}$) 'offspring, descent; begetting'[15] (41×) [**ǵenh$_1$-*]	τροφός (f.$^{m.}$) 'feeder; nurse' (17×) [**dʰrebʰ-*]
θρόος 'noise' (*Il* 4.437) [**dʰreu̯-*]	δοκός (f.$^{m.}$) 'bearing-beam' (4×) [**deḱ-*]
ῥόος 'stream' (33×) [**sreu̯-*]	ἀοιδός (m.$^{f.}$) 'singer' (38×) [**h$_2$u̯eid-*]
τόκος 'childbirth, child' (5×) [**teḱ-*]	θοός 'quick' (131×) [**dʰeu̯-*]
φόβος 'panic flight' (35×)[16] [**bʰegʷ-*]	τροπός 'twisted leathern thong' (Od. 4.782, 8.53) [**trep-*]
τόμος 'slice' (0×)[17] [**temh$_1$-*]	τομός 'cutting, sharp' (0×)[18] [**temh$_1$-*]
	ὁδός (f.) 'way, road; travelling, journeying' (99×) [**sed-*]

From the overview in Table 2.3, it is clearly visible that R(ó)-o formations are, as in PIE, abstracts (e.g., θρόος 'noise' and τόκος 'childbirth) and concrete nouns derived from abstract noun (μόρος 'fate, doom' < 'Anteil' < PIE **smer-* 'Anteil bekommen') and even result nouns (τόκος 'child'). R(o)-ó formations, on the other hand, are either active adnominals (e.g., θοός 'quick') [19] or subsequential substantivations of active or passive adnominals (τροφός 'feeder; nurse', τροπός 'twisted leathern thong').

A majority of the examples presented in Table 2.3 have (synchronic) verbal cognates in (Homeric) Greek, be they either primary or derived verbs. This is indicative of the difficulty in determining the age of a single R(o)-o formation as they could have either (a) been formed in PIE and inherited or (b) been formed in (P)Gr.

[15] The meaning 'begetting' is late, cf. LSJ^{9}: s.v. *begetting, procreation*, A.Supp.172 (lyr.); γόνῳ πατήρ, opp. ποιητός, Lys.13.91; γόνῳ γεγονώς D.44.49; γ. υἱός Men.Sam. 131, D.C.40.51, cf. IG 3.1445,al.

[16] Occurrences excluding the personification, e.g., as the son of Ares as in Il.13.299 (LSJ^{9}: s.v.).

[17] The earliest evidence for τόμος is in fragments from 5th century BC (Cratinus, Pherecrates; Teleclides, and Epicharmus/Pseudepicharmea) and is first canonically mentioned in Aristophanes Equites 1179, 1190 (5th/4th century BC), cf. Αλ. ἡ δ' Ὀβριμοπάτρα γ' ἐφθὸν ἐκ ζωμοῦ κρέας | καὶ χόλικος ἠνύστρου τε καὶ γαστρὸς **τόμον** respectively Πα. λαβέ νυν πλακοῦντος πίονος παρ' ἐμοῦ **τόμον**.

[18] The earliest evidence for τομός is not in Il. 1.235 (τομήν acc.sg.f. of τομή) but sees according to LSJ^{9}: s.v. to be Pl.Ti.61e. [...] τὴν δὲ λεπτότητα τῶν πλευρῶν καὶ γωνιῶν ὀξύτητα τῶν τε μορίων σμικρότητα καὶ τῆς φορᾶς τὸ τάχος, οἷς πᾶσι σφοδρὸν ὂν καὶ **τομὸν** ὀξέως τὸ προστυχὸν ἀεὶ.

[19] There happens to be no passive adnominals in this sample.

In Homeric Greek, there are three intriguing examples of feminine R(o)-ó formations.[20]

1. **τροφός 'feeder; nurse'**[21] is most likely a reminiscence of the *genus commune* of adnominal R(o)-o formations. In this example, the adnominal was transformed into a concrete noun that generally referred to female nurses. Later, post-classically, the noun was also used for male nurses.

2. **δοκός 'bearing-beam'**: The Greek noun for this essential naval structure seems to derive itself from a PIE verb **deḱ-* '(an-, auf-)nehmen, wahrnehmen' (LIV²: s.v.). A bearing-beam inherently is a wooden beam intended to withstand high amounts of pressure in order to keep up the structure of, e.g., a ship or a house. There are thus two possibilities in order to explain the feminine gender: (a) since the bearing-beam was – in Homeric times – out of wood, we may assume that the feminine gender stems from a tree that bore this name or from the fact that was wooden. As is well-known, plants and trees in PIE and in IE branches generally had the feminine gender; probably due to the fact that they were adnominals to a lost feminine PIE lexeme for 'plant, tree'. On Homeric naval vessels and their structure, see Köster 1969.

3. **ὁδός 'way, road; travelling, journeying'**: For ὁδός, the feminine genus cannot be explained by sexus nor by plant species. It is assumed that ὁδός comes from the PIE root **sed-* 'sich (wohin) setzen' (LIV²: s.v.)[22]. This aligns with other cognates in other IE branches that oppositely have the masculine gender, e.g., OCS *chodъ* 'Gang'. The feminine gender may be explained by comparison with other Gr words referring to words seemingly referring to a collective of (path)ways, cf. κέλευθος (f.) 'Pfad' and the non-collective substantivised R(∅)-o formation with accent retraction Gr πάτος (m.) 'Weg, Pfad'.[23] This is a better explanation than assuming that ὁδός was originally a (passive?) adnominal[24] – which was commune as OCS *chodъ* 'Gang' also shows. This passive adnominal would have lost in Greek, but

[20] In the case of γόνος and ἀοιδός, the feminine is rare/late (LSJ⁹: s.vv.). Thus, there are most likely not inherited feminines but innovations.

[21] Cf. also ἡ λοχός 'Kindbetterin'.

[22] For the semantic development from 'to sit' → 'to move', see LIV²: 514 footnote 1.

[23] I am indebted to Sergio Neri for his insight on the PIE root **pent-* and the root noun **pont/pent-* as the base for **penth₂-* and his notes on the feminine gender of ὁδός and κέλευθος.

[24] Perhaps meaning 'das Begangene'.

a derived abstract which due to its semantics inherently had feminine gender was retained in Greek, i.e. 'travelling, journeying'. This would have later made concrete by also adapting the meaning 'way, road' while retaining the feminine gender of the abstract.

2.4.2 Vedic Sanskrit

Vedic Sanskrit preserves the PIE nominal accent to a greater extent than Homeric Greek.[25] However, the Proto-Indo-Iranian vowel merger, i.e., PIE **e, *o(, *a*) > PIIr *a*, poses difficulties when analysing R-o formations. In all cases, R(*a*) can either be the result of R(o)-o formations or of (see *infra*) R(e)-ó formations. The assumption that Brugmann's Law (PIE **o* > PIIr **ā*) provides clarification is deceitful. On the basis of analogical levelling with verbal cognates, forms with an expected reflex of Brugmann's Law can appear with IIr R(a), while forms without an expected reflex of Brugmann's Law can appear with IIr R(ā).

The following table contains a non-exhaustive list of paroxytonic and oxytonic Vedic nouns of the structure R(o)-o,[26] their frequency of occurrence in the Rigveda and the corresponding PIE verbal root, and their gender, if not (only) masculine. Their meanings are adopted from Grassmann 1873.[27]

[25] i.e. there is, e.g., no "The Law of Limitation".

[26] The examples are taken from AiG.

[27] Mistakenly identified forms as R(o)-o include *róha-* 'die Erhebung, das Aufsteigen', *kā́ma-* 'Begierde' (73×,) and *bhā́ma-* 'Wut'.

Table 2.4: Vedic Sanskrit examples of R(o)-o (Macdonell 1912)

paroxytonic	oxytonic
jána- (m.) 'Mensch' (326×) [**ǵenh$_1$-*]	*ankā́-* (m.) 'Haken' (RV 1.162.13d) [**h$_2$enk-*]
svéda- (m.) 'Schweiss' (5×) [**su̯eid̯-*]	*spārhá-* (adj.) 'begehrenswert'
jámbha- (m.) 'Gebiß' (9×) [**ǵemb^h-*]	*khādá-* (adj.) 'verzehrend' [**Kh$_2$ed-*]
śā́sa- (m.) 'Gebot' (RV 1.68.9) [**ḱeHs-*]	*śāśá-* (m.) 'Gebieter' (4×) [*ḱeHs-*]
sā́dha- (m.) 'Ausführung' (RV 10.35.9b) [**seh$_1$d^h-*]	*bhrājá-* (adj.) 'schimmernd' (RV 10.170.3c) [**bhleG-*]
	vāśá- (adj.) 'brüllend' (RV 8.19.31a)

Regarding the paroxytonic examples from Table 2.4, the semantics point clearly to abstract nouns, e.g., *sā́dha-* 'Ausführung' to SĀDH ' zum Ziel gelangen, gelingen' (EWAia: 1, 722) from PIE **seHd^h-* 'zum Ziel kommen, gelingen' (LIV^2: s.v.). As in Greek, however, many abstract nouns have become concrete nouns, e.g., *jámbha-* 'Gebiß' derived from an abstract noun 'das Beissen' from JAMBH 'das Maul aufreißen, schnappen' from PIE **ǵemb^h-* 'schnappen, (zer)beißen'.

Regarding the oxytonic examples from Table 2.4, they mostly consist of adnominals both active and passive, e.g., *bhrājá-* 'schimmernd' to BHRĀJ 'glänzen, strahlen, funkeln' from PIE **b^{h}leG-* 'glänzen' (cf. OHG *blecchen* 'glänzen, funkeln') respectively *spārhá-* 'begehrenswert' to SPARH 'heftig begehren, Lust haben, verlangen' from PIE **sperǵ^h-* 'sich beeilen' (cf. σπέρχομαι 'eile; rege mich auf'). Two examples stand out, namely *ankā́-* (m.) 'Haken' and *bādhá-* (m.) 'Bedrängnis'. *ankā́-* (m.) 'Haken' may be explained as a concrete noun to a passive adnominal 'bent' that developed into 'hook'. A seemingly difficult noun to explain was *bādhá-* (m.) 'Bedrängnis', an abstract noun with oxytonic accentuation. On closer examination, **b^{h}eh$_1$d^h-* 'bedrängen' is the base of *bādhá-* thus making R(o)-o or R(e)-o or even R(∅)-o with analogical levelling to the present stem in *bā́dhate* '(be)drängt' possible. Additionally, from the two passages Grassmann (1873: s.v. *bādhá-*) cites, it is not evident if the noun is masculine or neuter, i.e., Abl.Sg *bādhā́t* and Loc.Sg *bādhé*. Thus, we may assume that *bādhá-* is a substantivisation of a possible

result adnominal of an R-o type that can not be identified.

Regarding gender, as in Greek, there are no known R(ó)-o formations that are feminine, which is indicative of demonstrating that though semantically being abstracts R(ó)-o never acquired feminine or neuter gender.

2.5 The relationship between R(ó)-o and R(o)-ó

As demonstrated above, the semantics between R(ó)-o and R(o)-ó formations are clearly distinguishable. R(ó)-o builds abstract nouns, while R(o)-ó builds active and passive adnominals. Due to their morphological similarity, it thus seems reasonable to assume that R(ó)-o and R(o)-ó are related: The question is if we can postulate a derivational chain. The following possibilities arise:

1. R(ó)-o and R(o)-ó are not related and are the product of coincidence.
2. R(ó)-o is the result of accent retraction of R(o)-ó.
3. R(o)-ó is the result of accent progression of R(ó)-o.
4. R(o)-ó is the result of suffixation of *-*ó*- of R(ó)-o.

The solution lies in looking at semantics rather than just form. Elsewhere in the PIE nominal system can we find a semantic relationship of abstract nouns and active/passive adnominals, i.e., *Possessivbildungen*, making possibility (4) the most probable which is indeed the theory by Schindler-Nussbaum.

2.5.1 The mechanics of possessive derivation

The most comprehensive theory about the relationship between abstract nouns and adnominals, e.g., τόμος and τομός nouns, has been put forth by Schindler (1985) in an unpublished handout.[28]

Schindler (1985) notes that by means of athematic suffixation (and resulting deletion of the thematic suffix for thematic nouns), e.g., in Ved with *-in-*, adnominals can be derived

[28] I am deeply indebted and thankful to Martin Peters and Melanie Malzahn for providing me with a copy of the original handout.

from abstract nouns. These adnominals can bear either active or passive semantics and generally denote *possession* of the abstract noun, thus, *Possessivbildungen*, cf. Table 2.5.

Table 2.5: Athematic possessive derivation in Vedic Sanskrit (Schindler 1985: §4)

abstract noun	**possessive**	**meaning**	**classification**
ukthá- 'praise' (131×) →	*ukthín-* (8×)[29]	'praising' 'praised'	act. adnominal pass. adnominal

Schindler (1985: §4) then demonstrates that by means of compounding, the same semantic variety comes to life, cf. Table 2.6.

Table 2.6: Compounded possessive derivation in Vedic Sanskrit (Schindler 1985: §4)

abstract noun	**possessive**	**meaning**	**classification**
nīthá- 'leading' (3×) →	*sunīthá-* (10×)[30]	'leading well' 'well lead'	act. adnominal pass. adnominal

Schindler (1985: §7) mentions that compounding is then not a necessary element, but rather the progressive accent shift suffices, e.g., in Gr ὗβος 'hump (of a camel)' → ὑβός, ή, όν 'humpbacked' and in Ved *kárṇa-* 'Ohr' → *karṇá-* 'geöhrt, langohrig'.

Schindler (1985: §8) then poses the questions of what are the mechanisms in examples such as Gr ὗβος 'hump (of a camel)' → ὑβός, ή, όν 'humpbacked', i.e., is the relation purely suprasegmental (accent shift) or morphological (suffixation with *-*ó-*).

Schindler (1985: §9) goes on to give examples of relationships merely by accent shift, e.g., Ved *bráhman* 'fromme Begeisterung; Gebet' → *brahmán* 'Beter, Brahman' and Ved *ápas-* 'Arbeit, Werk, Handlung' → *apás-* 'tätig'.

However, Schindler (1985: §11) notes that next to these purely suprasegmental derivations, there are many examples of accent shift and thematisation. Schindler (1985: §11) correctly does not postulate that these are two separate mechanisms, but the result

[29] 2× RV 3, 6× RV 8, 1× RV 10.

[30] 3× RV 1, 1× RV 2, 1× RV 3, 2× RV 5, 1× RV 6, 1× RV 8, 1× RV 10.

of one derivational step, i.e., suffixation with the possessive suffix *-*ó*- without vrddhi. Examples include Ved *íṣ* 'Saft, Trank' → *iṣá* 'mit Opfertrank versehen' and Gr ἔρυμα (< *ἔρυμᾰ) 'fence, guard; safeguard, defence' → ἐρυμνός, ή, όν 'fenced, fortified, strong (by art or nature)'

Additionally, Schindler (1985: §19) postulates in Greek and Vedic Sanskrit substantivisation by accent retraction, e.g., Gr δολιχός, ή, όν 'long' → δόλιχος 'the long course' and Ved *kr̥ṣṇá*- 'schwarz' → *kŕ̥ṣṇa* 'schwarze Antilope'.

Thus, we can postulate the following:

1. *Possessivbildungen* can be derived from abstracts by *-*ó*- (Schindler 1985: §1–14).
2. Adnominals can be derived from locatives by means of *-*ó*- (Schindler 1985: §16–18).
   (a) Gr νύκτερος 'nächtlich' to the PIE Loc.Sg **nok*^{w}*t-er* to the PIE root noun **nok*^{w}*t/nek*^{w}*t*- 'night'.
   (b) Perhaps Lith *žiemà* 'winter' to the PIE Loc.Sg **ǵ*^{h}*eim* to the PIE root noun **ǵ*^{h}*eim/ǵ*^{h}*im*- 'winter'.
3. Substantivisations and individualisations can be formed by accent retraction and thematic suffix with or without neo-e-grade (Schindler 1985: §19–22).[31]
   (a) Gr λευκός 'hell, klar, weiß' → λεῦκος eine Fischart
   (b) PIE **porḱ-ó*- to **perḱ*- 'graben, aufreißen' → **pórḱ-o*- 'junges Schwein'

2.6 R(∅)-ó – form and semantics

The third type of R-o formations are R(∅)-ó nouns that have the verbal root in the zero-grade and an accented thematic suffix.

Regarding its age, it is suggested that R(∅)-ó is a PIE phenomenon, given the attestation of forms in nearly all branches (even though limited to a few roots), cf. Table 2.7.

[31] See also Höfler 2017.

In contrast to R(o)-o formations, there is at leat one R(∅)-ó formation that can be traced back to PIE, namely the PIE neuter **i̯ug-o-m* 'yoke' which seems to be thematisation of a root noun still retained in Hittite as *iūk-*.

Table 2.7: Examples of R(∅)-ó in IE branches (Nussbaum 2017: §9)

	R(∅)-ó	LIV^2
Ved	*yugám* (n.) 'yoke'	**i̯eu̯g-* 'anschirren'
	rucá- 'shining'	**leu̯k-* 'hell werden'
	turá- 'sore, sick'	**terh$_3$-*'verwunden'
	turá- 'pressing forward, eager'	**terh$_2$-* 'durchkommen, überqueren'
	-ghná 'killing'	**g^{wh}en-* 'schlagen'
Av	*aka-* 'hook'	**h$_2$enk-* 'biegen'
Gr	ζυγόν (n.) 'yoke'	**i̯eu̯g-* 'anschirren'
	-γνός 'born'	**ǵenh$_1$-* 'erzeugen'
OCS	*igo* 'yoke'	**i̯eu̯g-* 'anschirren'
L	*iugum* (n.) 'yoke'	**i̯eu̯g-* 'anschirren'
	-brum *'bring'	**b^{h}er-* 'tragen, bringen'
	-gnus *'born'	**ǵenh$_1$-* 'erzeugen'
Hitt	*yugān* (n.) 'yoke'	**i̯eu̯g-* 'anschirren'
G	Got *juk* 'yoke'	**i̯eu̯g-* 'anschirren'
	OIc *lok* 'light, flame'	**leu̯k-* 'hell werden'

Regarding the semantics, commune R(∅)-ó formations form active or passive adnominals to their corresponding verbal root, cf. Ved *rucá-* 'shining' to **leu̯k-* 'hell werden' respectively -γνός 'born' to **ǵenh$_1$-* 'erzeugen'. In a further step, these adnominals could be substantivised and usually received masculine gender, rarely neuter. Given that process, **i̯ugóm* may also be based on an adnominal that was substantivised and turned to a neuter at the same time. Later in individual IE branches, substantives could also be derived by accent retraction, as e.g., in Gr τάφος 'funeral-rites'.

2.7 R(∅)-ó in Homeric Greek and Vedic Sanskrit

2.7.1 Homeric Greek

In the following table, I have listed from Nussbaum 2017: §9 and Risch 1974 a selection of possible R(∅)-ó formations and have sorted them according to their accentuation.

Table 2.8: Homeric Greek examples of R(∅)-ó

paroxytonic	oxytonic[32]
γάμος (m.) 'wedding; marriage' [**gem-*]	ζυγόν (n.) 'yoke' [**i̯eu̯g-*]
τάφος (m.) 'funeral-rites' [**dʰembʰ-*]	ἀρχός (m.) 'leader'[33] [**regʰ-*]
πάγος (m.) 'crag, rock'[34] [**peh₂ǵ-*]	ταρσός (m.) 'flat [of a body part]; crate'[35] [**ters-*]
βίος (m.) 'life' [?**gʷei̯-*]	καρπός (m.) 'fruit' [**(s)kerp-*]
	νεογνός (m.) (ox)[36] [**ǵenh₁-*]

Regarding the oxytonic R(∅)-ó formations, they are either active or passive adnominals.

As can be seen from Table 2.8, adnominals are oxytonic while paroxytonic forms are clearly substantives. This indicates that retraction of the accent was –at least in Greek– a mechanism for overt substantivization. However, within the oxytonic forms, substantives could be derived by (a) concretisation with no overt marking (the transition can be seen in ταρσός where it is both adnominal and substantive with various meanings) or (b) adding neuter morphology and neuter gender to the R-o form, e.g., ζυγόν (n.) next to ζυγός (m.) 'cross-strap (of a sandal)'.

Exceptions to this table are nouns that go back to R(a), e.g. ταγός as a derivative of**tag-* 'ordnen, anordnen, aufstellen'.

2.7.2 Vedic Sanskrit

The examples in Table 2.9 for Vedic R(∅)-ó formations are taken from Macdonell 1912: §115.I.3 and Macdonell 1916: 255. They are characterised by either mono- or bisyllabicity and their oxytonicity. They appear either as substantives or adnominals. They also only appear with a liquid in their root structure, hence it can be suggested that there is a (synchronic) restriction on roots that can form R(∅)-ó formations.

Firstly, we may assume that R(∅)-ó was productive in (late) PIE and was masculine.[37] R(∅)-ó essentially formed adnominals to the verbal root (most commonly active ad-

[33]An example of a Gr word with no corresponding PIE verbal root is ἀργός 'shining, glistening', a thematised Caland form, cf. Gr ἀργι-όδων 'mit blendend weißen Zähnen' IEW:, s.vv.

[34]**(h₂)regʰ-* 'sich aufrichten'

[35]*Pace* Pokorny (IEW:, §2006), there is no evidence in the Rigveda für Ved *tarṣa-* m. 'Durst'.

[36]The earliest evidence is in the Homeric Hymns (141 et 406).

[37]I have not been able to make out any examples of feminine R(∅)-ó formations.

Table 2.9: Vedic Sanskrit examples of R(∅)-ó

R(∅)-ó	PIE	Semantics
pr̥yá- (m.) 'lieb'	**preu̯H-* 'vertraut, lieb sein /werden'	Adnominal
sruvá- (m.) 'Löffel'	**sreu̯-* 'fließen, strömen'	Adnominal
turá- (m.) 'rasch'	**terh$_2$-* 'durchkommen, überqueren'	Adnominal
śucá- (m.) 'hell'	**ḱeu̯k-* 'aufflammen, erglühen'	Adnominal
kr̥śá- (m.) 'abgemagert'	**Kerḱ-* 'abmagern'	Adnominal
yugá- (n.) 'Joch'	**i̯eu̯g-* 'anschirren'	Concrete

nominals, cf. all Vedic examples in Table 2.9 except *kr̥śá* which seems to be passive (RV 6.28.6 and RV 10.39.03)).

Thus, we may now summarise our finding regarding form and function as in Table 2.10.

Table 2.10: Overview of R(∅)-ó

Form	Semantics	Examples
R(∅)-ó	active adnominals	ἀρχός
	passive adnominals	καρπός
R(∅)-óm	substantivisation	ζυγόν
R(ˊ∅)-o	(late) substantivisation	τάφος

2.8 The relationship between R(o)-ó and R(∅)-ó

As demonstrated *supra*, the semantics of R(o)-ó and R(∅)-ó overlap in that they both form active and passive adnominals. Thus, it safe to say that they are either related, be it closely or distantly. However, the pressing question remains when did possessives choose R(o)-ó or R(∅)-ó as the structure for adnominals.[38].

1. **Their similaritary is coincidental**: This assumption is too general in order to be accepted.

2. **The distribution is based on morphosyntax**: It is possible that in a very early PIE, uncompounded adnominals (i.e., *simplicia*) from roots were R(o)-ó. On

[38]There is no evidence for the claims that (a) the distribution is based on the root structure, (b) the distribution is based on the root semantics, and (c) the distribution is based on corresponding root nouns

the other hand, compounded adnominals from roots were R(∅)-ó. Thus, at one point, there was a clear distinction. Already in early PIE, however, *simplica* in R(∅)-ó (perhaps only of the root structure CeRC) were formed, thus providing synonymous formations.

2.9 R(e)-ó – form and semantics

Nussbaum (2017: §8.2.1) points out that next to an R(ó)-o nomen actionis an R(e)-ó adnominal is a regular feature in Proto-Germanic, e.g. **lóu̯bʰ-o* 'love, favour' next to **leu̯bʰ-ó* 'dear'. This shows that PIE had one mechanism of creating thematic abstracts, however thematic possessive derivates could appear with varying "Ablautstufen" in the root, i.e. R(o/e/∅).

Other examples that Nussbaum (2017: §8.2.1) states include Arm *cer* 'old' next to Ved *jára-* 'old age' and Lat *indi-gena* 'native' next to Ved *jána-* 'offspring, lineage race' and Gr γόνος 'id.'.

These R(e)-ó formations are spread among the IE languages. I argue that their sparsity is not a sign of innovation and deterioration within the single language branches. I rather assume R(e)-ó formations to be of PIE age that received a certain degree of productivity in Proto-Germanic. Remnants of R(e)-ó in other branches are therefore an archaism. Possible explanations for their deterioration might be the replacement of other adjectival formations and R(o)-ó formations.

There has been some debate on the accent of R(e)-ó formations. In Proto-Germanic, we have oxytonic adnominals next to paroxytonic adnominals. This seemingly 'freely chosen' position seems however to be solely restricted to Proto-Germanic. In Hittite, we have paroxytonic R(e)-formations, e.g. *pēdan* < **pédom*, next to Ved *padám* < **pedóm*. Both Hitt *pēdan* and Ved *padám* are substantivations of a neuter of an adnominal. This leads to the mechanism of *accent retraction* that can also be seen in R(∅)-ó formations, cf. *infra*.

I thus argue that we must reconstruct R(e)-ó for masculine (and feminine?) adnominals while R(é)-o in Proto-Germanic is an innovation and R(é)-om is a feature of substantivation innovated/retained in certain branches.

2.10 R(e)-ó in Homeric Greek and Proto-Germanic

2.10.1 Homeric Greek

(Homeric) Greek is not considered a language with many examples of R(e)-ó formations. There are but a handful examples, yet they are vital to consider.

The following table collects the examples from Nussbaum 2017: §8 and Risch 1974: §5e. Note that ἀγός can either be R(e)-ó or R(∅)-ó.

Table 2.11: Homeric Greek examples of R(e)-ó (Risch 1974)

paroxytonic	oxytonic
ἔργον (n.) 'work' (234×) [**u̯erǵ-*]	λευκός (m.) 'light, bright' clear' (61×) [**leu̯k-*]
?πέρκος (m.) 'hawk' [**perḱ-*]	ἀγός (m.) 'leader, chief' (22×) [$h_2eǵ$-]
	τηλό- 'at a distance, far off' [$*kwelh_1$-]

Synchronically, it seems that active adnominals are oxytonic and masculine. The neuter substantivised adnominal – that has an adnominal in compounds, e.g. κηπεργός 'Gärtner' and ἄργός 'untätig, unwirksam' – however shows accent retraction.

2.10.2 Proto-Germanic

In Germanic, numerous reflexes of R(e)-o formations exist. As we have seen *supra*, in Proto-Germanic there was accent retraction in R(é)-o formations just like in R(o)-o formations. act. **gera-* 'eager, zealous' to PIE **ǵʰer-* 'Gefallen finden, begehren'.

Table 2.12: Proto-Germanic R(e)-o formations (Nussbaum 2017)

	PG	LIV^2
act.	**berga-* 'mountain'	**bʰerǵʰ-* 'hoch werden, sich erheben'
?	**blenda-* 'blind'	**bʰlendʰ-* 'trübe werden'
pass.	**lerta-* 'bent'	–[39]
act.	**leuba-* 'dear'	**leu̯bʰ-* 'lieb sein, gefallen; betören, verwirren'
act.	**leuta-* 'false, deceitful'	**leu̯d-* 'sich ducken, sich beugen'
?	**welka-* 'soft'	**u̯elg-* 'sich rollend (?) bewegen'

In Table 2.13, PG R(e)-ó formations with reflexes of Verner's Law are listed.

Table 2.13: Proto-Germanic R(e)-ó formations (Nussbaum 2017)

	PG	LIV²
?	**déuza-* 'wild animal'	–[40]
act.	**skérza-* 'skittish'	**Kers-* 'laufen'
?pass.	**þérba-* 'tasting of nothing'	**terp-* 'erstarren'
act.	**þéuba-* 'thief'	**teu̯p-* 'sich niederkauern, sich klein machen'

PG *welga-* 'wet' cannot be identified due to the two PIE variants contained in **u̯elK-* 'feucht sein/werden'.

2.11 R-o minimal pairs in the *Indogermania*

As has been demonstrated, late PIE had four R-o formations in various flavours varying in root ablaut, accent position where oxytony infers adnominals and paroxytony substantives and semantics (i.e., abstract, possessive, resultative, and concrete nouns).

However, now the question must be asked as to which extent a root could build how many formations or if roots were limited to certain R-o formations.

An initial idea in the early process of this thesis was that there must be some underlying phonological constraint that determined if R(o)-ó or R(e)-ó was preferred. However, this hypothesis could not be strengthened.

It is nevertheless important to list the numerous equivalents in a table in order to get an overview of the inherited (and newly developed) R-o formations according to the verbal root (following LIV2).

Vedic meanings are taken from Grassmann 1873. Greek meanings are taken from LSJ[9]. Examples in brackets are not found in Nussbaum 2017 and have been added.

The number of minimal pairs in the *Indogermania* is indicative of the productivity of R-o formations in (late) PIE.

[40] Unless to a desiderative stem **dʰeu̯-s-* to **dʰeu̯-* 'laufen, eilen', cf. Gr θεύσομαι 'werde laufen' (LIV²: s.v.). Kroonen (EDPG:, 111) however sees **deuza-* to PG **dusēn-* 'to slumber', cf. L *furō* 'to be mad, rave'.

Table 2.14: Excerpt of R-o pairs in the *Indogermania* Nussbaum 2017

LIV²	R(ó)-o	R(o)-ó	R(e)-ó	R(∅)-ó
**bʰleG-*[41]	–	[OCS *blagъ*[42]	TB *pilke*	–
**ǵenh₁-*	Ved *jána-*, *jā́na-* [Av. *zana-*[43]	–	OL *-genus*[44]	–
**ǵerh₂-*	Ved *jára-*, [*jā́ra-*	–	Arm. *cer*	–
**gʷerh₃-* **h₂enk-*	Ved *gára-* Gr ὄγκος L *uncus*	[Gr βορός[45] L *uncus*	Lith *gẽras* L *ancus*	– L *ancus*
**kʷelh₁-*[46]	Gr πόλος TB *kele* [Ved *cā́ra-*	[L *colus*[47] [L *anculus*[48]	OPr *kelan* OIc *hvel*	–[49]
**leu̯k-*	Arm *loys* Ved *róka-*		Gr λευκός Ved *roká-*[50]	
**mer-*[51]	Ru *marъ*[52]	–	L *merus*	–
?**ser-*[53]		Gr ὀρός [Ved *sará-*	L *serum* [Ved *sará-*	
**(s)kerb-*	–	Latv *skaŕbs* [MIr *cerb*[54]	OIr *cerb*	[Gr κράμβος[55]
?**su̯enk*[56]		PG **swanga-*	OIr *seng*	
**u̯er-*	–	PG **wara-* [Gr ἔφορος[57]	L *vereor*	–
**u̯erǵ-*	Arm *gorc* TB *werke*		Gr ἔργον OHG *werc*	

2.12 Grammatical gender and R-o

In the previous sections, the gender of certain forms in Homeric Greek has been discussed. Consequently, an overview of feminine R-o formations is necessary in order to explain this phenomenon thoroughly.

van Emde Boas et al. (2019: §4.22) note several second-declension nouns that are either feminine-masculine or feminine. Two groups can be attributed to *ellipses*, i.e., a corresponding feminine noun has been dropped, yet the adnominal has retained the feminine gender. Firstly, geographical entities are known to be often feminine perhaps by ellipsis of a feminine substantive denoting 'earth', cf. e.g., ἡ Αἴγυπτος (γῆ) 'Egypt', ἡ Κόρινθος (πόλις) 'Corinth', and ἡ Ῥόδος (νῆσος) 'Rhodes' (van Emde Boas et al. (2019: §4.22)). The second group can be classified as trees and plants: This phenomenon is also well-known in Latin. Here, it is also assumed that a feminine word stood next to the adnominal. However, the respective (late) PIE feminine noun for 'tree' or 'plant' has been lost, leaving the feminine gender in the second declension nouns, e.g., ἡ ἄμπελος 'vine' and ἡ πλάτανος 'plane-tree' (van Emde Boas et al. (2019: §4.22)). Of the words listed as feminine second-declension nouns, only νῆσος 'island', νόσος 'disease', and ὁδός 'road'[58] seem to be of R-o origin.

[41] Cf. root noun: φλόξ.

[42] IEW §222 and EDSIL:, 51f.

[43] Cf. IEW §566.

[44] Cf. L *caprigenus*

[45] Cf. IEW §718.

[46] Cf. IEW §1089.

[47] If we assume that *colus*, *colī* (f.) is older than *colus*, *colūs* (mf.). L *colus* can also be a reflex of R(e)-o, cf. PIE **pekʷ-o* 'cook' > L *coquus* 'cook' (Weiss 2009: 272).

[48] Weiss (2009: 271) connects *anculus* 'servant' to **h₂n̥bʰi-kʷolHos* 'who bustles about'.

[49] Perhaps, Gr τηλό- belongs here.

[50] It is also plausible that Ved *roká-* is an R(o)-ó formation.

[51] Not in LIV²,

[52] With the meaning 'Sonnenglut; Schlaf'.

[53] Cf. IEW:, §1695.

[54] Cf. IEW §1738D.

[55] Cf. LIV²: 557.

[56] Cf. IEW:, §1937.

[57] Cf. IEW §2169.

[58] ὁδ- can be compared to the Greek verb with full-grade yod-suffix ἕζομαι 'sitzen, sich setzen'. Outside of Greek OCS *chodъ* m. 'βάδισμα, δρόμος' can be suggested to be a cognate (Frisk 1960–1972: s.vv.).

Additionally, there are nouns that have both feminine and masculine gender and can only be discerned by means of the article (or a non-compounded adjective or an adnominal), e.g., ὁ/ἡ θεός 'god/goddess'[59], ὁ/ἡ ἄνθρωπος 'man/woman', ὁ/ἡ τροφός 'nurse' (van Emde Boas et al. 2019: §4.22). These nouns are in a sense indicative in that they show that the thematic declension was not just restricted to the masculine gender and a marked neuter gender (in PIE *-*o*-*n*), but that the second-declension was inherently *commune* initially.

Thus, we may conclude that R-o formations were *commune* in early PIE. After the creation and establishment of the feminine gender in late PIE, the **adnominals** could be used (in archaic) fashion for both masculine and feminine. However, language-specifically former feminine adnominals in a feminine context adopted overt feminine morphology with the suffix *-*Vh*$_2$.

A possible explanation for feminine inanimate R-o formations is the differentiation between abstracts and non-abstracts. The Greek examples νῆσος 'island', νόσος 'disease', and ὁδός 'road' can be well explained as abstracts rather than active adnominals. This is no rare phenomenon in PIE. The feminine gender often described abstracts either by means of suffixes or even in root nouns.

Thus while analysing the following Tocharian evidence for R-o formations, we might expect to find a handful of feminine (or alternans) R-o formations that describe abstracts or, if not, at least adnominals referring to *sexus femininus*.

2.13 Number and R-o

Outside of Tocharian, we expect adnominals to both appear in the singular and the plural and – where retained – the dual. However, for abstract nouns, it is not trivial to find plural formations at all, until of course they are concretised. In this sample however, there were neither occurrences of inherited nor innovated *pluralia tantum*.

[59] Perhaps related to θοός· λαμπρός (H.) (Frisk 1960–1972: s.v.). See also recently Dedé 2018.

Chapter 3

R-o in Tocharian B

In this chapter, I will summarise the existing literature on R-o formations in Tocharian B, before in Chapter §4, newly sought out evidence will be discussed.

3.1 Tocharian B thematic nouns

Tocharian has a productive array of thematic formations that are primarily masculine.[1] Known exceptions are TB *yente* 'wind' (f.) and TA *want* 'id' (m. or f.),[2] and TA *lotañ* (m. or f.) (TEB:, 128; Neri 2017).

Thematic nouns are primarily recognisable by their endings in Tocharian B that have been mostly retained and are recognisable, in contrast to Tocharian A. The formation and inflection has been entirely inherited from PIE and is widely comparable to those endings of other PIE languages.

1. NOM.SG.M & NOM-ACC.SG.N: **TB *-e*** < PIE **-os*, cf. Gr -ος, OL *-os*, Ved *-as*, Hitt *-aš*.
2. NOM.PL.M: **TB *-i*** < PIE **-oi̯*, cf. Gr -οι, L *-ī*.
3. ACC.SG.M: **TB *-eṃ*** < PIE **-om*, cf. Gr -ον, OL *-om*, Ved *-am*, Hitt *-an*.

[1] On feminines of thematic adjectives in Tocharian B, see Fellner 2014. On gender in Tocharian B, see Hartmann 2013.

[2] TB *yente* is not an R-o formation, but rather a thematic adjective(?) **h₂weh₁n̥to-* (cf. Skt *vā́ta-*) to a participle (cf. Skt *vā́nt-*) to PIE **h₂weh₁-* 'wehen' (LIV²: s.v. **h₂weh₁*; DTB³: s.v.).

4. NOM-ACC.PL.ALT: *-a* < PIE *$*-h_2$, cf. Gr -α, L *-a*.

The Nom.Pl. *-i* does not cause palatalisation of the final consonant of the stem with the exemption of certain clusters in TB, i.e. *-tk, -tt-,* and *-l-* (TEB:, §179–181).

3.2 R(o)-o in Tocharian B

R(o)-o formations are common in Tocharian B. Since Tocharian B has revised its accent, it is, however, impossible to distinguish R(o)-o formations by accent only by semantics.[3] Nevertheless, R(o)-o formations are common in Tocharian B. However, the root vowel in *o is not seen throughout the formations since the Tocharian vowel system underwent various changes from PIE. This seems to have led to synchronic formations of the R(o)-o type to having different reflexes than expected.

The evidence of R(o)-o is vast and can be consulted in Malzahn 2013: 165–169. Malzahn (2013) groups the evidence into the following five groups based on (a) phonology and (b) semantics.

1. Abstract nouns of the pre-PT *R(ó)-o- type that have no cognate verbs with another pre-PT root vowel attested beside them[4]
   (a) TB *waike* 'lie, deception' < *$(s)\underset{\sim}{u}oi\underset{\sim}{g}^w$-o* 'deception' from *$(s)\underset{\sim}{u}ei\underset{\sim}{g}^w$- 'deceive'.
2. Nouns with a concrete meaning of the shape pre-PT *R(o)-o- that have no cognate verbs with another pre-PT root vowel attested beside them
   (a) TB *kleṅke* 'wagon, vehicle' and TA *klaṅk* < *klong-o* from *kleng- 'turn'.[5]
3. Abstract nouns of the pre-PT *R(ó)-o- type that have cognate verbs with another pre-PT root vowel attested beside them
   (a) TB *newe* 'roaring, cry' to TB *nu$^{(\bar{a})}$-* 'cry' from *$neu\underset{\sim}{H}$- 'schreien, brüllen'.
4. Nouns with a concrete meaning of the shape pre-PT *R(o)-o- that have cognate verbs with another pre-PT root vowel attested beside them

[3] For more on the Tocharian accent, see Jasanoff 2015.

[4] *Pace* Malzahn (2013: 166), I would not classify TB *taupe* 'mine' and TA *top* 'id.' as abstract nouns but rather as concrete nouns.

[5] This PIE root is not attested in LIV[2].

(a) TB *plewe* 'boat/raft' to Toch *plu-* 'fly, float' to **pleu̯-* 'schwimmen, schweben'.

5. Backformations to Preterite I stems

(a) TB *spertte* 'behaviour' and TA *spartu* 'lock (of hair)' to TB *spārtt*$^{(ā)}$- 'turn, behave' and TA *spārtw*$^{(ā)}$-.

From these examples, it is evident that only R(ó)-o abstract nouns, and concrete nouns derived from them, have survived into Tocharian, while the adnominals have seemingly disappeared and become unproductive.

3.3 R(e)-ó in Tocharian B

As seen *supra*, R(e)-ó is rarely accounted for in the Indogermania, except in Proto-Germanic. However, Tocharian B joins Proto-Germanic in this characteristic that R(e)-ó is moderately productive. This leads to the following question, discussed in §5 on whether R(e)-ó is an independent innovation in Proto-Germantic and Tocharian or rather an inherited formation that retained its mild productivity in two branches.

Malzahn (2013: 169–172) counts seven R(e)-ó forms in Tocharian B as displayed in Table 3.1.

Table 3.1: (Possible) examples of R(e)-ó in Tocharian B (Malzahn 2013: 169–172)

R(e)-ó	TB verb	PIE root	Semantics
**ñatke* 'pushing, holding off'	*ñätk-*		Adnominal
**pale* '± herald'	*päl-*	**bʰleH-*	Adnominal
pitke 'spittle'[6]			?
pilke 'copper'	*pälk-*	**bʰleG-*	Adnominal
yape 'spider'		**Hu̯ebʰ-*	Adnominal
lyake '± obstacle'[7]	*lyäk-*	**legʰ-*	?
**śuke* 'shining, sparkling'		**ḱeu̯k-*	Adnominal

From the evidence Malzahn (2013) has collected and analysed, it can be shown that R(e)-ó was mildly productive in Tocharian B. The semantics also fall in line with the expectation of seeing adnominals, both active and passive, as well as concrete nouns

[7] See recently Pan 2019 and Pan 2021: §2.4.

derived from adnominals. However, there is no way of finding evidence of substantivisation by accent retraction due to the restructuring of the Tocharian accent system. Only substantivisations by *Genuswechsel*, i.e., masculine to *genus alternans* can be indentified if a plural has been identified in the Tocharian B corpus.

3.4 R(∅)-ó in Tocharian B

Surprisingly, there is no explicit literature on R(∅)-ó in Tocharian B although there are a number of R(∅)-ó formations in Tocharian B. On the one hand, there are R(∅)-ó formations inherited from PIE, e.g., TB *wase* (m.sg) 'poison', cf. Ved *viṣá-* 'id.', Gr ἰός 'id.', L *vīrus* 'id.'. On the other hand, there are examples that are innovations of Tocharian, e.g., *warme* (m.sg) 'ant' to **u̯remb-* 'sich drehen'. As expected, Tocharian B R(∅)-ó formations are either adnominals or substantivisations thereof.

3.5 Established Tocharian B R-o pairs (Malzahn 2013: 172)

Malzahn (2013: 172) concludes that there are pairs in Tocharian B of R-o formations with varying ablaut and different semantics. Malzahn (2013) identifies that R(o)-o builds abstracts and, therefore, can be identified as the successor of R(ó)-o, while adnominals are R(e)-ó. The absence of R(o)-ó adnominals is identified as a consequence of the restructuring of the Tocharian accent system, where abstracts in R(ó)-o and adnominals in R(o)-ó coincided, but abstracts dominated.

Table 3.2: R-o pairs (Malzahn 2013)

DTB[3]	R(o)-o	R(e)-ó
nätk-	TB °*netke* (cf. TA *natäk*) 'urge'	TB **ñatke* 'pushing'
päl-	[TB *pele* (cf. TA *pal*) 'law, norm')]	TB *pale* 'praiser'
wäp-	TB *wepe* 'enclosure'	TB *yape* 'weaver'
lyäk-	TB *leke* 'bed' (cf. TA *lak* 'bottom')	TB *lyake* 'obstacle'

These pairs in R(o)-o and R(e)-o all have a corresponding verbal root in Tocharian B, indicated on the left. Most of them also have a corresponding PIE root, thus indicating their age.

From the sample in the previous table, we find indication that R(o)-o builds abstract nouns that then became concrete nouns, cf. e.g., 'enclosing' to 'enclosure'. R(e)-o on the other hand builds agentives, perhaps also passive adnominals if *lyake* is correctly identified.[8]

3.6 Synchronic Tocharian B R-o formations

Beside inherited R-o formations, Tocharian B exhibits lexemes that can only be explained as synchronic Tocharian B R-o formations, i.e. they are derived from verbal stems or roots that are only attested in Tocharian (B). The methodology of identifying these forms is fairly straight forward:

1. Is the formation traceable to a PIE verbal root (LIV^2; LIV^2 Add.)?
2. Is the formation tracebale to an R-o form in IE languages (IEW)?

Especially interesting are formations that do not go back to PIE roots but rather Tocharian synchronic roots based on PIE verbal stems. Since there are no known examples reconstructable for PIE, it is to be assumed that this method of derivation is *einzelsprachlich*. Examples include:

1. *nāske* 'weaving' to TB *^{2}nāsk-* 'spin/sew' Abstract
2. *ārtte* '±care, attention' to TB *ārtt-* G '± praise, love, be pleased with, esteem, be agreeable to, assent to, be right/appropriate [of time], choose [...]' Abstract

The differentiation between inherited and synchronic formations is indicative of the productivity of R-o in Tocharian B, however its use in dating R-o forms throughout Tocharian B is limited.

[8] *lyake* (m.sg) 'obstacle' seems to be a substantivisation of an adnominal. However, it is not possible to determine if the adnominal was active or passive since an obstacle can be either a thing 'lying in the way' or something 'laid/put in the way'. Adams (DTB^3: s.v.) however does not accept the previous interpretation of this lemma. For a further interpretation of *lyake*, see Pan 2021: §1.2.8.

Chapter 4

New (and old) Tocharian B evidence

4.1 (Newly) identified R-o formations

In the following list, previously doubted and new identified R-o formations have been sorted by their morphological appearance, i.e. R(o)-o, R(e)-o, and R(∅)-o, and are classified by their semantics, i.e., abstract nouns, concrete nouns, adnominals.[1] These formations have been elicited and their etymologies consulted from DTB³. Several of these (newly) identified forms have been described as R-o only in DTB³ and not yet considered in other literature.

- R(o)-o

    1. ***ewe* (~ *iwe*) (alt.) 'inner skin, hide; leather'** to *$h_2eu̯H$- '(Fussbekleidung) anziehen'; possibly from a passive adnominal 'angezogen' and then substantivised (by means of *genus alternans*) to the material of the footwear and its origin.[2] Substantivisation

    2. **‡*telki* (alt.) 'sacrifice (act of worship, offering, oblation)'**, cf. TA *talke*, to *$telk$- 'schlagen' if we assume an original substantivised *plurale tantum* that

[1] I have decided not to distinguish further between active and passive adnominals since it is often not discernible, and the benefit is limited.

[2] The semantics of 'inner skin' has been generalised as can be seen in PK AS 9A a6, where *ewe* is used in the context of plants: /// (*pi*)*ppalimulä · träkaṭukä · pilamaddhyi · pātha · ewe pe* – /// But note that the synchronic TB word for 'shoe' is a loan from Chinese.

was then reanalysed as a Nom.Sg to the *i*-stems and then substantivised by *genus alternans*.[3] Abstract

3. ***-pere* (–) '± stalk'**[4] from **por-o*, cf. Gr πόρος 'ford, ferry, strait', to either **per-* 'hindurchkommen, durchqueren' or **per-* 'schlagen'; found only in the compound *akwam-pere* 'sprout and stalk'. The former matches up if we assume that some kinds of stalks can be used as tubes and transport fluids, for example. To the latter, the semantics would match up as an active adnominal 'the hitter', i.e., the stalk of a plant used as a weapon. Adnominal

4. ***melte* (m.sg) (a) 'pile; (b) (pile of) dung'** to **meld-* 'weich werden' or **meld^{h}-* 'ablassen von, im Stich lassen'. Otherwise perhaps connected to L *multus* 'viel' from **mḷto-* as van Windekens (1976: 278). (DTB^{3}: s.v.; IEW:, §1260). ?

5. ***terwe* (–) a kind of snake (?)** to **tu̯oru̯o-* next to the substantivised Gr σαῦρος in R(∅)-o with accent retraction (Blažek 2021: 117).[5] However, if this connection is correct, we must assume a regressive dissimilation where **tu̯oru̯-* was dissimilated to **toru̯-*. Adnominal

6. ***nete* (m.sg) 'power'**, cf. TA *nati*, to PIE **Hned^{h}-* 'binden'. However, the semantics do not align well. I propose a passive adnominal 'bound' that was then substantivised and had abstract meaning. Other nouns to PIE **Hned^{h}-* include L *nōdus* 'knot' and PG **natja-* 'net'. Adams (DTB^{3}: s.v.) classifies *nete* as an R(o)-o formations to PIE **net-* 'help, support'. Abstract

· R(e)-ó

1. **^{1}*āre* (–) 'end, limit' (?)** to TB *ār-* G 'cease, come to an end' and **h$_{2}$erH-* 'sich auflösen, verschwinden'. TB *āre* might be a substantivisation of a passive adnominal 'ended'. Substantivisation/Abstract

[3] Regarding the semantic development from 'hit' to 'sacrifice', cf. OCS *kolję klati* 'stechen, schlachten; opfern' to **kelh$_{2}$-* 'schlagen' (IEW:, §880; LIV^{2}: s.v.).

[4] For its etymology and meaning, cf. Pinault 1988: 147f.

[5] *terwe*, *pere*, and *ewe*, if their etymology is correctly identified, are the only R(o)-o formations from this sample that indicate remnants of R(o)-ó adnominals in Tocharian B.

2. **²*āre* (m.sg) '± (settled) dust, loose earth'** to *h_2erh_3- 'aufbrechen, pflügen'. On Tocharian A *āre* 'Joch; Pflug', cf. Pan 2021: §1.6.8f. Adnominal

3. ***īke* (alt.) 'place, location; position'** to *$u̯eiḱ$-*o* from *$u̯eiḱ$- 'eingehen in, eintreten', cf. e.g., ϝοῖκος 'Haus', alb. *vis* 'Ort, Platz', and L *vīcus* 'Häusergruppe, Dorf, Flecken, Stadtteil'. Substantivisation to an R(e)-o adnominal with *Genuswechsel*. Substantivisation

4. ***eñcare* (adj.) 'disagreeable, unwelcome, unpleasant, unfriendly'** to either *ter- 'sprechen', *$terd$- 'durchbohren, spalten', *$terh_1$- 'bohren, reiben', *$terh_2$- 'durchkommen, überqueren', or *$terh_3$- 'verwunden'. Adnominal

5. ***‡erepate* (m.sg.) 'form'** to either *$b^hed^hh_2$- 'stechen, graben', *$b^heh_1d^h$- 'bedrängen', *ped- 'treten; fallen, sinken', *$peth_1$- 'fallen', *$peth_2$- 'ausbreiten', or *$peth_2$- '(auf)fliegen'. Substantivisation/Abstract

6. ***carke* (–) 'garland'** to TB ²*tärk*- 'twist around; work (e.g. wood) and PIE *$terk^w$- 'sich drehen'. Adnominal

7. ***calle* (–) '±burden, load' or 'impediment' (?)** to *$telh_2$- 'aufheben, auf sich nehmen' Substantivisation/Abstract

8. ***cake* (alt.) 'river'** to *tek^w- 'laufen, fließen'. Adams (DTB³: s.v.) connects *cake* to a synonymous non-labiovelar PIE root *tek- 'run, flow'. Substantivisation

9. ***ñare* (m.sg) 'thread; fringe'** to *$nerH$- 'eintauchen', though this etymology seems unlikely. Adnominal

10. ***kosi* (m.sg) 'cough'** to *$kweh_2s$- 'husten', initially a *plurale tantum* then transferred to the *i*-stems and reanalysed as a Nom.Sg. Substantivisation/Abstract

11. ***parki* (–) 'recompense' (?)** could be to be a *plurale tantum* in R(e)-ó to PIE *$perk$- 'an-, auffüllen'. Substantivisation/Abstract

12. ***-parki* 'rising (as of the sun)'** to *$b^herǵ^h$- 'hoch werden, sich erheben' Adnominal

13. ***pīle*** **(m.sg) 'wound'** and TA *päl* to **pel-* 'aufflammen' Adnominal

14. ***lyake*** **(–) '±obstacle'** to **leg*^{h}- 'sich (hin)legen'. Adnominal

15. ***lyūke*** **(m.sg) 'light, splendor'** to **leu̯k-* 'hell werden'.
Substantivisation/Abstract

16. ***lymine*** **(du.) 'lips'** to either **lembH-* 'schlaff herabhängen', **lemb*^{h}- 'ergreifen, fassen', or **lemH-* 'brechen'. Adnominal

17. ***‡yarke*** **(alt.) 'honor, reverence, veneration'** to *yärk-* 'to honour, venerate' ultimately to **h*$_1$*erk*^{w}- 'strahlen, singen'. Substantivisation

18. ***ścale*** **(adj.)** to which I propose an alternate meaning namely 'provided' (*pace* DTB^3: s.v.) to **stel-* 'hinstellen, bereit machen'. The corresponding evidence is ///spare ścale malkwer yokale /// which Adams (DTB^3) translates as '*ścale* milk is to be drunk'. Adnominal

19. ***ṣale*** **(m.sg) 'mountain, hill'** to either **su̯el-* '(ver)schlucken'[6] or **su̯elH-* 'anschwellen'. Concrete/Adnominal

20. ***ṣmare*** **(a) (adj.) 'smooth, even, slippery; greasy'; (b) 'oil'** to **smer-* (?), cf. OI *smiur* 'marrow' and PIE **smeru-* (IEW:, §1796). Adnominal

21. ***soye*** **(m.sg) 'doll'** to **seh*$_2$(*i̯*)- 'satt werden' or alternatively a synchronic R-o formation. However, there is no extra-Tocharian examples of concrete nouns to this root. From the documents where *soye* is known, the semantics clearly point to 'doll'. Adnominal

· R(∅)-ó

1. ***kare*** **(–) 'worth, rank, dignity'** and TA *kär* from **g*^{w}*r̥H-o* to either **g*^{w}*erH-* 'Zustimmung bekunden' or **g*^{w}*erh*$_3$- 'verschlingen'. Adams (DTB^3: s.v.) names it a derivate of **g*^{w}*er*(*H*)- 'heavy', cf. e.g., Gr βαρύς 'schwer' and L *gravis* 'id.'. Abstract

2. ***karse*** **(m.sg) '± deer, stag'** from **Kr̥s-o* to either **Kers-* 'laufen', **gres-* 'fressen,

[6]The only other natural phenomenon described by this root is OIc *svelgr* 'Stromwirbel, Fresser' (IEW:, §1927).

verschlingen', or **ǵʰers-* 'sich sträuben, erstarren'. *Pace* Adams (DTB³: s.v.), I also accept Hilmarsson's attempt to connect it to **kr̥s-ó* 'black', cf. Ved *kr̥ṣṇa* 'schwarze Antilope'. Adams (DTB³: s.v.) attempts on connecting *karse* to **ḱerh₂s-* 'horn'. Adnominal

3. ***tal(l)e* (–) 'load, burden'** to **telh₂-* 'aufheben, auf sich nehmen'. Abstract/Possessive

4. ***tarme* (m.sg) 'master of horses' (?)**, cf. DTB³: s.v. to **trem-* 'zittern (vor Angst)', cf. TA *träm-* 'in Zorn geraten' (LIV²: 648). Musitz (2022: 510) translates *tarme* as 'law (?)' and, if this translation is correct, we must reject the connection to PIE **trem-* 'zittern (vor Angst)' as the semantics do not align.[7] Adnominal

5. ***pāke* (alt.) 'part, portion, share, piece; appropriate portion, consequence (i.e. reward or retribution)'** to **bʰag-* 'als Anteil bekommen'. Substantivisation

6. ***miye* (–) 'an oil-producing fruit?'** to **meu̯H-* 'heranreifen, gedeihen'. Adnominal

7. ***ruwe* (–) 'openness, openly (?)'** to **reu̯H-* 'aufreißen' or **reu̯h₁-* 'öffnen'. Abstract

8. ***warke* (m.) 'garland'** to either **u̯reg-* 'einer Spur folgen', **u̯regw-* 'werfen', **u̯erǵʰ-* '(zu)binden', **u̯eRgʰ-* 'reißen', **u̯erǵʰ-* 'scheren', **u̯erǵʰ-* 'wirken, machen', **u̯erǵʰ-* 'einschließen, absperren', **h₂u̯erg-* 'sich umdrehen, sich wenden', or **h₃reu̯k-* '(aus)graben, (aus)rupfen' Possessive

9. ***warme* (m.sg) 'ant'** to **u̯remb-* 'sich drehen' as in the 'swarmer'. Adnominal

10. ***walke* (adv./indecl. adj.) 'for a long time; 'long [of time]'** to **u̯elg-* 'sich (rollend) bewegen' or **h₂u̯elk-* 'schleppen, ziehen'. Adnominal

[7] In personal correspondence with Sergio Neri, he enlightened me in elucidating that 'vor Angst schrecken' can also semantically develop into 'springen', cf. Got *þramstei* < PIE ?**trom-s-tih₂n-* 'Heuschrecken' and the New High German word 'Heuschrecken' where the same semantic development occurred. Thus, one may assume that the meaning had something to do maybe with a 'desultor'; however, this meaning does not fit with the context of SI 1877 (Musitz 2022: 509–511).

11. ***wase* (m.sg) 'poison'**, cf. TA *wäs*, Ved *viṣá-*, Gr ἰός, L *vīrus*, MI fí to PIE **u̯eu̯i̯s-* 'fließen'.[8] Substantivisation

12. ***sprāne* (du.) 'heels'** seems to be a dual to PIE **sp^{h}erH-* '(mit dem Fuß) stoßen'. Adnominal

Besides, there are TB words that could in theory likewise be identified as R-o formations. However, their morphology and their meaning make a connection less possible.

1. **(†)*aśāwe* ~ *śāwe* (adj.) '± gross, rough, coarse'** to either *śāy-* (~ *śāw-*) 'live' or *śu-* (*śuwā-* ~ *śāwā-*) 'eat (at); consume, devour' though the semantics do not align well.

2. **‡^{1}*āke* (m.sg) 'end'**[9] to **h$_2$eḱ-* 'scharf sein/werden/machen', cf. Gr ἀχή (f.) 'Spitze', Swedish *ag* (m.) 'Sumpfgras, Cladium mariscus, Schneide', and MHG *ag* 'Barsch' (IEW:, §48).

3. ***āntse* (m.) (a) 'shoulder, (b) 'element', (c) 'bough [of a tree]'** seemingly to PIE **h$_2$end^{h}-* 'blühen, sprießen' if we assume that 'bough' was the initial meaning; however, the development of PIE **d^{h}* > TB *s* is difficult to explain.[10] Adnominal

4. ***āwe* (–) 'grandfather'** with no (fitting) corresponding verbal root but certainly inherited from PIE **h$_2$eu̯h$_2$(-o-)* 'grandfather', cf. Milanova 2020: 125f.

5. ***epiṅkte* (adv./–) 'within; between, among; for; meanwhile, in the meantime; '± interval'** with no (fitting) corresponding verbal root.

6. ***īme* (m.) 'consciousness, awareness; thought; memory, recollection'** to either PIE **i̯em-* 'ausstrecken, hinstrecken', TB *yām-* 'do, commit, make, effect, handle, act; treat as', or TB *yäm-* G 'achieve, obtain; reach' (MP can be passive); K4 'make obtain'. However, TB *ī* is the result of three processes of which none happen here, i.e., (a) PIE **ei̯*, (b) PIE **iH*, (c) PIE **C$_{[lab]}$e*.

7. ***erkatte* (adj.) 'scornful, hostile, unable to get along, angry, unfriendly'** with no (fitting) corresponding verbal root.

[8] On the phonology, especially, the retention of TB *w* before high vowel, see Ringe 1996: 66.
[9] However Adams (DTB^{3}: s.v.) notes a plural in *akenta*, thus allowing *genus alternans* as well.
[10] See **hoefler2018** for the PIE etymology of the word for 'shoulder'.

8. ***aise* (m.sg) 'cooking pot'** to *$h_1e\underset{\wedge}{i}sh_2$- 'kräftigen; antreiben', *$h_1a\underset{\wedge}{i}$- 'geben; nehmen', *$h_1a\underset{\wedge}{i}$- 'warm sein', *$h_1e\underset{\wedge}{i}$- 'gehen', *$h_2e\underset{\wedge}{i}d$- 'schwellen', *$h_2e\underset{\wedge}{i}dh$- 'entzünden', *$h_2e\underset{\wedge}{i}s$- 'suchen', *$h_2e\underset{\wedge}{i}sd$- 'verehren', or *$h_3e\underset{\wedge}{i}t$- 'mitnehmen'. Of all these roots, some align morphologically and some semantically; however, none of these roots fulfil both requirements.

9. **‡[1]*kanti* (–) '± bread'** with no (fitting) corresponding verbal root.

10. ***kāye* (–) 'mosquito'** to *$\acute{k}eh_3(\underset{\wedge}{i})$- 'schärfen' though the semantics do not align, unless we assume a semantic development from 'sharpen' over 'cut' to 'bite'.

11. ***k_uśāne* (–) a coin and measure of weight** of unknown etymology and no corresponding verbal root.

12. **‡*matsi* (m.sg) 'headhair' (collective)** to **med*- 'messen, für Einhaltung sorgen, sich kümmern', **med*- 'voll werden, satt werden', **met*- 'mähen' or **met*- 'abmessen', cf. Lat *mats*. However, the assumption of a transfer from a *plurale tantum* to an *i*-stem is not attractive.

13. ***ñake* ~ *ñke* ~ *ṅke* (adv.) 'now'** is rather a particle and a **-tó*- formation to **ni ǵʰuto*- 'herabgerufen'; cf. Got *gþs* < **ǵʰu-tó*- to PIE **ǵʰe$\underset{\wedge}{u}$*-; cf. Ved *ni havaya*-; cf. Av *nizbaiia*- (LIPP: 2, 562).

14. ***tweye* (–) '±ashes'** as R(e)-o to *$d^hu\underset{\wedge}{e}h_2$- 'Rauch machen', yet intervocalic *-y-* remains unexplained (perhaps a *Hiattilger*). If we can assume *tweye* is R-o, I suggest analysing it as an active adnominal, i.e. 'the smoke producer' > 'ashes'. Adams (DTB[3]: s.v.) suggests it to be a R(o)-o formation to PIE *$d^he\underset{\wedge}{u}$(H)- 'rise in the air (like dust)'.

15. ***yaṣe* (–) 'needle'** to *$\underset{\wedge}{u}es$- '(Kleidung) anhaben, bekleidet sein mit', however the *ṣ* needs to be explained and the semantic does not fit well. Adnominal

16. **‡*rīye* (f.) 'city, town'** as R(e)-o to *$\underset{\wedge}{u}Re\underset{\wedge}{i}H$- 'zusammendrücken'. However, in TA and TB, *rīye* is an *n*-stem and the semantics do not align.

17. ***laṃtse* (adj.) 'smooth'** as R(∅)-o perhaps to **lend^h*- 'sich senken, nach unten geraten' although the semantics do not align well.

Other words cannot be determined yet due to their insecure meaning.[11]

On the other hand, there are various TB R-o formations that can only be regarded as synchronic innovations either due to (a) incompatibility with PIE root semantics or (b) phonology and morphology.

- ***nāske* (–) 'weaving'** to TB *²nāsk-* 'spin/sew' to PIE **sneh₁-* 'spinnen' with no inherited incohative-iterative stem in **-sḱ-* Abstract
- ***ārtte* (–) '±care, attention'** to TB *ārtt-* G '± praise, love, be pleased with, esteem, be agreeable to, assent to, be right/appropriate [of time], choose [...]' Abstract
- ***pāske* (–) 'guard'** to *pāsk-* 'guard, protect; practice [moral behaviour], obey [rules]', ultimately to the stem **ph₂sḱ-* to PIE **peh₂i̯-* 'schützen, hüten, weiden (tr.)' Adnominal
- **‡*meṅki* (–) 'lack, deficit, shortage; fault, error'** to *mäṅk-* G 'be deprived of, suffer the loss of; be inferior; lack [impersonal]' though it is synchronically an *i*-stem. Abstract
- ***yase* (–) 'shame'** to either *yās-* G 'be excited'; K 'excite' or *yäs-* G 'excite sexually; ravish' ultimately from PIE **i̯es-* 'sieden, schäumen' or perhaps a restructured version of *yäsk-* '± sully (?)' with a TA cognate, cf. TA *yayäskuräṣ*. Abstract
- **‡*nāki* (m.sg) 'fault, error; blame, blemish; false, groundless accusation'** to *nāk-* 'reprove, condemn, blame, scold, reproach, revile' if we assume a reanalysis of a *plurale tantum* to a singular of the *i*-stems. Abstract
- ***kentse* (m.sg) '± rust'** to TB *kānts-* '± sharpen, file' Abstract/Adnominal
- ***wākte* (–) a (measure of a) foodstuff (?)** to *wätk-* G 'separate, distinguish, decide', ultimately from PIE **u̯eh₂G-* 'brechen, zu Bruch gehen'. Abstract/Adnominal
- ***wipe* (adj.) 'close, even; loose' (?)** to *wip-* 'move in a (vaguely) circular motion' Adnominal

[11] These include *²āke* '?', *ewepe* (or *eweṣe*?) '?', *ore* '?', *kāñ* or *kāñe* '?' (a container or measure of some sort?), *kecye* '?', *kewe*(-) '?', *korṣe* '?' , *kwentse* '?', *kwerse* '?', *nāte*'?', (†)*pāre* '?', *palte* '?' (a medical ingredient), *peste* '?', *meksi* '?', *mepe* '?', *mlake*(-) '?', *recce* '?', *ˣyärne* '?', *[1]Ynaike** (n.) proper noun or title? , *nuñce* a kind of foodstuff, *śaṅke* '?' (Perhaps to PIE **ḱenk-* 'in der Schwebe sein, hängen (intr.)'.), *śike*(-) '?'.

This list proves that R-o formations were productive in Tocharian (B).

4.2 R-o formations and their inflexion class

The nominal system in Tocharian B has been widely rebuilt. It is, therefore, imperative to consider all nouns with base forms in *-e* and *-i* and evaluate if their semantics allow them to be retraced to R-o formations possibly but during a proto-Tocharian stage were redistributed to a different inflectional class, e.g., the *i*-stems. Such forms with non-thematic inflexion in Tocharian B are marked by, e.g., ‡*īke*.

4.3 R-o and the feminine

On gender and Tocharian, see Luraghi 2009, Kim 2009, Hartmann 2013, and Fellner 2014.

R-o formations are notably predominantly masculine in gender. There are, however, some examples that are either neuter and then they take neuter endings, i.e., in the nominative and accusative. However, there are also famous examples of feminine forms that have the same R-o morphology as masculines.

In Greek, the most famous example is τροφός ‘Amme, Ernährer(in), Pfleger(in)’. According to Frisk (1960–1972), the feminine is original and the masculine a later innovation (in Attic τροφεύς (m.) ‘Ernährer, Pfleger’ is used to form a masculine counterpart to τροφός).

4.4 New R-o minimal pairs in Tocharian B

By analysis of the synchronic Tocharian B lexicon in DTB³, new minimal forms can be proposed. Two pairs can be only retraced to a PIE verbal root that has since been lost in Tocharian, i.e. **u̯remb-* and **trem-*. Two pairs can either be synchronically derived or are inherited, i.e. *täl-* and *wip-*.

The root **u̯remb-* ‘sich drehen’ (LIV²: s.v.) is known from Middle Low German *wrimpen* ‘rümpfen’ and Gr ῥέμβομαι ‘umherschweifen’. A connection with TB *wreme* ‘object’ is

Table 4.1: Newly attested R-o pairs in Tocharian B

LIV^2	TB verb	R(o)-o	R(e)-o	R(∅)-o
**telh₂-*	*täl-*	–	*calle*	*talle*
**trem-*	∅	*tremi*	–	*tarme* (?)
**u̯ei̯p-*	*wip-*	*waipe*	*wipe*	–
**u̯erKʰ-*	∅	*werke*	–	*warke*
**u̯remb-*	∅	*wreme*	–	*warme*

semantically not difficult if we compare the development of the term 'object' from verbs of movement of Eng 'object' ultimately from Lat *obicere* 'to throw in the way, put before'. TB *warme* is certainly an active adnominal that was concretised, i.e. 'swarmer' > 'ant'. There is no evidence for the corresponding verb within Tocharian so it is unknown on which chronological stage the words were formed.

A further derivate, if the meaning is correctly identified by Adams (DTB^3: s.v.), with no synchronic TB verb is *tarme* 'master of horses (?)' from PIE **trem-* 'zittern (vor Angst)' (LIV^2: s.v.), cf. Gr τρέμω 'zittere, bebe', Lat *tremō* 'zittern', and probably Alb *tremb* 'erschreckt jmdn., verjagt'. Its corresponding TB R(o)-o formation is*tremi*, a *plurale tantum*. TB *tarme* 'master of horses' would therefore be a concretised active adnominal if we assume that a semantic shift from 'zittern' > 'verjagen/zittern machen' is possible.[12]

**telh₂-* 'aufheben, auf sich nehmen' (LIV^2: s.v.) is known from various IE languages, e.g. Gr ἔτλην 'ertrug; wagte', OL *abs-tulās*, and Got *þulan* 'ertragen, dulden'. If inherited from PIE, we would expect †*cale* and †*tale*. Adams (DTB^3: s.vv.) explains the gemination as a result of assimilation, i.e. from PIE **telh₂-no-*. However, I argue that *calle* and *talle* were reanalysed and therefore received geminated *-ll-* due to the present forms of *täl-*, the infinitive, and the gerundive, i.e. TB *tallaṃ* (3Sg. and 3Pl.), *tällätsi* and *tällālle*. Cf. also the TB nominal derivate *tallāw* (adj.) 'miserable, unfortunate, unhappy' with a geminate.

**u̯ei̯p-* 'in schwingende/zitternde Bewegung geraten' (LIV^2: s.v.) is known from e.g. Ved *vépate* 'zittert, erregt sich' and ONorse *veifa* 'schwingen, werfen'.

These new pairs suggest that R(o)-o and R(∅)-ó were plausible counterparts in Tochar-

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ian B.

Chapter 5

The Origins of R-o

As previously demonstrated, R(o)-ó is a derivative of R(ó)-o by means of a suffix replacement due to the suffixation of -ó- that forms possessives. What has not been answered so far is the origin of R(ó)-o itself and the role of the R(e) and R(∅) stem formations.

We certainly have to start from the derivational and semantic identity of R(o)-ó and R(e)-ó stems. Having established the origins of R(o)-ó, it is conceivable to apply the same derivation chain to R(e)-ó .

5.1 The origins of R(e)-ó

Searching for the origin of R(e)-ó, the following possibilities can be postulated:

A. **R(E)-Ó AS A REFLEX OF OLD ABLAUT IN THEMATIC STEMS:** It is assumed by some scholars that in early PIE, just like athematic nouns, thematic nouns also had root ablaut depending on strong and weak cases, namely R(o/e). R(e) formations would thus stand in derivational relation to the weak stem that then vanished (due to analogical levelling). This, however, requires multiple assumptions and poses many questions. For example, what other evidence is there for ablaut in thematic noun? If a weak and strong stem is assumed, we should expect some R(e) formations to have R(o) semantics. We would also expect to see archaic evidence of R(e)-ó formations in many more branches than just Germanic and

Tocharian.

B. **R(E)-Ó AS AN ANALOGY TO PRESENT STEM:** Given their alignment with verbal roots, it is conceivable to ask whether *e* is based on analogy with respective thematic verbal stems beside them. Both in Tocharian and Germanic we would be dealing with a replacement of the accent-driven distinction of abstracts and adnominals by an ablaut-driven distinction. Even though thematic presents with e-grade are indeed productive in both languages, is difficult to prove.

C. **R(E)-Ó BASED ON RETRACTION OF R(∅)-Ó:** R(e)-ó is the result of accent retraction from R(∅)-ó and subsequently the addition of an *e*-grade in the root. This however poses the problem of semantics, since accent retraction often is the mechanism of substantivisation. However, R(e)-ó does not account for (many) substantivations.

D. **THEMATISATION OF ROOT NOUNS, WHERE R(E)-Ó DERIVES FROM THE WEAK STEM AND R(O) FROM THE STRONG STEM:** This would mean that R(o)-o formations and R(e)-ó formation were present at the same time as root nouns existed. A difficulty needed to be addressed is the logical conclusion that R(e)-ó is in fact old. However, the evidence outside of Tocharian and Germanic is so sparse that such antiquity is difficult to be backed up or its productivity must have been reduced in PIE. Additionally, there would be no explanation for the functional difference of R(ó)-o and R(e)-ó formations and it is difficult to argue why a feminine abstract root noun was turned into a masculine except *qua forma*.

A connection with root nouns, however, does not have to be disregarded too easily. But before we can enter the discussion of possible mechanisms of derivation with root nouns, it is necessary to discuss root nouns in form and semantics in PIE.

5.2 Root nouns in PIE

Across all theories of PIE root nouns, there is common ground: Root nouns can be identified easily by their morphology by being analysed as R-∅-E (root, zero suffix and ending) rather than R-S-E (roof, overt suffix and ending). Thus, only the root or the ending could bear the accent. Static root nouns are root nouns that bear the accent on

the root through the paradigm. If, however, the accent can shift to the ending within the paradigm, these root nouns are called mobile root nouns (Beekes 2011: §13.2.8).

In this chapter, we will analyse three root noun theories, i.e. The Beekes Model (§5.2.1), The Schindler Model (§5.2.2), The Schindler-Nussbaum Model (§5.2.3) in order to close in on the early PIE root noun in form and semantics.

5.2.1 The Beekes Model

Beekes (2011: §13.2.8) distinguishes primarily between variants accent mobility (static vs mobile) and secondarily between *commune* and neuter gender.[1]

Table 5.1: Root nouns in Beekes' Model

	'foot'	'voice'	'house'	'eyebrow'	'foal' (?)	'heart'
Accent	static			mobile		
Gender	commune		neuter	commune		neuter
Nom.Sg	**pṓd-s*	**u̯ṓkʷ-s*	**dṓm*	**h₃bʰréu̯H-s*	**pṓlH-s*	**ḱḗrd*
Acc.Sg.	**péd-m̥*	**u̯ókʷ-m̥*	**dṓm*	**h₃bʰréu̯H-m̥*		**ḱḗrd*
Gen.Sg.	**péd-s*	**u̯ókʷ-s*	**dém-s*	**h₃bʰruH-ós*	**pl̥H-ós*	**ḱr̥d-ós*

Regarding the static common gender inflexion, Beekes notes that the R(o/e) is the older paradigm scheme as the older paradigm: «It can easily be understood why the ablaut *ō*/*e* was replaced by *ō*/*o*.» (Beekes 2011: 209). Thus implying that by paradigmatic leveling/pressure, the o-grade root in all cases is secondary. Interestingly, Beekes (2011) does not mention the allomorphic R(o/∅) for CeRC-roots; instead he assumes R(o/e) even for **dṓm*.

Beekes (2011: 209) further names the reason for long vowels in the Nom.Sg. to be of morphological nature, i.e., lengthening of monosyllabics rather than analogy to root nouns in -R with Szemerényi's Law.

This system is unfortunately flawed since it most notably lacks the inclusion of 1. connections to roots, 2. semantics, and 3. classification by ablaut class.

[1] For further takes on root noun classification, see Tremblay 2010.

5.2.2 The Schindler Model

Schindler (1972a) wrote his PhD thesis on the Greek and (Indo-)Arian root nouns with an extensive list of all attested root nouns. His classification was published in Schindler 1972b. Nussbaum (2004), in his handout, summarises the essential findings from Schindler 1972a, which will be reiterated here as "The Schindler Model". Further on in Nussbaum 2004, Nussbaum then reclassifies The Schindler Model, which will then be discussed in Section 5.2.3 under the name "The Schindler-Nussbaum Model".

As Nussbaum (2004: 1) concludes, The Schindler Model regarding **commune** root nouns is based on a strict distinction between form and function.

Regarding form, Schindler distinguished between Type 1 and Type 2 root nouns that were solely distinguishable by ablaut. Thus, the paradigma of Type 1 had R(o) in the strong stem and R(e)/R(∅) in the weak stem[2] and in all cases E(∅). Type 2 is defined by having no o-grade and rather an ablaut in R(e) and R(∅) with E(e) in weak cases and E(∅) in strong cases.

Schindler's thesis on root nouns remains the basis of our modern understanding of the nominal derivation. Schindler adequately described the Greek and Vedic data on supposed root nouns (be they lexical items or embedded in compounds).

In Table 5.2, root nouns of the structure R(o/e) are exemplified. There are two semantical groups that can be distinguished, namely agentives (and iteratives) and abstracts.

Table 5.2: R(o/e) root nouns according to Schindler (Nussbaum 2004: §1.1.2)

agents (normally m.)	result/patient nouns (originally f.)
**u̯ók*^{w}/*u̯ék*^{w}- 'voice'	**u̯ók*^{w}/*u̯ék*^{w}- 'word'
**spóḱ*/*spéḱ*-[3]	**h*$_2$*u̯ólk*-/*h*$_2$*u̯l̥k*- 'furrow'[4]
**b*^{h}*ór*/*b*^{h}*r*- 'thief'[5]	**dom*/*dem*- 'house'[6]

[24] "[...] o/e vs. o/z in complementary distribution according to root shape are (1) collapsible in principle (2) offer positive invitation to collapse in: *dóm-/*dém- » *dm-, where the root is itself -ER(C)." (Nussbaum 2004: 2) For further restrictions, see Nikolaev 2020: 127f.

In the Table 5.3, root nouns of the structure R(e/o) are listed by their semantics, i.e. agentives and abstracts.

Table 5.3: R(e/∅) root nouns according to Schindler

agents to "stative roots"	abstracts
**h₂ner*/*h₂nr*- 'one who is strong'	**ker*/*kr*- 'termination'
**di̯eu̯*/*diu̯*- 'sky' etc.	

The Schindler Model provides many advantages againt Beekes' Model by sorting the root nouns according to their ablaut pattern. Additionally, R(o/∅) nouns are already declared as variants of R(o/∅) constrained to root structure, rather than R(e/∅).

Additionally, to R(o/e) and R(e/∅) root nouns, Schindler postulated root noun that were based on Narten roots of the structure R(ē/e) and concludes that R(ē/e) is the sole possibility for Narten roots regardless of function.

1. **h₃rēǵ*/*h₃reǵ*- 'king'
2. **spēh₂*/*speh₂*-, cf. L *spēs* 'hope'
3. **lēǵ*/*leǵ*-, cf. L *lēx* 'law'

As Nussbaum (2004: §4) points out, there are however many problems with Schindler's Model that need to be addressed:

1. E.g., **ǵʰu̯er*-/*ǵʰur*- to **ǵʰu̯er*- 'go crooked' is a non-stative agent, but R(e/∅).
2. Asymmetry of R(o/e) with agents and **result** nouns and R(e/∅) with agents and verbal abstracts, "especially since result nouns are typologically a common kind of concretization of verbal abstracts" (Nussbaum 2004: §4.2).

[4]Cf. the Gr concrete root noun σκώψ 'kleine Horneule' and the non-concrete R(o)-ó adnominal σκοπός 'Späher' (Frisk 1960–1972: s.vv.).

[5]Cf. the Gr root noun variants ἄλοξ, αὖλαξ, ὦλκα, and ὦλαξ, the R(o)-ó adnominals ὁλκός (m.) 'der Zieher' and ὁλκός, -ή, -όν 'an sich ziehend; sich hinziehend, hinneigend, zögernd' (Frisk 1960–1972: s.vv.). Weiss (2009: 271) connects L *sulcus* 'furrow' and ὁλκός to PIE **selk*- 'drag'.

[6]Cf. the Gr root noun φώρ 'thief', the abstract noun in R(ó)-o φόρος (m.) 'Ertrag, (eingehobener) Tribut, (eingelieferte) Abgabe', and the adnominal in R(o)-ó φορός 'tragend, förderlich, trächtig, einträglich' (Frisk 1960–1972: s.vv.).

5.2.3 The Schindler-Nussbaum Model

Nussbaum (2004: §4.2) revises Schindler's system by picking up at these very questions and proposes that both R(o/∅) and R(e/∅) built agent and verbal abstracts. Nussbaum (2004) then proposes that the valency of roots (besides Narten roots) determined which root noun structure they "chose".

Nussbaum (2004: §4.4.1) concludes that the following distribution is visible in PIE:

Regarding the root nouns in R(e/∅), Nussbaum assumes that the distinction between agentives and abstracts is superfluous. He assumes that R(e/o) agentives (e.g., *h_2*nér*/ h_2*nr*- 'Mann') are essentially concretised abstracts ('stark sein' à *'Virilität' (f.) à 'Mann' (m.)). Thus, R(e/∅) formed only abstracts.

Nussbaum, however, assumes a further constraint, namely that R(o/e) originally formed abstracts only to transitive roots which explains the resultatives as remnants of former concretized abstracts. In that case, however, one has to assume that all examples of former intransitive o/e abstracts have been eliminated (since it would make no sense to restrict the type to the valency of the verb).

Table 5.4: Distribution of root nouns (Nussbaum 2004: §4.4.1)

Valency	Agents	Abstracts
Intransitive-stative	R(o/e)	R(e/∅)
Transitive	R(o/e)	*R(o/e) → R(e/∅)
"Narten"		R(ē/e)

5.2.4 (Re)vision of the Schindler-Nussbaum Model

Though the Schindler-Nussbaum Model explains many cases, the transitive and intransitive distinctions is still surprising.

Instead, we may assume that Nussbaum's analysis is a *Momentaufnahme* of many different mechanisms for non-Narten root nouns.

In (late) PIE, root nouns in R(o/e) became unproductive yet remnants were still inherited into various IE branches. At the same time, root noun abstracts in R(o/e) were replaced

by R(e/∅), and agentives stopped being formed by means of root nouns and were now often derived by means of suffixes.

If we assume that the 3:1 distribution is a momentary state, it could be suggested that at an even earlier stage of PIE had only the means of building root nouns in R(o/e) which were *commune*. There was thus no formal distinction between agentives (also used as adnominals) and abstracts.

Table 5.5: *Commune* root nouns in early PIE

	Abstracts and agentives
Gender	Commune
Type	R(o/e)

This assumption explains such divergences such as abstract PIE **u̯oi̯ḱ* 'settlement' which Nussbaum (2004: 11) assumes to be a transitive abstract though Rix & Kümmel (LIV²: s.v.) reconstruct an intransitive **u̯ei̯ḱ* 'eingehen in, eintreten' and PIE **dʰombʰ-* 'Staunen', both intransitive abstract, by labeling it as an archaisms rather than an exceptions. Additionally, we may add Gr φλογ- 'flame' if it is of PIE descent, cf. **bʰleG-* 'glänzen'.

The disadvantage to this hypothesis is that we must assume that it is purely coincidental that we have only abstracts in R(e/∅), i.e., according to Nussbaum (2004), Gr ἀνήρ, φυγ-, L *nex*, *nix*, etc.

After the establishment of commune R(o/e) root nouns, root nouns of the structure R(e/∅) (both commune and rarely neuter) become productive. The remaining question is the origin of R(e/∅) root nouns. If we assume that all root nouns were originally R(o/e) what would be the motivation?

1. Reinterpretation of the weak stem of R(ē/e) to the strong stem R(e/∅).
2. Reinterpretation of the weak stem of R(o/e) to the strong stem R(e/∅).
3. Reinterpretation of the weak stem of R(o/∅) to the weak stem R(e/∅) with retracted accent and thus neo-e-grade in the root.
4. Organised combination of R(o/∅) and R(e/∅) with the reanalysis of the morphophonologically conditioned weak-stem of R(o/∅) of a weak stem in R(e/∅)

with the influence of the weak stem R(o/e): This holds up with the current data that shows that (maybe) all R(e/∅) root nouns have a liquid in their root, while R(o/e) knows non-liquid root nouns, e.g. **spoK*- and **pod*-.

5.2.5 Gender and root nouns

As has been demonstrated, initially, root nouns were either commune or neuter.[7]

Root noun as abstract nouns were often feminine and in this was retained into IE branches as well, cf. e.g., Ved *mít*- (f.) 'pillar', *stút* (f.) 'praise'.[8] Greek examples are φλόξ (f.) 'Flamme', (Gen.Sg) ὀπός (f.) 'Stimme', Στύξ (f.) 'Styx', σάρξ (f.) 'Fleisch',[9], even if they had been turned into concrete forms.

5.3 Similarities between root nouns and R-o

As elaborated *supra*, it can be rightfully assumed that the antiquity of root nouns is unprecedented, cf. the Neolithic *Grundwortschatz* as in 'building' and 'furrow' and human anatomy as in 'foot', 'heart', 'eyebrow'. This could also indicate that their age precedes thematic nouns with no verbal root equivalent, cf. e.g., PIE **u̯l̥kʷos* 'wolf'. Hence, if any relation is to be made between the root nouns and R-o formations, as will be done here, it is indisputable that R-o formations could only derive from root nouns and not vice versa.

1. Semantics: Root nouns can build both action nouns and agent nouns just like R(ó)-o and R-ó that can later become concrete nouns by non-overt concretisation. This distribution in semantics is easily equitable to the semantics of R-o formation in that they derive the meaning to the same extent and a verbal root with a predefined meaning.

2. Root vocalism and ablaut: Root nouns contain the following root vowel grades: R(o), R(e) and R(∅). It is thus surprising that R-o formations contain the same

[7] There is to my knowledge no known theory on the distribution of commune and neuter in root nouns since neuter ones are extremely rare. It might be that in early stages, in order to derivate abstracts, commune root nouns could become neuters, e.g., ***dom*- (m.) 'builder, building' would be substantivised to **dom*- (n.) 'building'.

[8] Examples taken from Macdonell 1916: 254.

[9] Examples taken from Risch 1974: 4.

vowel grades: hence, no lengthened grades. This fact has also led scholars to assume that thematic nouns at a certain time in antiquity had an ablaut pattern as well, and R-o formations are the reminiscence of this feature.

5.4 From root noun to R(ó)-o formation

We must first analyse R(ó)-o abstracts as the first R-o formation and its relationship with root nouns as it is the only inherently abstract noun of all R-o formations.

There are two explanations that we can assume for its origin:

1. Inflectional process: As R(o/e) root nouns were both abstract and agent nouns, there was the need to derive abstract nouns lacking synonymity with agent nouns. This must have happened when the bipartite gender system in PIE was still in place, as the feminine wasn't yet available to categorise abstracts from agents. By the mechanism of *simple thematisation* to the **strong stem**, a *commune* abstract noun was derived. Thus, e.g., to PIE *b^her- 'tragen, bringen', there was a PIE root noun *b^hor/*b^hr- 'carrier, carrying'. This resulted in an agentive root noun φώρ 'Dieb' (whose feminine abstract homonym was lost) and a distinctive R(ó)-o abstract noun that was later made concrete φόρος 'Ertrag, Steuer' (IEW:, §229). However, there is not always a remnant root noun, cf. e.g., a supposed/uninherited root noun *$tómh_2$-/$témh_2$- 'cutter, cutting' could become *$tómh_2$-*o*- 'das Schneiden' as in τόμος, indicating that this process became productive. These newly formed abstract nouns in R(ó)-o kept the common gender of their original root noun. However, when the tripartite gender system was established, root nouns distinguished abstract and agentive nouns, i.e., marked by the feminine, respectively, the masculine gender. However, R(ó)-o abstract nouns needed no further distinction and were thus unaffected by overt gender marking. Additionally, *qua forma* thematic nouns were now masculine, thus providing another lever for retaining the masculine gender.

2. Derivational process: The previous approach, however, does not explain the immense productivity of R(ó)-o abstract nouns; we would need to assume that there were many R(o/e) nouns at one point to nearly all verbs. It is, therefore,

more attractive to consider that R(ó)-o is not related to root nouns but is instead a primary derivation from the root itself. Thus, independently from root nouns, a root could take on R(ó) and add a thematic suffix to build abstracts. However, the mechanisms of this process, i.e., how the abstract semantics and the o-grade and the thematic suffix are related/intertwined, remain unknown and requires further research.

I thus propose that R(ó)-o is not related to root nouns but is, in fact, a primary derivative from PIE roots.[10]

As mentioned in Section 2.8, the origin of R(o)-ó need not be further elaborated here since it is in no way related to root nouns.

5.5 From root noun to R(e)-ó formation

If we assume a connection of R(e)-ó adnominals to root nouns, it is necessary to reiterate the status of late PIE root nouns. As mentioned *supra*, R(o/e) root nouns became unproductive within PIE and gave way to R(e/∅) root nouns. These R(e/∅) root nouns could, as did R(o/e), form abstracts (and agentives if we accept θήρ) to roots. Since there were already two productive means in late PIE to build abstracts by means of primary derivation, i.e., R(e/∅) and R(ó)-o, there seemed to be no need to build *R(é)-o abstracts. However, late Proto-Indo-European, for a still unknown reason, needed more adnominal formations. And thus, by means of the suffixation of possessive *-ó-*, adnominals to the strong stem of the reasonably newly productive R(e/∅) root nouns were built. From my sample and research, I had not stumbled upon any feminine R(e)-ó formations which would indicate that this must have occurred when the tripartite gender system was already established.

This "late" innovation would thus explain its scarcity among the IE languages, its sole productivity in Proto-Germanic and Tocharian B, and its scarcity throughout other IE branches.

In Table 5.6, I propose a timeline of co-occurrences of root nouns and various full-grade

[10] I am deeply indebted to Melanie Malzahn for extensively discussing the possible origins of R(ó)-o with me and her insightful comments that have shaped this theory.

R-o formations from a very early stage of PIE to late PIE.

Table 5.6: Timeline of root nouns next to full-grade R-o formations in PIE

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
root nouns	R(o/e)	R(o/e)	R(o/e)	R(o/e) > R(e/∅)	R(e/∅) > R(o/e)
-o- abstracts		R(ó)-o	R(ó)-o	R(ó)-o	R(ó)-o
-ó-			R(o)-ó	R(o)-ó	R(o)-ó and
adnominals					R(e)-ó

Thus, I do not follow Peters (2022: 336) in assuming R(e)-ó is the reflex of a mobile accent and root ablaut in thematic nouns even though he makes a case for a similar interpretation of the first member of compound of the pheré-oikos made by Schindler. Additionally, against this argument, there is no other evidence of (simple) R(é)-o or R(e)-ó abstracts and no abstracts in R(ø)-o, which we would expect in archaisms if there was thematic root ablaut. It is more attractive, thus, to explain the various ablaut grades in thematic nouns as a result of systematic derivational patterns.

5.6 From root noun to R(∅)-ó formation

Thus, it is now evident to discuss the origin of R(∅)-ó adnominals. R(∅)-ó adnominals seem to be older than R(e)-ó as derived substantivisations are found in Hittite, cf. Hitt *yuga-*. We can explain its development in two ways:

1. R(∅)-o substantivisations are the result of an inflexional process, i.e., root nouns in R(e/∅) were transferred to an overt declension class by means of simple thematisation of the weak stem. Accent retraction, as seen in Greek, is, therefore, an *einzelsprachliche* phenomenon. Adnominals in R(∅)-ó would thus be a derivative of R(∅)-o abstracts. This assumption would be preferable according to Occam's razor for PIE **i̯éu̯g-* (n.) 'yoke' where we need only to assume a simple thematisation with retention of the neuter gender of the root noun.[11]

[11]The Latin evidence, i.e., *coniux*, might be counter-evidence for the neuter gender of the PIE root noun.

2. R(∅)-ó adnominals are derived from the weak stem of R(e/∅)[12] that could be substantivised through suffixation of the possessive thematic suffix *-*ó*-, cf. Schindler 1985.

In Table 5.7, I have summarised the various evidence of nouns of 'yoke' in Hittite, Greek, Latin, and PIE.

Table 5.7: PIE 'yoke': From root noun to R(∅)-ó

	Root noun	Possessive derivate	Substantivisation
Hitt	*iūk*- (n.) 'yoke, pair'	*iuga*- (adj.) 'yearling'	*iuga*- (n.) 'yoke, pair'
Gr	–	ζυγός (m.)	ζυγόν (n.) 'yoke'
L	*con-iux* (mf.)	*iugus* (adj.) 'belonging together'	*iugum* 'yoke'
PIE	**i̯ug*- (n.) 'yoke'	**i̯ug-ó*- (c.) 'yoked'	**i̯ug-ó-m* (n.) 'yoke'

Unless the *Vorderglied* of compounds such as ζεύξιππος (m.) 'desultor, junctor', ζευξίλεως (m.) 'subjugator of men', ζευξίγᾰμος (f.) 'she that yokes in marriage' are derived from ζεῦξις 'yoking', there is no evidence for a Gr root noun.

Thus, we should assume that two processes (inflexional and derivative) were simultaneous in PIE. However, for early PIE, we cannot precisely pinpoint which process developed first.

[12] Most likely, also derived from the weak stem of R(o/e) root nouns of the root structure (C)CeR(C)-.

Chapter 6

Conclusion

In this thesis, I have taken a closer look at R-o formations in Proto-Indo-European, Tocharian B, and various branches outside of Tocharian. Communis opinio is that R(o)-o and R(∅)-o formations are of PIE age, while the age of R(e)-ó has been disputed. By showing the prevalence of R(e)-ó and substantivisation mechanisms in Tocharian B and Proto-Germanic, I suggest we consider R(e)-o to be of PIE age. The reduced productivity in other IE branches results from its relatively late conception next to the thematic adnominals in R(o)-ó and R(e)-ó in PIE.

It has also been shown that the process of thematic abstracts and adnominals gaining momentum in the PIE nominal system coincides with the restructuring of the PIE root noun (i.e., loss of productivity of R(o/e) root nouns and R(e/∅) root nouns becoming productive).

By associating R(e)-ó to the weak stems of R(o/e) and the strong stem of R(e/∅) root nouns, I propose that we do not presume that thematic nouns in PIE had root ablaut and accent mobility, instead only the thematic vowel only had qualitative ablaut. This also eliminates the difficulty of finding abstracts that would be conclusively necessary for R(e)-o.

Furthermore, it has been demonstrated – as Schindler and Nussbaum have proposed – that R(ó)-o abstracts and R(o)-ó possessives are related by secondary derivation by suffixation of *-*ó*-. However, whether this process also worked later in the opposite

direction is still a matter of debate However, adnominals were often substantivised. Adnominals could retract the accent, derive neuters, or both to form abstracts, concrete nouns, or resultatives. This process is undoubtedly of PIE age if we compare the IE cognates of 'yoke', for example.

For Tocharian B, as Malzahn 2013 has demonstrated, numerous R-o formations are attested. There are still more examples to be found by further thorough joint philological and linguistic research and further analysis of possible R-o formations that have switched inflexion classes with overt cognates in other IE branches. However, the collected data has not only presented likely new R(e)-ó formations but also R(o)-o and R(∅)-o formations. This has brought forth new pairs of R-o formations to the same verbal root in Tocharian B, demonstrating that R-o was productive in Tocharian B.

Furthermore, by analysing the gender system of R-o formations, we can surely assume that non-substantivised R-o formations were inherently commune in early PIE, as demonstrated in Hittite. However, when the three-gender system in late PIE became established, R(ó)-o defied the tendency of abstracts to assume neuter or feminine gender (that helped polysemantic root nouns differentiative between agents (masculine) and abstracts (feminine)) and qua forma took masculine gender as thematic nouns. I assume that before the tripartite system's establishment, R(o)-ó had to have been established due to the numerous Greek adnominals describing sexus femininus without overt marking the noun. The lack of feminine sexus adnominals in R(e)-ó formations may be evidence for its late conception. However, this requires a more thorough analysis of other IE branches and their R(e)-ó reflexes.

There are many remaining questions which would give us a better overview of R-o formations and the PIE nominal system in general, e.g.:

1. Why are Ved *-tu-* abstracts masculine?
2. What led to the increased productivity of R(e/∅) root nouns?
3. What were the various motivations for Proto-Indo-Europeans speakers to choose between the vast array of R-o adnominals when deriving an adnominal to a root?

In conclusion, I hope to have brought more insight into the early and late PIE nominal system by advancing some aspects of R-o formations.

Abbreviations

AiG	Jacob Wackernagel & Albert Debrunner (1930–1957). *Altindische Grammatik*. 3 vols. Göttingen: Vandenhoeck & Ruprecht.
CEToM	Melanie Malzahn et al. (2011–). *CEToM. A Comprehensive Edition of Tocharian Manuscripts*. URL: http://www.univie.ac.at/tocharian.
DTB^3	Douglas Q. Adams (2019). "A Dictionary of Tocharian B". Unpublished.
EDHIL	Alwin Kloekhorst (2008). *Etymological Dictionary of the Hittite Inherited Lexicon*. Leiden & Boston: Brill.
EDPG	Guus Kroonen (2013). *Etymological Dictionary of Proto-Germanic*. Leiden & Boston: Brill.
EDSIL	Rick H. Derksen (2008). *Etymological Dictionary of the Slavic Inherited Lexicon*. Leiden & Boston: Brill.
EWAia	Manfred Mayrhofer (1986–2001). *Etymologisches Wörterbuch des Altindoarischen*. 3 vols. Heidelberg: Winter.
IEW	Julius Pokorny (1959). *Indogermanisches etymologisches Wörterbuch*. URL: http://ieed.ullet.net/pokorny.html (visited on 01/05/2023).
LIPP	George E. Dunkel (2014). *Lexikon der indogermanischen Partikeln und Pronominalstämme*. 2 vols. Heidelberg: Winter.
LIV^2	Helmut Rix & Martin J. Kümmel (2001). *Lexikon der indogermanischen Verben*. 2nd ed. Wiesbaden: Reichert.
LIV^2 Add.	Martin J. Kümmel, ed. (2018). *Addenda und Corrigenda zu LIV^2*. URL: http://www.martinkuemmel.de/liv2add.html (visited on 02/18/2018).
LSJ^9	Henry G. Liddell et al. (1996). *A Greek-English Lexicon*. 9th ed. Oxford: Clarendon.
TEB	Wolfgang Krause & Werner Thomas (1960–1964). *Tocharisches Elementarbuch*. 2 vols. Heidelberg: Winter.
TVS	Melanie Malzahn (2010). *The Tocharian Verbal System*. Leiden & Boston: Brill.

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