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**Indo-European origins of Anatolian morphology and semantics:
innovations and archaisms in Hittite, Luwian and Lycian**

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Verbal Part

CHAPTER 4

From the Proto-Indo-European perfect to the Hittite *hi*-conjugation

Semantic and formal distributions between the *mi*- and *hi*-conjugations

Abstract: The chapter argues that the Hittite *hi*-conjugation developed from the PIE perfect through the development to a past tense – which crucially comes down to a shift from stative to eventive semantics – and the subsequent creation of a new present tense by the addition of **-i* in imitation of the pattern of the *mi*-conjugation, after which the new conjugation absorbed all other formations with *o*-grade (notably *CoC-eie/o*-causative-iteratives and **molH*-type iteratives) as well as verbs and suffixes whose *e*-grade was colored by **h₂* or **h₃*. The ultimate division between the *mi*- and *hi*-conjugations is traced back to the PIE state of affairs in which only verbs with a specific semantic frame allowed expression in the perfect.

1 Introduction

The Hittite verbal system famously has two conjugations in its active voice: the *mi*-conjugation and the *hi*-conjugation. Traces of this distinction are also found in the other Anatolian languages. The *mi*-conjugation is clearly the Anatolian equivalent of the PIE athematic present-aorist system, to which it is a perfect morphological match: its PAnat. 1-3sg. endings are pres. **-mi* **-si* **-ti*, pret. **-m* **-s* **-t* (**^oC-to*), and it shows *e/∅*-ablaut. The *hi*-conjugation is clearly related to the PIE perfect: it features the 1-3sg. endings **-Ha* **-ta* **-e* < **-h₂e* **-th₂e* **-e* and *o/∅*-ablaut.

There are, however, also some differences with the PIE state of affairs, especially regarding the *hi*-conjugation. The most important ones are the following four, two formal and two functional. First, the PIE perfect is usually reduplicated; the *hi*-conjugation is usually not. Second, the *hi*-conjugation has a tense opposition featuring a derived present tense; the

PIE perfect was typically a present tense and is in some branches accompanied by a derived past tense (pluperfect). Third, Anatolian verbs are either *mi-* or *hi-*conjugated; in PIE one verbal root could in principle (depending on semantics) inflect both as a present-aorist and as a perfect, with each inflection expressing a different aspect of the verbal semantics, e.g. pres.-aor. **h₁ger-* ‘to wake up’ (eventive), perf. **h₁ge-h₁gor-* ‘to be awake’ (stative(-resultative)). Fourth, related to this: in Anatolian there is no functional opposition between the *mi-* and *hi-*conjugations. The *hi-*conjugation does not have perfect (i.e. stative(-resultative)) semantics. Indeed, it has been noted that *hi-*verbs are in general eventive rather than stative.¹

In recent times the idea has gained popularity that some of these differences hamper the identification with the perfect to such an extent that it is preferable to transpose the Anatolian *hi-*conjugation back to an otherwise unknown PIE “**h₂e-conjugation*”. This idea originated with Jasanoff (most elaborately expounded in Jasanoff 2003) and has since made its way to mainstream thought to the point that in the recent Handbook of Comparative and Historical Indo-European Linguistics, Oettinger (2017: 266) can state: “The origin of the *hi-*conjugation is the *vexatissima quaestio* of Anatolian morphology. A systematic survey being impossible here, we can at any rate state that the traditional derivation of this conjugation from the late PIE perfect is no longer likely.” Jasanoff (2003: 28) states that “[t]he traditional endings-based approach has been taken as far as it will go”, before proceeding to develop the alternative idea of a PIE “**h₂e-conjugation*”.

I wish to show that these thoughts of despair, and their result, the assumption of a “**h₂e-conjugation*”, are unwarranted. There is no need to cut the morphologically obvious identification with the perfect and to resort to an otherwise unsupported back-projection of the *hi-*conjugation. This amounts to throwing out the baby with the bathwater, and multiplies rather than solves the difficulties. It is true that the existing accounts of the development from the perfect to the *hi-*conjugation are not yet wholly satisfactory, but they *can* be improved upon, and be brought to a

¹ The *hi-*conjugation and the perfect do not historically differ in ablaut, as has sometimes been claimed. See Kloekhorst (2012; 2014b; 2018: 90-91).

satisfactory level. I will show how from section 3 onwards. First, however, I will outline the most elaborate version of the scenario as laid out by Eichner (1975), as well as Jasanoff's (2003) attack of this scenario and Kloekhorst's (2018) defense and slight adaptation of it.

The issue of reduplication has little relevance here (cf. e.g. Cowgill 1974: 566). Suffice it to state for this moment that the existence of the obvious archaism **uoid-* / **uid-* 'to know', the perfect of **ueid-* 'to see', strongly suggests that the perfect was at some point unreduplicated.² The perfect inherited by Anatolian may therefore in principle still have been unreduplicated, or it may have undergone dereduplication, or a bit of both.³ I will revisit this point in 6.3, where it will be argued that reduplication had hardly any chance to survive, meaning that Anatolian may just as well continue a stage in which the perfect was generally reduplicated.

2 Existing scenarios and criticism

The most elaborate scenario of the development from the perfect to the *hi*-conjugation is that of Eichner (1975). In this scenario, three categories of

² Jasanoff's (2003: 228-233) interpretation of **uoid-* as an innovation is not remotely credible. **uoid-* bears all the hallmarks of an archaism (cf. Sihler 1995: 568-569, Kümmel 2004: 149-150, Fortson 2010: 104, Kloekhorst 2018: 93-94, etc.): it must have been among the most frequent verbs, it shows archaic ablaut, and it has to some extent been lexicalized – a common pathway to becoming an archaism – by a semantic development (**uoid-* does not normally mean 'to have seen' anymore, but only 'to know'). Cf. also the daughter languages, where this verb often manages to survive with archaic traits that are otherwise lost, e.g. ablaut (Gr. οἶδα / ἴδμεν), endings (Gr. οἴσθα), present tense value (Goth. *wait*, Skt. *véda* (>> *védmi*)), and perfect morphology in general (OCS *vědě*). Since **uoid-* is, or at least clearly originated as, the perfect of the root **ueid-* (cf. Gr. οἶδα, ptc. εἰδώς, inf. εἰδέναι, subj. εἰδῶ), which also has eventive instantiations in the present-aorist system, notably the aorist **h₁e-uid-e-t* (Gr. εἶδε 'saw', Skt. *ávidat* 'found out', Arm. *egit* 'found'), and several presents (probably) of later date (Lat. *videō* 'to see', OCS *viděti* 'to see', Gr. εἶδομαι 'to be seen, appear'; cf. also εἶδος 'appearance, shape'), **uoid-* shows that non-reduplicated perfects did not belong to a different functional category.

³ Kloekhorst (2018: 94) points to the two reconstructable variants of the perfect 3pl. ending, **-ēr* and **-r*, which can be compared to the variation of **-enti* and **-nti* in unreduplicated and reduplicated presents, respectively. This variation may indicate that PIE had both unreduplicated and reduplicated perfects.

verbs were input for the *hi*-conjugation. The oldest layer consists of perfects in their known function of indicating a state that is the result of a previous action (Eichner 1975: 85-87). Eichner's prime example is *šakk-* 'to know', which he traces back to **soh₂g-*, interpreting it as a perfect ('to have traced, know') to a root **seh₂g-* 'to trace' (Goth. *sokjan*, Gr. ἠγέομαι, Lat. *sāgīre*). The *hi*-conjugation took shape when these originally tenseless perfects received an explicit present tense counterpart created with the **-i* from the *mi*-conjugation. Since these perfects did not partake in the step that follows, they must have been lexicalized, and indeed as such have formed a small *hi*-conjugation. Other, later members of this conjugation, Eichner (1975: 88-89) reasons, can on semantic grounds hardly have existed as perfects in the proto-language. Rather, in his view, the only conceivable meaning of a perfect such as the one to **d^heh₁-* 'to put' that should ultimately underlie Hitt. *dai-* 'to put', is one of a past tense. This would mean that the perfect was at some point interpreted as a past tense. When the new past tense had completely coincided in function with the old one, one of the two past tense stems was generalized, and if the chosen stem was that of the new past tense, the present tense assumed the same stem. In such cases the small existing *hi*-conjugation served as a model for the creation of new present tense forms. The third influx of verbs (Eichner 1975: 96-98) resulted from transfers to the new conjugation because of formal features, notably *o*-vocalism, e.g. *lākⁱ* 'to knock down, fell' < **log^h-eie/o-* 'to make lie down', and reanalysis of 1sg.pret. forms such as **tr-n-eh₂-m* > *tarnaḥḥ-un* as *tarna-ḥḥun*, whence *tarnaḥḥi* instead of **tarnami* (etc.).

According to Jasanoff (2003: 10-15), "[v]irtually every step in this account is problematic." Against the first stage, Jasanoff objects that verbs in the *hi*-conjugation tend to have eventive meaning rather than stative, and that no stative *hi*-verb can plausibly be equated with a known perfect. He also finds the introduction of a tense distinction implausible, as he would reconstruct a PIE pluperfect, meaning that the perfect would already have had a tense opposition. Regarding the second stage, he dismisses the creation of a new present tense on the basis of a past tense as 'unnatural', and condemns the apparent lack of a principle behind the choice for either inflection. The transformation of *CoC-eie/o-* formations into ablauting *hi*-

verbs is denounced as a “bizarre remodeling”, and the reinterpretation of **-nahh-un* as **-na-hhun* is regarded as impossible in view of the existence of 3sg.pres. forms in *-nai* in Luwian and Palaic, suggesting that the type was Proto-Anatolian, which still had **-Ha*.

For Oettinger (2006: 37), the semantics of the *hi*-conjugation are the key argument for rejecting a direct connection with the perfect: “Entgegen der *Opinio communis* glaube ich (ebenso wie Cowgill und J[asanoff]) nicht mehr, daß die *hi*-Konjugation vom indogermanischen Perfekt abstammt. Würde sie nämlich aus ehemaligen Perfektstämmen bestehen, so würde man in ihr nicht Verben mit Bedeutungen wie ‘schlüpfen’ erwarten, sondern mit überwiegend statischen Bedeutungen, wie z. B. in englisch *I can* aus Perfekt **ǵe-ǵónh₃-h₂a* ‘ich (habe erkannt und) weiß (jetzt)’.” This sentiment is widely shared and can already be found, for example, in Couvreur (1936: 551-552).⁴

Eichner’s scenario was defended and slightly adapted by Kloekhorst (2018). He subscribes to a tenseless PIE perfect and suggests merging Eichner’s first two stages by assuming that the addition of **-i* to create a present tense was simultaneous in stative perfects (such as *šakk-*) and action-focused perfects (such as *dai-*).

It is true that the envisaged scenario in its various incarnations is still not optimal as it stands. However, I will show that it has not ‘been taken as far as it will go’. In the following I will present my own analysis of the data, in the process addressing the most important remaining objections to a direct connection of the *hi*-conjugation with the perfect, notably the deviating semantics, and the alleged random distribution of verbs and suffixes among the two conjugations. Sections 3, 4 and 5+6 respectively correspond in content to Eichner’s first, second and third layers of *hi*-verbs.

⁴ Cf. further e.g. Cowgill (1974: 566-569). Kuryłowicz (1979: 143) even speaks of “semantischen Schwierigkeiten, die eine Gleichsetzung der *hi*-Konjugation mit dem idg. Perfekt ausschließen”. Similarly, Tischler (1982: 238) contends that “eine direkte Gleichsetzung bzw. Herleitung der hethit. *-hi*-Konjugation aus dem idg. Perfekt wegen der unüberwindlichen semantischen Probleme ausgeschlossen ist”.

3 No stative perfects

The first improvement that can be made is the acknowledgment that there is no evidence for the survival of any stative perfect in the *hi*-conjugation, and that *hi*-verbs typically have eventive rather than stative meaning. Here the criticism is fully justified. Eichner's example *šakk-* 'to know' can because of the *-kk-* not be reconstructed as **sVh₂g-* and is therefore unrelated to PGM. **sōkjan-*, Gr. ἠγέομαι, Lat. *sāgīre* (see Kloekhorst 2008: s.v.).⁵ Although it is still theoretically possible, perhaps even plausible,⁶ that a few perfects were lexicalized and therefore escaped later developments, there are no plausible examples that survived until the historical period. If they existed at all, there is no reason to believe that they had any impact on the developments of the remaining group of non-lexicalized perfects. This means that the reality of Eichner's first stage of lexicalized perfects does not have any relevance here, and that it can be left out of consideration.

4 The perfect and tense

4.1 PIE and IE developments

No tense opposition can be reconstructed for the PIE perfect (and the related middle).⁷ The perfect is found with various morphologically expressed tense oppositions in the daughter languages, none of whose formations match: we can only reconstruct the one perfect paradigm (cf. Beekes 2011: 265-266). It is therefore quite possible that PIE did not have

⁵ The current derivation from **sekH-* 'to cut' does not necessarily imply preserved perfect semantics, as the parallel ToB *kərsa-*, ToA *kārsā-* 'to know' < **kers-* 'to cut' shows; indeed there is reason to believe that the meaning 'to know' developed metonymically from 'to distinguish, realize' at a rather late stage. See the treatment of this verb in 6.1.1.2.

⁶ Cf. note 11.

⁷ For the present(-aorist) system, however, this is not true. I do not follow Kloekhorst (2018) (and cf. Lazzeroni 2012: 59) in equating the creation of the *hi*-conjugation present tense with that of the *mi*-conjugation present tense.

a formally distinct pluperfect.⁸ But the existence or absence of a formally expressed pluperfect is a moot point. What is important is that not all tense interpretations of the reconstructable perfect paradigm were equal in PIE. In all languages in which a morphological tense distinction is found, the perfect paradigm emerges as a present tense, and a new preterite was created: in Greek (based on the augmented perfect stem + *-ε-*, e.g. *ἔτεθνήκεε* ‘was dead’), Sanskrit (augmented perfect stem + secondary *mi*-endings, e.g. *ájagan* ‘had gone’), Germanic (weak preterite endings, e.g. Goth. *wissa* ‘knew’), Latin (**-is-ā-* + secondary endings, e.g. *nōverat* ‘knew’), Slavic (regular preterite endings, e.g. **věděxъ* ‘knew’). The most primary, default tense interpretation of the indicative perfect paradigm must, then, have been the present tense. This is also expected given the inherently imperfective aspect of the perfect. Latin and Slavic reinforced the present interpretation with the present tense marker **-i* in analogy to the present(-aorist)-system (Lat. 1sg. *-ī*, 2sg. *-istī*, 3sg. *-īt*, 3pl. *-ēre* < **-h₂e-i*, **(is)-th₂e-i*, **-e-i(-ti)*, **-ēr-i*; OCS *vědě* < **uoid-h₂e-i*).⁹

⁸ It is relatively common to reconstruct a distinct pluperfect with secondary present-aorist endings, **-m*, **-s*, **-t*. There is, however, no comparative evidence to support this; only Indo-Iranian features this kind of formation. The Greek forms adduced by Jasanoff (2003: 36) as a justification for pushing this reconstruction back to PIE (e.g. 3du. *ἔικτην*, to *ἔουκε*; 1pl. *ἔπέπιθμεν*, to *πέποιθα*) do not in fact show that the Greek pluperfect also used to have present-aorist endings, since these forms feature endings that are found both in the present-aorist and in the perfect. The Greek 1-3sg.plupf. endings *-εα -εας -εε* are certainly secondary, but we cannot be sure what they are secondary to.

⁹ Although the Latin addition of **-i* is often loosely considered parallel to the one in Anatolian (cf. e.g. Eichner 1975: 87, Weiss 2009: 392 n. 56), the two developments are not the same. In Latin, the **-i* was added to the perfect paradigm itself as a reinforcement when it still had present tense value (cf. still the ‘praeterito-presents’ of the type *meminī* ‘I remember’, *nōvī* ‘I know’, *stetī* ‘I stand’), perhaps at the time already accompanied by the secondary preterite, the later pluperfect (*memineram* ‘I remembered’, *dīxeram* ‘I had said’). The addition of **-i* was not part of the creation of a secondary present tense *on the basis of* the perfect paradigm, itself surfacing in the past tense, as in Anatolian, which, as I argue below, would suggest an earlier development of the perfect to a past tense. In Latin, this development ostensibly only took place *after* the perfect endings had been extended with the present tense marker **-i*. A second reinterpretation is impossible given the shift from stative to eventive that comes with such a reinterpretation. This means that the Latin development was not parallel to the Anatolian one as argued for below, even though the morphological result, a set of perfect endings extended with **-i*, is the same.

Although the indicative of the perfect was typically a present tense, it also often entailed a preterite element ('is in a state (resulting from a previous action)').¹⁰ This explains why in most languages the perfect was reinterpreted as a present perfect or anterior ('is in a state (resulting from having done something)' > 'has done'), and often further developed into a simple past ('did'). We can even neatly observe this process in the course of attested Greek, where the perfect is gradually shifting from a present to a past tense (e.g. τέθνηκε 'is dead' > 'has died' > 'died') from late classical times onward, eventually being outcompeted by the aorist. The same shift happened in Tocharian, Germanic, Italic, Celtic, Sanskrit and Albanian, where the perfect generally functions as a past tense (e.g. Goth. *bītan* 'to bite', *bait* 'bit' < **b^heid-e/o-*, **b^hoid-e*). The languages differ in the way in which they dealt with the new past tense: we find the perfect merging functionally with the aorist creating a morphologically diverse category (e.g. Latin), a general replacement of all other old past tenses (e.g. Germanic), and extinction of the perfect after having become functionally redundant and been outcompeted by more original past tenses (e.g. Greek, Sanskrit).¹¹

4.2 Anatolian: development to a preterite

For Anatolian, Eichner assumed that the perfect likewise developed to a past tense for his second wave of lexemes into the *hi*-conjugation, but only loosely justified this assumption by pointing out that a preterite interpretation could better account for the existence of *hi*-conjugation lexemes that did not feature a perfect in PIE (e.g. 'to put'). This may at most be seen as a hint, but not as compelling evidence for such a change.¹²

¹⁰ For a more detailed treatment of the semantics of the perfect see 7.

¹¹ Next to the effects of the general development to a past tense, several relics of the older present-tense status are found; cf. e.g. Skt. *jāgāra* 'is awake' < **h₁ge-h₁gor-e* (Gr. ἐγρήγορε 'is awake'), Lat. *meminit* 'remembers' < **me-mon-e+* (Gr. μέμνε 'is minded, eager to'), and the Germanic praeterito-presents, e.g. Goth. *mag* 'can' < **mogh^h-e*. Cf. also lexicalized participles such as Goth. *berusjos* 'parents' < perf.ptc.f. in **-us-ieh₂-* to **b^her-* 'to carry'.

¹² Indeed I do not agree with such an interpretation for the main example Eichner provides, *dai-* 'to put'. For my analysis, see 6.2.3.

In this section I will argue on the basis of different arguments that the PIE perfect developed to a past tense in Anatolian.

4.2.1 *A priori*: predisposition

Given that we find the development from present result state to simple past in virtually all other branches (Greek, Tocharian, Germanic, Italic, Celtic, Sanskrit and Albanian), the perfect clearly had a predisposition to go down this pathway. The germ of this development must have been a feature of PIE already (cf. 7). This makes it *a priori* likely, almost expected, that the development happened in Anatolian as well. It would be remarkable if Anatolian had *not* undergone this change, if of course by no means impossible.

4.2.2 Perfect endings emerge as preterite endings

One Anatolian feature, however, strongly suggests that the perfect indeed developed to a past tense in this branch as well: the fact that the basic *hi*-conjugation endings corresponding to those of the PIE perfect are those of the preterite rather than those of the present tense (cf. already Kuryłowicz 1958: 236-237, Risch 1975: 252). As we saw in 4.1, the default interpretation of the perfect indicative was a present tense, and in secondarily created tense distinctions the preterite rather than the present is secondary. Only in those cases in which a semantic shift to a past tense has taken place do the basic perfect endings surface as such in the past tense.¹³ The fact that the basic paradigm surfaces as the preterite in Anatolian strongly suggests a shift in the default interpretation of the perfect indicative from a present to a past tense.

¹³ This makes it unlikely that there was a development as envisaged in Eichner's (1975) first step, maintained by Kloekhorst (2018: 97) (and cf. Lazzeroni 2012: 59), by which the original perfect inflection was 'pushed into' preterite interpretation because of the creation of a new present. The parallel with the *mi*-conjugation does not hold, as this conjugation was the default inflection for all verbs, most of which were telic and therefore predominantly occurring in preterite interpretation (cf. the ratio of root presents vs. root aorists in Greek, see e.g. Risch 1974: 233). The present tense was therefore a marked interpretation and hence came to be the one to be marked morphologically.

4.2.3 Eventive semantics

The typically eventive semantics of *hi*-conjugated verbs that have featured as a major argument for disconnection of the *hi*-conjugation from the perfect are in fact exactly what we would expect from a perfect that has made the shift to a simple past. The development from a result state to a simple past is in essence a *shift of focus from the resulting state of an event to the event itself*, e.g. ‘is dead’ > ‘died’. This is exemplified by all branches in which this development happened (cf. 4.1 above), most notably by Greek, in which it took place in historical times (e.g. τέθνηκε ‘is dead’ > ‘died’).¹⁴ The eventive semantics of the *hi*-conjugation thus receive a straightforward explanation, and are, moreover, rather another argument *in favor* of a direct derivation of the *hi*-conjugation from the perfect, through a simple past.

4.2.4 Syncretism with the *s*-aorist

It is clear that the 3sg.pret. ending *-š* is a secondary intrusion into the *hi*-conjugation, replacing older **-e*. The older ending can still be seen in the present ending that was built on it: **-e-i* > Hitt. *-e* (>> *-i*). The replacement is neatly motivated by the fact that the original ending **-e* would not have survived in Hittite (Kloekhorst 2008: 97 n. 214 and s.v. *-š*). It is usually held that the source category of this ending *-š* was the *s*-aorist, with **-s* coming to serve as an ending after the loss of **-t* in **-s-t*.

The replacement of 3sg. **-e* must have happened after the creation of the present tense. However, another ending that is specific to the *hi*-conjugation, as Kloekhorst (2007a) has shown, is the 2pl. ending pres. *-šteni*, pret. *-šten*. Here the present ending does equal the preterite ending plus *-i*, and so it is quite possible that this ending already was a feature of the *hi*-conjugation before the creation of the secondary present tense. Kloekhorst (2007a, 2008: s.v. *-šten(i)*) connects the ToAB 2pl. pret. ending *-s* and proposes to trace both back to a PIE 2pl. perfect ending **-su*. Such a reconstruction, however, is difficult to reconcile with the 2pl. perfect ending we find in Sanskrit, *-á* < **-é*. Since the latter can hardly be secondary, the *communis opinio* is that this was the PIE 2pl. perfect ending

¹⁴ For this development see e.g. Allan (2016: § 3) with refs.

(cf. Fortson 2010: 103-104, Beekes 2011: 265). The Hittite ending *-šten*, on the other hand, can easily be secondary, since a likely source quickly presents itself. Given the 2pl. *mi*-conjugation ending *-ten*, the analysis of the ending must be *-š-ten*, with a suffix **-s-*. This suggests even more directly than in the case of the 3sg. that the source of this ending was the *s*-aorist.¹⁵ Of course, if the 3sg. **-e* was a problem, this may also have been the case for the 2pl. **-é* – although in this case, it was at least originally accented. But even before the workings of sound law, the identity of these two endings must have been quite inconvenient, and it is no surprise to find that the 2pl., the less frequent of the two, was replaced in virtually all daughter languages. This suggests that Anatolian inherited the 2pl. ending **-é* and at some point replaced it with the *s*-aorist ending **-s-te*^o.

These apparent intrusions of *s*-aorist endings to repair the inherited inconveniences of the perfect endings suggest not only that the *s*-aorist existed in pre-Hittite,¹⁶ but also that it was semantically close if not

¹⁵ Peyrot (2013: 418) similarly traces the Tocharian ending back to the *s*-aorist.

¹⁶ Since the Anatolian *s*-aorist did not survive as such into the historic period, its original distribution is largely beyond our reach. However, it is likely to have been less prominent than, for example, in Greek, whose recessive category of (active) athematic presents, morphologically corresponding to the default shape of Hittite verbs (another clear testimony to Hittite's archaicity), the *mi*-conjugation, systematically lacks an *s*-aorist (e.g. εἶμι 'to be', εἶμι 'to go', ἔδμεναι 'to eat', φημί 'to say', ἄημι 'to blow'). The *s*-aorist is naturally also secondary to root aorists, with which *s*-aorists sometimes coexist with a functional difference: intransitive athematic aorists may be accompanied by an *s*-aorist counterpart with causative value, e.g. ἔστη 'stood up', ἔστησε 'made stand up, set up', ὄρτο 'rose', ὄρσε 'made arise'. This means that the *s*-aorist does not seem to be 'native' to the core of the verbal system, and it is likely originally to have had a more restricted, secondary, perhaps semantically fuller function, and to have gradually grammaticalized into a marker of perfective aspect functioning more in the core of the verbal system only later. The *s*-aorist is still spreading at the cost of less characterized aorists even in attested Greek, e.g. ἔλιπον >> ἔλειψα 'left', ἔδωκα >> MoGr. ἔδωσα 'gave'. These facts should, however, not be exaggerated. Even if the full grammaticalization of the *s*-aorist may have been a relatively late development, it is still *a priori* likely that the *s*-aorist existed before this development at least as a morphological category, and that its function was at this point not too distant from the attested one, since it was apparently this category that was best suited to become an aorist marker.

The idea that the non-Anatolian *s*-aorist grew out of the 3sg. ending of a preterite category corresponding to the preterite of the *hi*-conjugation in which it had itself been an intrusion (cf. most recently Jasanoff 2019) is, to say the least, a suboptimal solution. It is much more natural to simply identify the *s*-aorist as the source of the *s*-intrusions

identical to the perfect at the time of the spread of these endings. Semantic identity may also well be the reason for the eventual disappearance of the *s*-aorist.¹⁷ This again favors the assumption of a shift in the interpretation of the perfect from a present result state to a past event. The Hittite situation fits in well with the competition between, and mergers of, perfect and aorist that we find in other languages that went through such a development.

4.3 The creation of a new present tense

Clearly, at some point, a new present tense was created by the addition of **-i*. This creation finds a plausible motivation in the development of the perfect to a simple past which then overshadowed the old preterite(s) of the verbs involved. This had created two categories of verbs: those whose preterite went back to the imperfect and those whose preterite went back to the perfect. The two conjugations had effectively already been formed. But since the original *mi*-verb was at this point still the only formation that could express present tense, one was morphologically imbalanced.

into the *hi*-conjugation. The derision of the idea that the *s*-aorist was both the donor of the *s*-morphemes in the perfect and eventually ousted by the perfect (Jasanoff 2003: 177) is the unfortunate result of confusion: the *s*-morphemes served to repair the problematic endings of the perfect *within the paradigm*; this does not at all exclude that the perfect as a *category* was the more dominant of the two. Finally, the comparison with the Tocharian *s*-preterite (Jasanoff 2003: 175-177; 2019: 39), which should prove that the Hittite situation of a 3sg. **-s* among perfect endings is of PIE date, is a mirage. Tocharian simplified *CsC*-clusters on a large scale (cf. e.g. the origin of the *tk*-presents in **^ot-sk*), naturally affecting much of the original *s*-aorist paradigm, but not the 3sg. in **-sa* << **-s* < **-s-t* (see e.g. Peyrot 2013: 503-507). The occurrence of perfect endings in the paradigm is due to the development of the perfect to a preterite, and the subsequent spread of its endings to other preterites (see e.g. Peyrot 2013: 417-419, 421-422).

¹⁷ For one of many parallels cf. e.g. the heavy encroachment of the Italian present perfect (e.g. *ha fatto* ‘has done’) on the domain of the old simple past (i.e. the continuation of the old perfect, called the *passato remoto*, e.g. *fece* ‘did’), to the point of complete ousting in the daily speech of most northern Italians.

	pret. < impf.	pret. < perf.	
pres.	*g ^{wh} en-m-i	*Heḱ-m-i	>> *Hoḱ-Ha-i
	*g ^{wh} en-s-i	*Heḱ-s-i	>> *Hoḱ-ta-i
	*g ^{wh} en-t-i	*Heḱ-t-i	>> *Hoḱ-e-i
	*g ^{wh} n-uen-i	*Hḱ-uen-i	
	*g ^{wh} n-ten-i	*Hḱ-ten-i	>> *Hḱ-sten-i
	*g ^{wh} n-ent-i	*Hḱ-ent-i	
	pret.	*g ^{wh} en-m	*Hoḱ-Ha
*g ^{wh} en-s		*Hoḱ-ta	
*g ^{wh} en-t		*Hoḱ-e	
*g ^{wh} n-uen		*Hḱ-uen	
*g ^{wh} n-ten		*Hḱ-sten	
*g ^{wh} n-ent		*Hḱ-ēr	

While the *m*-preterite was accompanied by a present tense which differed from it only through an additional *-i*, the *Ha*-preterite and its present tense were in most forms a mismatch of ablaut and endings, which was all the more prominent due to the presence of *-i* which in the other category was the only difference between present and preterite. The analogical replacement of the mismatching present forms resolved this morphological imbalance: now in this category of verbs, too, the main distinction between the two tenses was the additional *-i* of the present.¹⁸ In essence, we are dealing with a straightforward case of analogy, with a simple motivation and a clear model. Contra Jasanoff (2003: 12-13), then, there is nothing spectacular or problematic about such a development.¹⁹

Neither is it surprising that the preterite was taken as a basis for the innovation rather than the present. The perfect was typically used with verbs whose present-aorist counterpart indicated a change of state, with the

¹⁸ It is possible that the *hi*-conjugation 3pl. pres. *-anzi* directly stems from the earlier *mi*-present rather than being a recent replacement of a hypothetical **-ēr-i* which itself replaced **-enti*. The existence of **-enti* next to pret. **-ēr* was conceivably tolerated because the *mi*-conjugation had the same endings after **-ēr* replaced **-ent* > **-an*, which had become too opaque due to the workings of sound law (cf. Cowgill 1974: 564, Risch 1975: 252).

¹⁹ And *pace* Cowgill (1979: 28-32), whose criticism is (likewise) too much fueled by the typological comparison with the non-Anatolian IE languages, in which the morphological situation is crucially different.

perfect expressing the subsequent state (more on the semantics of the PIE perfect in 7). Verbs with such a semantic frame usually occur much more frequently in the preterite than in the present.²⁰ For verbs like **Hek-* ‘to die’ and **ues-* ‘to buy’, the preterite (‘died’, ‘bought’) will therefore have been much more common than the present (‘dies, is dying’, ‘buys, is buying’).²¹ Many such lexemes may not even have had a preexisting present at all, a state of affairs comparable to Greek lexemes lacking a present aspect such as *δει-* aor. ‘to get scared’, perf. ‘to be scared’ (more on this in 7). The creation of a present tense on the basis of the preterite (**Hok-e* ‘died’ → **Hok-e-i* ‘dies, is dying’, **uos-e* ‘bought’ → **uos-e-i* ‘buys, is buying’) is therefore completely understandable.²²

²⁰ For the term ‘semantic frame’ see 7.

²¹ Cf. the lack of a present stem to the Greek aor. *πρίατο* ‘bought’ (in later Greek suppletively expressed with *ὠνέομαι*).

²² It is not difficult to find present tense formations based on preterites in other IE languages, cf. e.g. MoGr. *πεθαίνει* ‘dies’, based on the aor. *πέθανε* < *ἀπέθανε*. Note that in this case, too, there already was an earlier ‘serviceable present’ (one of Jasanoff’s (2003: 13) objections), *ἀποθνήσκω*, which was nevertheless replaced in order to morphologically (re)align present and aorist. Of course, since Greek operates with an aspectual system, examples like this show the creation of a new imperfective stem beside a perfective stem rather than just a present tense beside a past tense. Anatolian crucially does not work like that, but rather only has a tense distinction expressed by the absence or presence of **-i*. Since there is no other IE language that functions like this, one can hardly expect to find a perfect parallel in any of them. Despite the necessary difference of morphological mechanism, however, it is not difficult to grasp the typological relatedness of these developments.

One Greek lexeme that did happen to parallel the Anatolian development more closely is the following. The main expression of ‘to stand’ in Ancient Greek was with the perf. *ἔστηκε* ‘stands’ (to the eventive pres. *ἵσταται* ‘goes and stands’, aor. *ἔστη* ‘stood up/still’). This verb was lexicalized to some extent, and therefore, like e.g. *οἶδα*, missed the general development of the perfect to a preterite. Nevertheless, the shape of *ἔστηκε*, which not only had the endings of the new preterite, but could also, after psilosis, be interpreted as having an augment, suggested that it should be a past tense, and hence it came to mean ‘stood’ rather than ‘stands’. Some of its forms allowed for a reinterpretation as a thematic imperfect, which led to the creation of a new present tense *στήκει* ‘stands’ (*στήκω*), e.g. *τῷ ἰδίῳ κυρίῳ στήκει ἢ πίπτει* ‘to his own master he stands or falls’ (NT *Rom.* 14:4). Modern Greek still has *στέκω* ~ *στέκομαι* ‘I stand’, pret. (impf.) *ἔστεκα* ~ *στεκόμουν* ‘I stood’.

5 Conjugation assignment I

5.1 Is there a principle?

Although the origin of the *hi*-conjugation in a development of the perfect to a preterite to which a new present was created by the addition of **-i* is clearly suggested by the overall characteristics of the category, what remains to be inspected is the individual, lexical level. Is there a principle behind the assignment of verbs to the *mi*-conjugation or the *hi*-conjugation?

According to most, there is no such principle.²³ Jasanoff (2003: 13) supports his subscription to this opinion by pointing to the different conjugation assignments of the (near-)synonyms *-šš(a)-i* and *-ške/a-zi* (imperfective suffixes), and *-ahh-i* (factitive suffix) and *-nu-zi* (causative suffix).

Jasanoff criticizes Eichner's "ad hoc explanation" of a layer of verbs transferred based on formal characteristics. The idea that some *hi*-verbs go back to the PIE *CoC-eie/o*-type (main example: *lāk-i* < **log^h-eie/o-*) which were transferred on the basis of their *o*-vocalism is in Jasanoff's view "literally incredible" and "beyond belief", because he "know[s] of no other case in an IE language in which the root vocalism of a morphological class was sufficient to trigger a wholesale switch in inflection and stem structure", which is further characterized as a "bizarre remodelling".²⁴ He

²³ Kortlandt (2010) explores the possibility that the members of the *hi*-conjugation are perfects that came to denote the imperfective rather than the stative-resultative aspect, comparing Slavic formations in *-ěti*, which generally match the PIE perfect semantically, but can also be used for creating imperfectives denoting continuous action, and then occasionally develop secondary transitivity (e.g. Cz. *vidět* 'to see'). Accordingly, Kortlandt tries to find a lexical semantic principle behind membership of the *hi*-conjugation. This scenario has become superfluous with the recognition that a development to a past tense, which Kortlandt (2019: 106) now also assumes, is a transition from stative to eventive (4.2.3), and that transitive verbs (and indeed *hi*-verbs in general) are typically formal transfers (as will become apparent in the following).

²⁴ True falsification, in Jasanoff's (2003: 14) view, is *yašše/a-zi* 'to put on (a piece of clothing); clothe', for which he follows the old reconstruction **uos-eie/o-*. This reconstruction is impossible, however, because of the geminate *-šš-* (Melchert 1984: 31-32 n. 64, Kloekhorst 2008: s.v. *yešš-^{ta}*; *yašše/a-zi*): intervocalic **-s-* gives Hitt. *-š-*. Melchert (1984: 31-32 n. 64; 1994: 152) tried to save the reconstruction **uos-eie/o-*

is certainly correct in objecting to Eichner's assumption of metanalysis of *-nahhun* as the source of the type in *-nai* that this 3sg. must be reconstructed for Proto-Anatolian when the 1sg.pret. ending was still **-Ha*.

Willi (2018: 42 n. 18) is also skeptical and only devotes one rhetorical question in a footnote to the idea: "In Eichner's (1975) model, these formations belong to a 'tertiary group' of *hi*-verbs, whose transfer from the *mi*-conjugation was due to superficial features such as radical *a*-vocalism (...); but are such motivations sufficient?"

Kloekhorst (2018), on the other hand, does follow Eichner and provides other examples of transfers between morphological categories on the basis of formal similarity, such as the fate of the laryngeal-final nasal presents in Greek (**-n-eh₂-* > *-vη/vα-*, but **-n-eh₁-* >> *-vε/o-*, **-n-eh₃-* >> *-vu-*) and the transfers of some originally weak Germanic verbs with **-ī-*, Dutch *-ij-*, to the first class of the strong verbs.²⁵ He further points out that there are many word equations between *hi*-verbs and present-aorist forms in other languages. He provides the following examples.

- Stem formations with **ēh₃*: *dā⁻ⁱ* 'to take' ~ PIE root aorist **deh₃-* 'to give'²⁶ and *pāš⁻ⁱ* 'to swallow' ~ PIE *s*-aorist **pēh₃-s-* (?).

by assuming that *-šš-* was introduced from *uešš^{-ta}* 'to wear', but *-šš-* cannot have come about by sound law in this lexeme either; Melchert's (1994: 152) rule by which **-s-* became *-šš-* "in non-alternating verbal stems in final /-s/" is implausible, and superior explanations are available for his three examples *kišš-*, *lišš-* and *uešš-* (cf. e.g. Kloekhorst 2008: s.vv.). Since there is no plausible analogical source for the geminate *-šš-* in *uašše/a^{-zi}*, it must have come about in this verb by sound law. Kloekhorst's (2008: s.v. *uešš^{-ta}*; *uašše/a^{-zi}*) reconstruction of *uašše/a^{-zi}* as **us-ie/o-*, with *-šš-* from **-sī-*, neatly fits this conclusion. As Kloekhorst points out, it also makes the pair *uešš^{-ta}* 'to wear' and *uašše/a^{-zi}* 'to put on' neatly fit the established pattern of a middle root formation next to an active *je/a*-formation (e.g. med. *huett^{-ta(ri)}*, act. *huttije/a^{-zi}* 'to draw, pull').

²⁵ The examples can easily be multiplied. For example, in Germanic, we find transfers from weak to strong not only with radical **-ī-* to the first class (an English example is *dived* >> *dove*), but also, for example, with radical **-a-* to the sixth class, e.g. Dutch *jagen* 'to hunt', pret. *jaagde* >> *joeg*.

²⁶ For *dā⁻ⁱ*, Eichner (1975: 93-94) had created an ad hoc scenario by which the *hi*-endings in this case went back to middle endings. This formally untenable idea (cf. Kloekhorst 2008: s.v.) arose only to explain the meaning 'to take' ('to give to

- *CoC-eie/o*-formations: *lākⁱ* ‘to knock out (a tooth)’, *kānkⁱ* ‘to hang (tr.)’, *uākⁱ* ‘to break (tr.)’, which on account of their causative meanings vis-à-vis the basic verbs in other branches may be traced back to the PIE causatives **log^h-eie/o-* ‘to make lie down’, **kōnk-eie/o-* ‘to hang (tr.)’, **uoh₂ǵ-eie/o-* ‘to break (tr.)’.
- “*molō*-presents”, which occur with both *o*-grades and *e*-grades in the other branches: *mallⁱ* ‘to grind’ (**molH-*), *paddaⁱ* ‘to dig’ (**b^hod^hh₂-*), *maldⁱ* ‘to recite, make a vow’ (**mold^h-*); possibly also *ueyakkⁱ* ‘to wish, ask for’ < **ue-uok-*, an intensive to **uek-* ‘to want’.
- The type in *°naⁱ* (*tarnaⁱ* ‘to let (go)’, *šunnaⁱ* ‘to fill’) could go back to **°neh₃-* (with **°noǵ-ti* >> **°noǵ-ei* rather than through a reinterpretation of the 1sg.pret. *°ahh-un* as *°a-hhun*), although there is no independent proof for the color of the laryngeal.
- The imperfective suffix *-ššaⁱ* could go back to **-seh₃-* / **-sh₃-*, which may ultimately be the same as **-ske/o-* < **-sk^w-e/o-(?)* with **h₃ ~ *k^w* as in **=k^we ~ *=h₃e* ‘and’ (see 6.2.3).

5.2 In defense of formal transfers

The idea of formal transfers has to be taken much more seriously. If there were formal transfers, they have to be filtered out in order to reach the original input of the *hi*-conjugation.

The kind of stupefaction and skepticism the idea of formal transfers has met with is out of place. It is really not outrageous or even peculiar: with partial identity leading to full identity, it is quite an ordinary form of analogy. Categories merge on the basis of formal overlap all the time.

Especially in Anatolian, the ablaut vowel, along with the endings, was the main distinctive characteristic between the two conjugations, and it is not surprising to find that vowel color took a leading role in conjugation assignment, and that mismatches were transferred.

And not only are such transfers *a priori* perfectly possible, there are several facts that directly suggest that they did indeed happen.

oneself”). However, we do not need the middle to explain the meaning; see Chapter 7.

A strong indication are the distributions that will become apparent from section 6. Roots in which the ablaut vowel was flanked by $*h_2$ or $*h_3$ are almost exclusively found in the *hi*-conjugation. This distribution cannot be related to any functional parameter, but can only be explained by the assumption that the *hi*-conjugation attracted these roots on purely formal grounds.

The correctness of this analysis is underlined by Hittite verbs starting with *h-* < $*h_{2/3}$ -. As we will see below, these regularly ended up in the *hi*-conjugation. However, if they had originally started with $*h_{2/3}o-$, the laryngeal would most probably not have come out as *h-*, but it would have been lost (cf. Kortlandt 2003-2004, Kloekhorst 2006b). This is suggested, for instance, by *au-*ⁱ ‘to see’, which goes back to $*h_2ou-$. The original zero grade, rather than analogical *u-*, is probably preserved in the lexicalized imperfect *hu-ške/a-* ‘to wait for’ < $*h_2u-ske/o-$ (Kloekhorst 2008: s.v.).²⁷ A similar effect is probably seen in the doublet *ānš-*ⁱ ‘to wipe (off)’ ~ *hane/išš-*^{zi} ‘to plaster, wipe’,²⁸ which seems to have resulted from a paradigm split of an ablauting verb $*h_2ómh_1-s-$ / $*h_2mh_1-s-$ (Kloekhorst 2008: s.vv.). Therefore, all *hi*-verbs showing *ha-* in principle go back to $*h_{2/3}e-$, with *e*-grade, which directly implies original *mi*-inflection. Restoration of a preform $*h_{2/3}o-$ on the basis of the zero grade is unlikely: as verbs like *au-*ⁱ / *u-* ‘to see’ show, the analogical leveling rather proceeded in the opposite direction, i.e. from the strong to the weak stem.

²⁷ For the semantic development, cf. e.g. It. *aspettare* ‘to wait (for); expect’ < Lat. *a(d)spectāre* ‘to watch (for)’. An alternative proposal connects *huške/a-* with *huiš-*^{zi} ‘to live’, through the meanings ‘to dwell; to remain, stay’, which are also attested in the cognates (thus e.g. Puhvel 1991: s.v. *hues-*). Against this proposal it may be objected that *huiš-* only means ‘to live, be alive, survive, recover’, with derivations meaning ‘raw’ and ‘wild beast; game’ – very similar to $*g^w ieh_3-$ in the rest of Indo-European. There is no indication that the Anatolian verb ever meant ‘to dwell, stay’, which may have been a post-Anatolian innovation (cf. PGM. **libēn-* ‘to be alive’ > Eng. *live* ‘to be alive; to dwell’ – although **libēn-* itself shows the opposite development from PIE $*lik^w-eh_1-$ ‘to be left, to remain’). It is quite a stretch to assume a development ‘to live’ > ‘to dwell’ > ‘to stay’ > ‘to wait’ > ‘to wait for’, and only in the imperfective. A development $*h_2u-ske/o-$ ‘to watch (for)’ > *huške/a-* ‘to wait (for)’ is much more straightforward.

²⁸ The semantic closeness of these verbs is borne out, for example, by the fact that both can be used with *išhahru* to express ‘to wipe (away) tears’ (cf. HED 3: 86-87).

More evidence comes from affixes. For example, the other IE languages show that PIE nasal infix formations only had *e*-grade. In Hittite, we find two types of continuation of this infix, *-ni(n)(C)^{-zi}* and *-na⁻ⁱ*. It is telling that formations going back to **-ne-K-* are only found *mi*-conjugated, and it will be argued below that the remaining formations in **-ne-H-* are distributed according to the color of the laryngeal: **-ne-h₁-* comes out as *mi*-conjugated, whereas **-ne-h₂-* and **-ne-h₃-* are the sources of the type in *-na⁻ⁱ*. Significantly, there is no type in ***na^{-zi}*. Another clear case is *-ahh⁻ⁱ*, whose reconstruction as **-eh₂-* is not in doubt (cf. e.g. Lat. *novāre* ‘to renew’, Hitt. *neṽahh-* ‘to renew’ < **neu-eh₂-*).

In addition, some undeniable word equations suggest that the Hittite verbs go back to a different morphological category, with an accordingly differently shaped preform. The semantics of *lāk⁻ⁱ* (< virtual **log^h-ei*), for example, directly point to the PIE causative **log^h-eie/o-*, to which it is formally extremely close, and whose morphological type does not survive in Hittite in any other way. We will see more examples below, such as the striking pair *dākk⁻ⁱ* ‘to resemble’ ~ Gr. *δοκέω* ‘to resemble’ < **dok⁻-eie/o-*, originally the causative of **dek⁻* ‘to receive’.

Jasanoff’s perplexity especially regards this *CoC-eie/o*-type, of which he does not believe that it could lose its stem suffix and become an ablauting athematic verb. To be sure, such a development may seem odd from the perspective of other Indo-European languages. In the context of Hittite, however, it is completely understandable. First of all, since intervocalic **-j-* does not survive in Hittite, sound law took care of the destruction of the suffix. Compare, for instance, the PD *i*-stems, whose OH oblique cases in *-a-* < **-eio-*, e.g. gen. *-aš* < **-eios*, show that we should expect there to be nothing left of a prevocalic sequence **-ei-*. The ensuing verbal type, whose approximate shape must have been **CoC-ē-ti* (*-di*) / **CoC-onti*, had characteristics both of the *hi*-conjugation (**-o-* in the root) and of the *mi*-conjugation (**-ē^{-ti}*), and was subsequently dehybridized into one of the two more familiar types. Clearly, of these characteristics, the defining *o*-vocalism was the dominant feature, which induced a transfer to the *hi*-conjugation.²⁹ The fact that it became ablauting is not at all

²⁹ Since the *CoC-eie/o*-type was clearly pushed into the mold of the perfect/*hi*-conjugation pattern in pre-Hittite, it does not seem advisable to me to adapt the

surprising. While ablaut was on its way out in the other IE languages, it was still thriving in Hittite. Here it rather was the pattern with *-o- throughout the paradigm that was abnormal, and its adaptation therefore does not have to surprise us.

In the case of other formations, not discussed by Jasanoff, the transfer was even simpler, and only entailed a switch in the endings that differ between the two conjugations, e.g. *dō-m >> *dō-Ha.

The same goes for formations with *o*-grade of the type *molH- ‘to grind’ (cf. Goth. *malan* ‘to grind’, Lith. *málti* ‘to grind, mill’). These sometimes have cognates with *e*-grade (e.g. OIr. *meilid* ‘grinds’, OCS *meljǫ* ‘to grind, mill’). For Jasanoff, this category of verbs constitutes the true cognate of the Hitt. *hi*-conjugation in non-Anatolian IE: he regards them as the *disiecta membra* of a category with perfect endings and *o/e*-ablaut. However, we always find either **o* or **e* in the formations of the daughter languages, never both in one paradigm,³⁰ suggesting that we are rather dealing with two separate morphological types. It has been noted that the verbs in question typically designate (potentially) repeated actions and belong to such semantic domains as beating, stabbing and digging (cf. Stang 1942: 40-42, Kümmel 2004: 142, Kloekhorst 2018: 100-101). Stang (1942: 42) therefore plausibly compares the formation featuring *o*-vocalism with the Sanskrit ‘intensive’ (iterative) of the type *jan̄ghan-* < **g^{wh}en-g^{wh}on-*, intensive to *han-* < **g^{wh}en-* ‘to beat’. Accordingly, LIV² reconstructs e.g. Goth. *malan* (etc.) as **me-molH-*, assuming dereduplication. Although it may be debated whether these were indeed a single type in PIE, and, if not, what exact shape the **molH*-type had, it is at least clear that the latter did not have perfect endings. There is no trace of perfect endings outside Anatolian, nor would this make semantic sense. Therefore it is best to assume that in Hittite these verbs simply took on *hi*-inflection on the basis of their *o*-vocalism, just like laryngeal-colored verbs

preform **CoC-eie/o-* as reconstructable on the basis of the other IE languages only to bring it closer to the Hittite form (thus e.g. Kloekhorst 2018: 100: **CoC-e*, only in non-Anatolian IE + **-ie/o-*).

³⁰ The Hitt. *a/e*-ablaut on which this idea is based is clearly secondary, see Kloekhorst (2012; 2014b; 2018: 90-91).

such as **deh₃-* and the *CoC-eie/o*-type, rather than the other way around (cf. Kümmel 2004: 146-148).³¹

6 Conjugation assignment II:

A formal distribution between the *mi*- and *hi*-conjugations

In the following I will conduct a systematic investigation of the relationship between form and conjugation assignment. If formal mismatches were generally avoided, we should be able to observe some clear formal tendencies, and to be able to find principles to predict to a large extent, on the basis of the inherited PIE root or stem structure, according to which conjugation a given inherited verb will inflect in Hittite: we expect *mi*-inflection to be the standard, and *hi*-conjugation to correlate with laryngeal-coloring and morphologically motivated *o*-grade, notably *CoC-eie/o*-formations, **molH*-type iteratives, and – the original core of the category – old perfects. If there are no secure cognates, we can make an educated guess about the original formation of a *hi*-verb based on its meaning. If this does not point in any direction either, the exact original formation of the verb in question must remain unclear.³²

³¹ Cf. especially Kümmel (2004: 148): “Es erscheint vorläufig besser, *mi*-Endungen des Aktivs anzusetzen, und zwar wegen der “aktiven” Bedeutung (Tätigkeitsverben) und der Fortsetzung außerhalb des Anatolischen, die nirgendwo eine Konfusion mit dem Perfekt erkennen lässt. Dies impliziert, dass die betreffenden Verben im Heth. sekundär in die *hi*-Konjugation eingeordnet worden und lässt die Frage nach dem eigentlichen Ursprung der anatolischen **hai*-Konjugation offen (hier könnte er jedenfalls nicht liegen).”

³² In the overviews, perfects are noted as **(Ce-)CoC-e*, *CoC-eie/o*-causatives and -iteratives as **CoC-eie/o-* and **molH*-type iteratives as **CoC-*. All ‘educated guesses’ are provided with a question mark. When such a guess points to an iterative, the merger prevents us from distinguishing between the iterative type represented by **molH-* ‘to grind’ and the *CoC-eie/o*-iterative type; in such cases I will note **CoC-(eie/o-)*, and use the cover term ‘*o*-grade iterative’. A meaning in the domain of ‘cutting’ is sometimes used to justify the reconstruction of a **molH*-type iterative (e.g. Jasanoff 2003: 78-79), but since the original meaning of the formation must then have been iterative, such cases may in principle just as well continue *CoC-eie/o*-iteratives. When the original category is irretrievable, but the formation must in any case have had *o*-grade, this is noted as ‘? (*CoC-*)’.

The discussion will be structured as follows. The first and main part of the overview consists of a collection of unaffixed Hittite verbs inherited from PIE (cf. in general Kloekhorst 2008). This includes verbs with a historical suffix **-s-* or **-u-*, which are usually the only surviving form of the lexeme, and for all intents and purposes behave like root formations. In order to determine the effects of laryngeals on conjugation, the root formations are divided into roots which did and roots which did not have a laryngeal adjacent to the ablaut vowel. Those which did not are further divided according to the structure of the root: first the straightforward structures in **^oeC-*, then those in **^oeCC-*. The latter shape requires separate attention because it underwent various vowel-altering sound laws. We then move on to roots with a laryngeal flanking the ablaut vowel to see if they show different *mi-* to *hi-* ratios. This is *a priori* not expected for **h₁*, but it is for **h₂* and **h₃*: if the coloring of the latter type indeed generally triggered a transfer from the *mi-* to the *hi-* conjugation, these groups should have a much higher percentage of *hi-* inflection. The treatment of the root formations is followed by a scrutinization of the behavior of the remaining types: reduplicated verbs, nasal infix verbs, and verbal suffixes. For the sake of clarity, an overview of the sections of the discussion is provided below.

6.1	Root formations	6.2	Affixed formations
6.1.1	No adjacent laryngeal	6.2.1	Reduplicated formations
6.1.1.1	<i>*^oeC-</i>	6.2.2	Infix formations (<i>*^o-ne-C-</i>)
6.1.1.2	<i>*^oeCC-</i>	6.2.3	Suffixes
6.1.2	Adjacent laryngeal		
6.1.2.1	<i>*h₁</i>		
6.1.2.2	<i>*h₂</i>		
6.1.2.3	<i>*h₃</i>		
6.1.2.4	<i>*H</i>		

6.1 Root formations

6.1.1 No adjacent laryngeal

6.1.1.1 *^oeC-

6.1.1.1.1 *CeC-

The following overview contains a collection of all roots with the structure CVC- without any possibly interfering laryngeal. For this structure, we do not expect there to be an inherent liability to be transferred to the *hi*-conjugation, only occasional transfers based on morphological *o*-grade.

PIE root	formation	Hitt.	meaning	conj.
*g ^{wh} en-	*g ^{wh} en-	kuen ^{-zi} / kun-	‘to kill’	<i>mi</i>
*kes-	*kes-	kiš ^{-zi}	‘to comb’	<i>mi</i>
*k ^w er-	*k ^w er-	kuer ^{-zi} / kur-	‘to cut’	<i>mi</i>
*mer-	*mer-	mer ^{-zi} / mar-	‘to disappear’	<i>mi</i>
*neg ^{wh} -	*neg ^{wh} -	neku ^{-zi}	‘to become evening’	<i>mi</i>
*pes-	*pes-	peš ^{-zi} / pišš-	‘to rub’	<i>mi</i>
*ses-	*ses-	šeš ^{-zi} / šaš-	‘to sleep’	<i>mi</i>
*ter-	*ter-	ter ^{-zi} / tar-	‘to speak’	<i>mi</i>
*uek̑-	*uek̑-	uek ^{-zi} / uekk-	‘to want’	<i>mi</i>
*dek̑-	*dok̑-eie/o-	dākk ⁻ⁱ / dakk-	‘to resemble’	<i>hi</i>
*leg ^h -	*log ^h -eie/o-	lāk ⁻ⁱ / lak-	‘to knock down, fell’	<i>hi</i>
*ues-	*(ue-)uos-e?	uāš ⁻ⁱ	‘to buy’	<i>hi</i>

It is immediately clear that we are not dealing with a random distribution. As predicted, the majority of verbs of this type is *mi*-conjugated. Moreover, of two out of three exceptions, it is clear that there is something going on on the morphological level.

dākk⁻ⁱ ‘to resemble’ does not continue the base verb **dek̑-* ‘to receive’ (Gr. δέκτο ‘received’), but is identical in meaning to Gr. δοκεῖ ‘resembles’ < **dok̑-eie/o-*. This must originally have been the causative of **dek̑-* (cf. Oettinger 1979: 427), but, although the historical semantic connection is not difficult to grasp (cf. the etymological connection between *receive* ~ *perceive*), the somewhat deviant meaning in both Greek and Hittite indicates that it had developed towards the meaning ‘to resemble’ in PIE

already.³³ It is clear, then, that Hittite *dākk-i* must be interpreted as continuing a PIE *CoC-eie/o*-causative, which joined the *hi*-conjugation only secondarily. Coincidentally, the identification of *dākk-i* with $\delta\kappa\epsilon\tilde{\iota}$ < **dók-eie/o-* may also solve a formal problem. If **dók-e(i)* were original, it would have lenited the **k* (-*kk-*) and we would not have had *dākki*, but ***dāki* (cf. *aki* / *akkanzi* ‘to die’ < **Hók-ei* / **Hk-enti*). For Kloekhorst (2008: s.v.), this is the reason to assume that the preform was **dók_{h1}-*. But there is otherwise no trace of a final **h₁*, and forms like Gr. $\delta\acute{\epsilon}\kappa\tau\omicron$ ‘received’ and $\delta\acute{\omicron}\xi\alpha$ ‘expectation, notion’ rather indicate that there was no root-final laryngeal. However, if we accept that the source of *dākk-i* is **dók-éie/o-*, with accent on the suffix (cf. Skt. *-áya-*), the problem disappears: unaccented **-o-* does not trigger lenition. A model for long *-ā-* plus a non-lenited *-kk-*, which **dakk-* resembled most closely, was available in *šākk-i* / *šakk-* ‘to know’ < **sókh-* / **skH-*.

lāk-i ‘to knock down, fell’ is by now familiar. Its meaning corresponds to that of the causative **log^h-eie/o-* ‘to make lie down’ (cf. Goth. *lagjan* ‘to lay’) rather than to that of the base verb **leg^h-* ‘to lie (down)’ (cf. Goth. *ligan* ‘to lie’) (cf. Oettinger 1979: 425).

For *uāš-i* ‘to buy’, we do not have any exact non-Anatolian cognates. The other IE languages only have a derived nominal formation **ues-no-* ~ **uos-no-* (Skt. *vasná-* m. ‘price bid’, *vasná-* n. ‘wage(s)’, Gr. $\tilde{\omega}\nu\omicron\varsigma$ ‘price paid; purchase’, $\tilde{\omega}\nu\eta$ ‘buying, purchasing’, Lat. *vēnus* ‘sale’, *vēnum dare* ‘to sell’, Arm. *gin* ‘price’), a zero grade³⁴ version of which was also inherited in Anatolian, as evidenced by Hitt. *ušnije/a-zi* ‘to put up for sale’ < **us-n-ie/o-*. The verb indicating the action of buying in the ancestor of the other IE languages was rather **k^wrih₂-* (Skt. *krīṇāti*, Gr. $\pi\rho\rho\iota\sigma\theta\alpha\iota$, OIr. *ni-cria* subj., RCS *kr̥nuti*, ToB *k̥arya-*, all ‘to buy’). For the prehistory of Hitt. *uāš-i*, there are two main possibilities that may be explored. One is that the Hittite situation derives from the system as reconstructable on the basis of the other IE languages, which would mean that Hittite innovated the verb based on the noun. This may then have been the source of the *o*-vocalism (cf. later Gr. $\tilde{\omega}\nu\acute{\epsilon}\omicron\mu\alpha\iota$ ‘to buy’ ← $\tilde{\omega}\nu\omicron\varsigma$). However, Hitt. *ušnije/a-zi* suggests that at least one inherited form of the noun did not have

³³ Cf. similarly Lat. *doceō* ‘to teach’ < **to make perceive*’.

³⁴ And possibly athematic, see Kloekhorst (2008: s.v.).

o-vocalism in Anatolian, and the verb would have to have been backformed, i.e. the noun would have to have been deprived of its *n*-suffix, which is not an obvious operation. Moreover, *ušnije/a^{-zi}* is itself already a denominal derivation from this noun, showing the normal IE denominalizing procedure of adding **-ie/o-*. It therefore seems more straightforward to assume that the verb is old. This suggests that post-Anatolian IE replaced **ues-* with **k^wrih₂-*, with **ues-* only surviving as an archaism in a nominal derivation. Since there are no direct cognates to check with, we only have the semantics of the verb to go by in trying to determine which *o*-grade formation *uāš⁻ⁱ* continues. Since its meaning is neither causative nor iterative, it is unlikely to continue the causative formation or an *o*-grade iterative.³⁵ Rather, the meaning ties in well with the assumption that we are dealing with one of the verbs which were primary to the category of the *hi*-conjugation, i.e. an old perfect. In short, the development would have been pres.-aor. **ues-* ‘to buy’, perf. **(ue-)uos-e* ‘has bought, is in possession of’ (cf. Gr. κέκτημαι) > ‘bought’, whence a new pres. **uos-e-i* ‘buys’.

Taking stock of the first and most basic structural category as a first indication of the principles underlying the distribution among the conjugations, we can conclude the following. The distribution of verbs among the two conjugations is not random. Most verbs of the shape **CeC-*, in which *C* is not a laryngeal, are *mi*-conjugating. Of the three exceptions, two clearly go back to derived formations with morphological *o*-grade: *dākk⁻ⁱ*, *lāk⁻ⁱ* < **doḱ-eie/o-*, **log^h-eie/o-*. The remaining verb *uāš⁻ⁱ* ‘to buy’ is a good candidate to belong to the original group of perfects that was part of the genesis of the *hi*-conjugation.

6.1.1.1.2 **CCeC-*

The following overview contains roots of the shape **CCeC-*. We do not expect the extra consonant to have any effect on the ablaut vowel, and so our expectation is that most verbs are *mi*-conjugated, and that any verb with *hi*-inflection will have a morphologically motivated *o*-grade.

³⁵ Oettinger’s (1979: 430) reconstruction of a causative **uos-eie/o-* is based on the incorrect idea, also found in LIV² (s.v.), that *uāš⁻ⁱ* means ‘to sell’ rather than ‘to buy’. On the semantics cf. HEG (s.v.).

PIE root	formation	Hitt.	meaning	conj.
* <i>h₁ueb^h</i> -	* <i>h₁ueb^h</i> -	<i>uep^{-zi}</i>	‘to weave’ (?)	<i>mi</i>
* <i>h₂ueǵ^(h)</i> -	* <i>h₂ueǵ^(h)</i> -	<i>huek^{-zi}</i> / <i>huk-</i>	‘to slaughter’	<i>mi</i>
* <i>h₂ueg^h</i> -	* <i>h₂ueg^h</i> -	<i>huek^{-zi}</i> / <i>huk-</i>	‘to conjure’	<i>mi</i>
* <i>h₂ues-</i>	* <i>h₂ues-</i>	<i>huiš^{-zi}</i> / <i>huš-</i>	‘to live’	<i>mi</i>
* <i>smen-</i>	* <i>smen-</i>	<i>šamen^{-zi}</i> / <i>šamn-</i>	‘to pass by’	<i>mi</i>
* <i>trep-</i>	* <i>trep-</i>	<i>terepp^{-zi}</i> / <i>tere/ipp-</i>	‘to plough’	<i>mi</i>
* <i>sreb^h</i> -	* <i>srob^h-eie/o-</i>	<i>šarāp⁻ⁱ</i> / <i>šarip-</i>	‘to sip’	<i>hi</i>
* <i>sker-</i>	* <i>skor-(eie/o-)?</i>	<i>iškār⁻ⁱ</i> / <i>iškar-</i>	‘to stab’	<i>hi</i>
* <i>sper-</i>	* <i>spor-(eie/o-)?</i>	<i>išpār⁻ⁱ</i> / <i>išpar-</i>	‘to spread’	<i>hi</i>
* <i>g^hreb^h-?</i>	? (* <i>g^hrob^h-</i>)	<i>karāp⁻ⁱ</i> / <i>kare/ip-</i>	‘to devour’	<i>hi</i>

Indeed, although it is not an overwhelming majority, most verbs are *mi*-conjugated.

The origin of the *o*-grade of one of the four *hi*-verbs, *šarāp⁻ⁱ* ‘to sip’, can be established without difficulty. The only manifestation of PIE **sreb^h*- which is attested in multiple daughter languages is **srob^h-eie-* (Gr. ῥοφέω ‘to slurp’, Lat. *sorbeō* ‘to slurp’, Alb. *gjerb* ‘slurps’; see LIV²: s.v.). It is therefore likely that this is the preform of *šarāp⁻ⁱ* as well (see Oettinger 1979: 426). Again, then, an exception goes back to the *CoC-eie/o*-type, here in its iterative function. This also solves the only example hinted at by Oettinger (2006: 37) of a verb whose meaning he considers problematic to the idea that the *hi*-conjugation derives from the perfect: the verb is a secondary member of the conjugation.

For the other three, the comparative evidence is less helpful. Only *iškār⁻ⁱ* and *išpār⁻ⁱ* have undisputed root etymologies. However, the cognates rather feature *e*- or zero grade: for *iškār⁻ⁱ* ‘to stab’, cf. e.g. Gr. κείρω ‘to cut (off), shave’, OHG *sceran* ‘to cut (off), shave’, Lith. *skirti* ‘to separate’; for *išpār⁻ⁱ* ‘to spread’, cf. Gr. σπείρω ‘to sow’. We can therefore only speculate about the origin of the morphological *o*-grades of *iškār⁻ⁱ* and *išpār⁻ⁱ* based on semantics. *iškār⁻ⁱ* ‘to stab’ is perhaps most likely categorized as an original *o*-grade iterative, given the semantic domain of cutting. The inherently repeated nature of **sper-* ‘to spread’ may also point to an *o*-grade iterative. These classifications have to remain speculative.

Least clear of all is *karāp*⁻ⁱ ‘to devour’. The most favored comparison (LIV²: s.v. **g^hrebh₂-*) connects several words for ‘to seize’, among which the perfect **g^he-g^hrobH-e* (Skt. *jaḡrābha* ‘has seized, possesses’) and perhaps a causative-iterative **g^hrobH-eie/o-* (OCS *grabiti* ‘to snatch, grab’). Kroonen (2012: 194-195) rather connects Nw. dial. *gurpa, garpa, garva* ‘to devour, gobble, belch’ < **g^hrb^h-neh₂-*, **g^hrob^h-neh₂-*, with an *o*-grade which he regards as reflecting a derivational base with *o*-grade, which he identifies with Hitt. *karāp*⁻ⁱ < **g^hrob^h-* and interprets as an iterative on semantic grounds. None of these options is evidently correct.

6.1.1.2 *^oeCC-

In roots ending in *^oeCC- various sound laws made sure that **e* did not survive as such in Hittite. Most importantly, **CerC*- and **CelC*- surface as *CarC*- and *CalC*-, respectively, due to the well-established sound change *eRCC* > *aRCC*, and it seems that the same vocalic change is also found if there is a stop rather than a resonant in such sequences (cf. Melchert 1994: 140, Kloekhorst 2008: s.vv. *takš*^{-zi}, *ṽatku*^{-zi}). It has been proposed on independent grounds that the vowel written as *-a-* here does not spell /a/, but /ə/.³⁶ If this is indeed the case, we do not expect verbs of this root structure to have been structurally transferred to the *hi*-conjugation. For *ḥamank*⁻ⁱ and *išpānt*⁻ⁱ, see 6.2.1; for *tamenk*^{-zi}, see 6.2.2.³⁷

³⁶ Kloekhorst (p.c.), based on the observation that these verbs show consistent spelling with *CVC*-signs where these are available, pointing to a phonological interpretation *CəC* rather than *CaC*. The latter distinction is an older idea confirmed in recent times by more systematic investigations. Frotscher (fthc.) demonstrates that there is an etymological distribution between, on the one hand, consistent use of the sign *kán* (< **-Ken-*, **-Kŋ-*) and, on the other hand, alternation between *kán* and *ka-an*, *ga-an* or *qa-an* (< **-Kon-*). Kloekhorst & Mens (fthc.) show that the distribution also holds for other pairs, and give a synchronic linguistic interpretation.

³⁷ We may also include here the verb *le/išš*- ‘to pick, gather’ < **lesH-*. There are no attestations with diagnostic endings, but the verb is generally analyzed as *mi*-conjugated on the basis of its vocalism. For the analysis underlying the reconstruction and meaning of the verb *ū(n)ḥ*^{-zi}, see Lorenz & Rieken (2011). Note that the original inflection and prehistory of *malk*- ‘to spin’ are too insecure to allow for a meaningful classification. The original inflection of *kalank*- ‘to soothe, satiate’ is not known, and its original morphological make-up is debated. The preform could be either **KlonK*- or **KlnK*- (see Shatskov 2017: 48-49). The verb is hardly an indication for the existence of an *o*-grade *n*-infix type **-on-*.

PIE root	formation	Hitt.	meaning	conj.
*b ^h erh ₂ -	*b ^h erh ₂ -	parḫ ^{-zi}	‘to chase’	mi
*b ^h ers-	*b ^h ers-	parš ^{-zi}	‘to flee’	mi
*h ₁ leng ^h -	*h ₁ leng ^h -	li(n)k ^{-zi}	‘to swear’	mi
*h _{1/3} uenh ₁ -	*h _{1/3} uenh ₁ -	uen ^{-zi} / uyan-	‘to copulate’	mi
*h _{1/3} uenh ₂ -	*h _{1/3} unh ₂ -	ū(n)ḫ ^{-zi}	‘to clear’	mi
*kelh ₁ -	*kelh ₁ -s-	kallišš ^{-zi} / gališš-	‘to call’	mi
*kerp-	*kerp-	karp ^{-zi}	‘to pick’	mi
*kers-	*kers-	karš ^{-zi}	‘to cut off’	mi
*leuk-	*leuk-	lukk ^{-zi}	‘to set fire to’	mi
*nenK-	*nenK-	ni(n)k ^{-zi}	‘to soak up’	mi
*selK-	*selK-	šalk ^{-zi}	‘to knead’	mi
*senh ₂ -	*senh ₂ -	ša(n)ḫ ^{-zi}	‘to seek’	mi
*senh ₂ -u-	*senh ₂ -u-	ša(n)ḫu ^{-zi}	‘to roast’	mi
*sperd ^h -	*sperd ^h -	išpart ^{-zi}	‘to escape’	mi
*stelg ^h -	*stelg ^h -	ištalk ^{-zi}	‘to flatten’	mi
*sTeNh _{2/3} -	*sTeNh _{2/3} -	išta(n)ḫ ^{-zi}	‘to taste’	mi
*sterk ¹ -	*sterk ¹ -	ištark ^{-zi}	‘to afflict’	mi
*teks-	*teks-	takš ^{-zi}	‘to devise’	mi
*terh ₂ -u-	*terh ₂ -u-	tarḫu ^{-zi}	‘to prevail’	mi
*terk ^w -	*terk ^w -	tar(k)u ^{-zi}	‘to dance’	mi
*treup-	*treup-	tarupp ^{-zi}	‘to collect’	mi
*ueih ₂ -	*ueih ₂ -	ueḫ ^{-zi} / uah-	‘to turn, patrol’	mi
*uelh ₃ -	*uelh ₃ -	ualḫ ^{-zi}	‘to hit’	mi
*uelK-	*uelK-	ualk ^{-zi}	‘to ?’	mi
*uerp-	*uerp-	uarp ^{-zi}	‘to wash’	mi
*uetk ^w -	*uetk ^w -	uatku ^{-zi}	‘to jump’	mi
*b ^h ed ^h h ₂ -	*b ^h od ^h h ₂ -	padda ⁻ⁱ / padd-	‘to dig’	ḫi
*kenk-	*konk-	kānk ⁻ⁱ / kank-	‘to hang (tr.)’	ḫi
*meld ^h -	*mold ^h -	māld ⁻ⁱ / mald-	‘to recite’	ḫi
*melH-	*molH-	mall ⁻ⁱ	‘to mill’	ḫi
*merǵ-(?)	*morg ¹ -(eie/o-)?	mārk ⁻ⁱ / mark-	‘to divide’	ḫi
*serTh _{2/3} -	*sorTh _{2/3} -(eie/o-)?	šarta ⁻ⁱ / šart-	‘to wipe, rub’	ḫi
*skelh _{2/3} -	*skolh _{2/3} -(eie/o-)?	iškalla ⁻ⁱ / iškall-	‘to split’	ḫi
*sperh _{2/3} -	*sporh _{2/3} -(eie/o-)?	išparra ⁻ⁱ / išparr-	‘to trample’	ḫi
*uers-	*uors-(eie/o-)?	uarš ⁻ⁱ	‘to wipe’	ḫi
*meuh ₁ -	*(me-)mouh ₁ -e?	mau ⁻ⁱ / mu-	‘to fall’	ḫi
*sekh ₁ -	*(se-)sokh ₁ -e?	šākk ⁻ⁱ / šakk-	‘to know’	ḫi
*h ₂ ueph ₁ -	? (*h ₂ uoph ₁ -)	ḫuḫapp ⁻ⁱ / ḫupp-	‘to throw’	ḫi
*h ₂ uert-	? (*h ₂ uort-)	ḫuḫart ⁻ⁱ / ḫurt-	‘to curse’	ḫi
*stemb ^h H-?	? (*stomb ^h H-)	ištāp ⁻ⁱ / ištapp-	‘to shut’	ḫi

Indeed, the majority of these verbs are *mi*-conjugated. This category therefore shows the behavior expected for roots without laryngeal coloring. This is independent confirmation of the idea that the *a* of these verbs does not spell /a/ (cf. also 6.1.2.2.2 and 6.1.2.3.2). Moreover, for some of the *hi*-inflected verbs, cognates with *o*-grade are again more numerous than those with *e*-grade, meaning that the corresponding Hittite verbs also plausibly continue *o*-grade formations, whose vocalism triggered a transfer to the *hi*-conjugation.

The cognates of *padda*⁻ⁱ ‘to dig’ predominantly point to an *o*-grade iterative, esp. Lat. *fodiō* ‘to dig’, Lith. *badýti* ‘to butt, poke’ (beside Lith. *bèsti* ‘to stick (into)’ with *e*-grade). It is therefore likely that the Hittite verb also goes back to the formation underlying these verbs (cf. Jasanoff 1979: 87; 2003: 74, 77; Kloekhorst 2018: 101).

kānk⁻ⁱ ‘to hang (tr.)’ even provides us with two plausible preform candidates with **-o-*. Given the meaning ‘to hang (intr.)’ in the rest of IE, Kloekhorst (2018: 100) proposes to trace the Hittite verb back to a causative **kōnk-eie/o-* ‘to hang (tr.)’, corresponding to ON *hengja* ‘to hang (tr.)’ < **hangjan-*. However, **hangjan-* is probably secondary to **hanhan-* ‘to hang (tr.)’ (e.g. Goth. *hahan*, ON *hanga*, OHG *hāhan*, all ‘to hang (tr.)’; cf. Kroonen 2013: s.v. **hanhan-*). This in turn points to an *o*-grade present, PIE **kōnk-* ‘to hang (tr.)’ (cf. Oettinger 1979: 420–421, Jasanoff 2003: 72–74, 76). It is remarkable, however, that the meaning is not iterative.

The main cognate of *māld*⁻ⁱ ‘to recite’ is Proto-Balto-Slavic **mold-* (Lith. *maldýti* ‘to implore’, OCS *moliti* ‘to ask, pray’; beside Lith. *melsti*, 1sg. *meldžiu* ‘to ask, pray’ with *e*-grade).

mall⁻ⁱ ‘to mill’ goes back to the *Paradebeispiel* of the **molH*-type iteratives. Indeed, various cognates have *o*-grade, e.g. Goth. *malan* ‘to grind’ and Lith. *mālti* ‘to grind, mill’.

We can only speculate about the original formations of the remaining lexemes, which do not have secure *o*-grade cognates, or even secure cognates at all, in other IE languages.

On the basis of the meaning, we can speculatively classify *šarta-i* ‘to wipe, rub’, *išparra-i* ‘to trample’ and *uarš-i* ‘to wipe, harvest’ as *o*-grade iteratives.³⁸

Since *mārki-i* ‘to divide, separate, cut up’ and *iškalla-i* ‘to split’ belong to the semantic domain of cutting, they could also tentatively be classified as *o*-grade iteratives (cf. Jasanoff 2004: 78-79).³⁹

The subject-affecting meaning (see 7) of *mau-i* ‘to fall’ speaks most in favor of an old perfect: **(me-)mouh₁-e* ‘has fallen’ > ‘fell’, whence **mouh₁-ei* ‘falls’.⁴⁰

The verb *šākk-i* ‘to know’ is nowadays usually connected with **sekH-* ‘to cut’ (cf. ToB *karsa-*, ToA *kārsā-* ‘to know, understand, recognize’ ~ Hitt. *karš-* ‘to cut’ < **kers-*), through a meaning ‘to distinguish’. *šākk-* can still have meanings quite close to this, such as ‘to take note of’, ‘to recognize’, ‘to acknowledge’ and ‘to experience’ (see CHD: s.v.). This meaning ‘to distinguish’ and the related telic and subject-affecting meanings lend themselves well to an analysis as an old perfect: **(se-)sokh₁-e* ‘has distinguished’ > ‘distinguished’, whence **sokh₁-ei* ‘distinguishes, recognizes’. Note that the stative meaning ‘to know’ is secondary, not a remnant of the original stative(-resultative) value of the perfect.

³⁸ *šarta-i* does not have obvious cognates. For *išparra-i* cf. Skt. *sphurāti* ‘to kick/push away’ < **sprH-*, Lith. *spirti* ‘to kick out’ < **sprH-* (cf. Jasanoff 2003: 78, Kloekhorst 2008: s.v.). For *uarš-i* cf. OLat. *vorrō* ‘to sweep’ < **uors-* or **urs-*, RCS *vbrxu* ‘to thresh’ < **urs-* (cf. Oettinger 1979: 428-429, Jasanoff 2003: 78, Kümmel 2004: 155).

³⁹ *mārki-i* does not have secure cognates. Proposals include Skt. *marc-āya-* ‘to damage’ < **mork-eie/o-(?)* (Oettinger 1979: 425) – which probably rather goes back to **molk^w-eie/o-*, with Gr. βλάπτω ‘to damage’ < **mlk^w-ie/o-* – and PGm. **markō-* ‘border, region’, Lat. *margō* ‘border’ < **morg-* (Kloekhorst 2008: s.v.). For *iškalla-i* cf. Gr. σκάλλω ‘to stir up, hoe’ < **sklH-*, Lith. *skėlti* ‘to split’ < **skelH-*, σκούλλω ‘to tear up, molest’, perhaps < **skolH-* (cf. Jasanoff 2003: 78).

⁴⁰ *mau-* does not have secure cognates. It is usually presented as having many cognates (cf. e.g. LIV²: s.v. **m₁ieuh₁-*), but the semantics of the connected verbs are only vaguely reminiscent of each other (‘to shove’, ‘to shake’, ‘to disappear’, ‘to move’), rendering the entire reconstructed complex quite questionable, and none of the meanings comes very close to the specific Hittite meaning. The reconstruction with **h₁* is based only on the supposed cognates and might therefore be wrong.

The semantics of *ḫuḫapp-i* ‘to throw’, *ḫuḫart-i* ‘to curse’ and *ištāp-i* ‘to shut, plug up’ do not strongly favor an identification with one particular *o*-grade formation.⁴¹

6.1.2 Adjacent laryngeal

We now turn to root formations whose ablaut vowel is flanked by a laryngeal.

6.1.2.1 **h*₁

We do not expect the picture to be any different if one of the flanking consonants was **h*₁, which had no coloring effect. We find the following verbs of this shape. For *āk-i* ‘to die’, *ār-i* ‘to arrive’ and *ār*k*-i* ‘to cut off, divide’, whose initial laryngeal cannot be determined with certainty, see 6.1.2.4. For the nasal infix formations and the suffix *-e-zi*, see 6.2.2 and 6.2.3, respectively.

PIE root	formation	Hitt.	meaning	conj.
* <i>h₁ed-</i>	* <i>h₁ed-</i>	<i>ed-zi</i> / <i>ad-</i>	‘to eat’	<i>mi</i>
* <i>h₁eg^{wh}-</i>	* <i>h₁eg^{wh}-</i>	<i>eku-zi</i> / <i>aku-</i>	‘to drink’	<i>mi</i>
* <i>h₁ei-</i>	* <i>h₁ei-</i>	<i>i-zi</i>	‘to go’	<i>mi</i>
*- <i>h₁ei-</i>	*- <i>h₁ei-</i>	<i>paii-zi</i> / <i>pai-</i>	‘to go’	<i>mi</i>
* <i>h₁eNs-?</i>	* <i>h₁eNs-?</i>	<i>āšš-zi</i>	‘to remain’	<i>mi</i>
* <i>h₁ep-</i>	* <i>h₁ep-</i>	<i>epp-zi</i> / <i>app-</i>	‘to seize’	<i>mi</i>
* <i>h₁erk^w-</i>	* <i>h₁erk^w-</i>	<i>ārku-zi</i> / <i>arku-</i>	‘to chant, intone’	<i>mi</i>
* <i>h₁ers-</i>	* <i>h₁ers-</i>	<i>ārš-zi</i> / <i>arš-</i>	‘to flow’	<i>mi</i>
* <i>h₁es-</i>	* <i>h₁es-</i>	<i>eš-zi</i> / <i>aš-</i>	‘to sit; to be’	<i>mi</i>
* <i>h₁eup-</i>	* <i>h₁eup-</i>	<i>upp-zi</i>	‘to come up’	<i>mi</i>
* <i>d^heh₁-</i>	* <i>d^heh₁-</i>	<i>tē-zi</i>	‘to state, say’	<i>mi</i>
*- <i>d^heh₁-</i>	*- <i>d^heh₁-</i>	<i>pēhute-zi</i> / <i>pēhut-</i>	‘to bring (there)’	<i>mi</i>
*- <i>d^heh₁-</i>	*- <i>d^heh₁-</i>	<i>uḫate-zi</i> / <i>uḫat-</i>	‘to bring (here)’	<i>mi</i>
*- <i>d^heh₁-</i>	*- <i>d^heh₁-</i>	<i>uerite-zi</i> / <i>uerit-</i>	‘to fear’	<i>mi</i>
*- <i>d^heh₁-</i>	*- <i>d^heh₁-</i>	<i>uete-zi</i> / <i>uet-</i>	‘to build’	<i>mi</i>
*- <i>h₁ieh₁-</i>	*- <i>h₁ieh₁-</i>	<i>peje-zi</i> / <i>pej-</i>	‘to send’	<i>mi</i>
*- <i>h₁ieh₁-</i>	*- <i>h₁ieh₁-</i>	<i>uje-zi</i> / <i>uj-</i>	‘to send (here)’	<i>mi</i>
* <i>h₁erh₁-</i>	? (* <i>h₁orh₁-</i>)	<i>ār<i>r</i>-i</i> / <i>arr-</i>	‘to wash’	<i>hi</i>
* <i>leh₁-?</i>	? (* <i>loh₁-</i>)	<i>lā<i>i</i></i> / <i>l-</i>	‘to loosen, release’	<i>hi</i>

⁴¹ *ḫuḫapp-i* and *ḫuḫart-i* do not have secure cognates. For *ištāp-i* cf. perhaps Skt. *stabhnāti* ‘to prop, fasten, fix’ < **stmb^h-ne-H-* (see Melchert 1994: 162; 2012: 180).

Indeed, again a clear majority of verbs are *mi*-conjugated.

If $\bar{a}rr$ -ⁱ ‘to wash’ is related to ToA $y\bar{a}r\bar{a}$ - ‘to bathe (intr.)’ (caus. $y\bar{a}r$ - ‘to bathe (tr.)’) < $*h_1erH$ -, we need morphological *o*-grade to understand the form $\bar{a}rr$ - < $*h_1orh_1$ -. The inherently repeated semantics may point to an *o*-grade iterative (cf. Oettinger 1979: 438). Since the basic ToA verb means ‘to bathe (intr.)’ rather than ‘to wash’, however, we may also consider a causative $*h_1orh_1-eie/o$ - (‘to bathe (tr.)’).

Another possible case of morphological *o*-grade is $\bar{l}\bar{a}$ -ⁱ ‘to loosen, release’, which does not have direct counterparts in other IE languages, but is usually reconstructed as $*leh_1$ - rather than $*leh_2$ - or $*leh_3$ - on the basis of the possibly related PIE roots $*leh_{1u}$ - / $*luh_1$ - (Gr. $\lambda\acute{o}\omega$ ‘to loosen’, Skt. $lun\acute{a}ti$ ‘cuts off’, Lith. $li\acute{a}uti$ ‘to stop’) and $*leh_{1d}$ - (Goth. $letan$ ‘to let’). This is not completely obvious, but nevertheless quite possible. Although most forms point to $\bar{h}atrae$ -type inflection (cf. Puhvel 2001: 31-32),⁴² i.e. lae -, Oettinger (1979: 63-67) and Kloekhorst (2008: s.v.) analyze these as secondary to $\bar{l}\bar{a}$ -ⁱ, a formation parallel to $d\bar{a}$ -ⁱ ‘to take’, in view of the oldest 3sg. pres. $\bar{l}\bar{a}i$ and imp. $\bar{l}\bar{a}u$. If this is correct, we need morphological *o*-grade to explain its vocalism. It is not clear which of the *o*-grade formations this should be. The domain of cutting may suggest an *o*-grade iterative (cf. Kümmel 2004: 154, who reconstructs an *o*-grade present $*louH$ - for the potential variant with $*-u$ -). Melchert (1984: 38) proposes a causative-iterative $*loh_1-eie/o$ -. LIV² (s.v. $*leh_1$ - n. 8) rather considers a perfect. In the absence of direct cognates, on top of the uncertainties regarding the inflection, the exact prehistory of this verb must remain unknown.

6.1.2.2 $*h_2$

We have now reached the point at which an increase in the number of $\bar{h}i$ -conjugated verbs is expected. In all overviews seen so far, the percentage of $\bar{h}i$ -verbs has not exceeded 40%, and in most it was much lower. If the coloring caused by $*h_2$ and $*h_3$ indeed ushered *mi*-verbs to the $\bar{h}i$ -

⁴² Puhvel (2001: 31): “Oettinger (...) incomprehensibly collated the paradigms of $\bar{l}\bar{a}$ - (sic) and $d\bar{a}$ - ‘take’ (despite e. g. pret. sg. act. $lanun$, $lais$, $lait$ vs. $dahhun$, $datta$, das). Instead lai - conforms to the conjugation of hai - ‘trust’ (...) and especially sai - ‘rage’ ($lanzi:sanzi$, $lanun:sanun$, $lait:sait$, $lantat:santati$, $lanza:sanza$, $lauwar:sauwar$, etc.)”

conjugation, the following overviews should show a significant surge in the percentage of *hi*-verbs.

6.1.2.2.1 **eh*₂

I first examine the behavior of verbs featuring **h*₂ directly following the ablaut vowel. The following verbs historically show the sequence **-eh*₂-. For the nasal infix verbs and the suffix *-ahh*⁻ⁱ, see 6.2.2 and 6.2.3, respectively.⁴³

PIE root	formation	Hitt.	meaning	conj.
* <i>neh</i> ₂ -	* <i>neh</i> ₂ -	<i>nāh</i> ⁻ⁱ / <i>nahh</i> -	‘to fear’	<i>hi</i> .
* <i>peh</i> ₂ -	* <i>peh</i> ₂ - <i>s</i> -	<i>paḥš</i> ⁻ⁱ	‘to protect’	<i>hi</i>
* <i>pleh</i> ₂ -	* <i>pleh</i> ₂ -	<i>palāh</i> ⁻ⁱ / <i>palahh</i> -	‘to call (?)’	<i>hi</i>
* <i>seh</i> ₂ -	* <i>seh</i> ₂ -	<i>šāh</i> ⁻ⁱ	‘to stuff’	<i>hi</i>
* <i>tieh</i> ₂ -	* <i>tieh</i> ₂ -	<i>zāh</i> ⁻ⁱ / <i>zahh</i> -	‘to beat’	<i>hi</i>
* <i>ueh</i> ₂ ǵ-	* <i>ueh</i> ₂ ǵ-	<i>uāk</i> ⁻ⁱ / <i>uakk</i> -	‘to bite’	<i>hi</i>
* <i>demh</i> ₂ -	* <i>dmeh</i> ₂ - <i>s</i> -?	<i>tamāš</i> ^{-zi} / <i>tame/išš</i> -	‘to (op)press’	<i>mi</i>

Remarkably, virtually all verbs, including all original root formations, are *hi*-conjugated. There is only one potential exception.

For each of these verbs, it cannot be excluded that they did originally have *o*-grade – crucially, the two ablaut grades are formally indistinguishable in this structure. However, given the predominance of *e*-grade verbs in the previous overviews, they can hardly all happen to have been *o*-grade formations. The correlation between the morphologically meaningless formal characteristic of featuring **h*₂ after the ablaut vowel and *hi*-inflection can only be explained from the coloring effects of **h*₂ on the morphologically relevant ablaut vowel.⁴⁴

⁴³ Note that “*hā*-” ‘to believe, trust’ and “*šāi*-” ‘to become sullen’ are rather *hae*- and *šae*-, respectively: they inflect according to the thematic *hatrae*-class. The verb *ma*- ‘to disappear(?)’ is so poorly attested that we cannot analyze it properly. Similarly, our understanding of *lāp*(*p*)- ‘to glow, flash’ is too limited to be helpful; it has been interpreted both as *mi*- and as *hi*-conjugated (I would follow Oettinger 1979: 443 in assuming the latter).

⁴⁴ It remains to be determined whether the fact that *a*-vocalism triggered *hi*-inflection also means that the transfers of these verbs happened only after the collapse of *o*- and *a*-vocalism in post-Proto-Anatolian pre-Hittite. It is also not excluded that *ā*-vocalism had become morphologically associated with **ō*, and dissociated from **e* or **a*, even

One noteworthy feature of this class is the alternation found in stems ending in a single consonant, viz. ${}^{\circ}\bar{a}C-$ / ${}^{\circ}aCC-$, i.e. a long vowel plus a lenis consonant in the strong stem and a short vowel plus a fortis consonant in the weak stem.⁴⁵ This alternation has its origin in lenition caused by $*\acute{o}$ ($> *\acute{o}$), which affected a following single fortis consonant (either also originally from a single fortis consonant or from a consonant cluster), e.g. $\bar{a}k-i$ / $akk-anzi$ ‘to die’ $< *H\acute{o}k-ei$ / $*Hk-enti$, $i\acute{s}t\bar{a}p-i$ / $i\acute{s}tapp-anzi$ ‘to shut, plug up’ $< *st\acute{o}mb^hH-ei$ / $*stmb^hH-enti$.⁴⁶ The pattern was analogically extended to other single obstruents, as is suggested, for example, by the historically unexpected $-kk-$ in $\bar{u}\bar{a}k-i$ / $\bar{u}akk-anzi$ ‘to bite’ $< *ueh_2\acute{g}-$ / $*uh_2\acute{g}-$ (cf. Melchert 2012: 180).⁴⁷ Similarly, although the potential verbs with ${}^{\circ}\bar{a}h-$ which do in fact continue old o -grade formations would have obtained their alternation through a purely phonetic development $*\acute{o}h_2V > \bar{a}hV$, those which do not must not only have switched to hi -endings, but also have adopted the ${}^{\circ}\bar{V}C-$ / ${}^{\circ}VCC-$ alternation that was characteristic of the category that they joined. The more original non-alternating form can be seen in $-ahh-i$ (see 6.2.3), which did not join this class of root formations in which the alternation of C and CC was productive, and therefore continued to show $-ahh-$ throughout the paradigm.⁴⁸

before the actual phonetic merger of $*\acute{a}$ and $*\acute{o}$. These options will have to be evaluated mainly on the basis of the Luwic evidence.

⁴⁵ Most probably $\acute{s}\bar{a}h-i$ ‘to stuff’ also used to show ablaut, but generalized the strong stem (cf. Kloekhorst 2008: s.v.).

⁴⁶ Melchert (2012) rather proposes that only $*\acute{o}h_2V > *\acute{o}\bar{a}hV$ was regular, producing $n\bar{a}h-i$ and $\acute{s}\bar{a}h-i$, after which the pattern of these two verbs was analogically extended to $h\bar{a}\acute{s}-i$ ‘to beget’, $h\bar{a}\acute{s}-i$ ‘to open’, $p\bar{a}\acute{s}-i$ ‘to swallow’, $\bar{a}k-i$ ‘to die’, $i\acute{s}t\bar{a}p-i$ ‘to plug up’, $\bar{u}\bar{a}k-i$ ‘to bite’, and possibly $z\bar{a}h-i$ ‘to beat’. This seems too small a basis for the spread of the pattern. The main evidence Melchert adduces against a more general development $*\acute{o}CC > \bar{a}C$, viz. $\bar{a}ppa$ ‘away’ $< *Hop\acute{o}$, is hardly probative, since this etymon not only probably had accentual peculiarities (note, for example, the general absence of two surrounding word dividers with the Lyc. cognates epi and $ep\bar{n}$), but may also simply have been restored from cognate forms (cf. e.g. $appezzija$ ‘backmost’).

⁴⁷ In this case, a potential explanation based in sound law also exists ($*\bar{u}\acute{o}h_2\acute{g}- > *\bar{u}\acute{o}kk-$, Kloekhorst 2008: s.v.).

⁴⁸ The evidence of the type $tarna-i < *trneh_2-$ further suggests that the appearance of $-h(h)-$ throughout the paradigm was the result of analogical restoration; see 6.2.2 and 6.2.3.

paḥš⁻ⁱ ‘to protect’ shows some oscillation between *mi*- and *hi*-inflection, e.g. *paḥḥšmi* (OH/NS, 1x) ~ *paḥḥšḥi* (MH/NS, often). This is found more often in *hi*-verbs ending in *-š-*; the same is found for example in *pāš⁻ⁱ* ‘to swallow’ (3sg.pres. *pašzi* (OH~MH/NS) ~ *pāši* (MH/NS)). The oscillation clearly has its roots in the unfortunate combination of the stem-final **-s-* and the 3sg.pret. ending **-s* in *s*-final *hi*-verbs, which was remedied with the introduction of the ending *-ta* before our earliest records. Conceivably, in *hi*-verbs which were transferred from the *mi*-conjugation, such forms (e.g. **peh₃sto* > *pāšta* ‘swallowed’) had never been adapted in the first place (cf. Oettinger 1979: 436 n. 89). A 3sg.pret. form in *°š-ta* could easily trigger other *mi*-conjugation forms such as a 3sg.pres. in *°š-zi* (cf. Oettinger 1979: 435). Cf. also *au⁻ⁱ* ‘to see’ (6.1.2.2.2), *mau⁻ⁱ* ‘to fall’ (6.1.1.2), whose *s*-extended forms *auš-* and *mauš-* are *mi*-conjugated. In the specific case of *paḥš⁻ⁱ*, all of these forms are probably secondary, since the regular paradigm is middle: the only attested 3sg.pres. is *paḥša*.

uāk⁻ⁱ ‘to bite’ goes back to PIE **ueh₂ǵ-* ‘to break, burst, split apart’, which further survives in ToB *waka-*, ToA *wākā-*, and Gr. ἄγ⁻.⁴⁹ Kloekhorst (2018: 100) suggests reconstructing a causative **uoh₂ǵ-eie/o-*. This reconstruction does not seem likely to me, for two reasons. First, a causative of this kind is not paralleled for this verb. Second, it is likely that the root formation of this verb could by itself also express, or take on, a transitive meaning, and that the distinction was rather made with a voice opposition; cf. Gr. ἄγνυμι ‘to break (tr.)’, ἄγνυμαι ‘to break (intr.)’, and a similar situation is found in Tocharian (cf. Malzahn 2010: 66, Peyrot 2013: 813). For the existence of a similar middle in Hittite cf. *uakk-āri* ‘to be lacking’ < **‘to break away’*; see Kloekhorst (2008: s.v.). We can therefore simply reconstruct **ueh₂ǵ-*, with *hi*-inflection triggered by the *a*-vocalism.

There is one verb in this list with consistent *mi*-inflection, *tamāš^{-zi}* / *tame/išš-* ‘to (op)press’. If this goes back to **dmeh₂-s-* / **dmh₂-s-*, as has been reconstructed on the basis of the occasional attestation of a strong stem *tamāš-* (Kloekhorst 2008: s.v.; 2009), its exceptional behavior in comparison to the other verbs historically featuring the sequence **-eh₂-* is remarkable. There are several factors which may be relevant here. First,

⁴⁹ For the development from ‘to split’ to ‘to bite’ cf. PGm. **bītan-* ‘to bite’ < **b^heid-e/o-* ‘to split’ (Lat. *findō* etc.).

the verb ends in *-š-*, which means that *mi*-inflection is at least partly expected. Indeed, there are no relevant OS attestations, and the oldest (OH/MS) attestations are exactly those forms in which we would expect *mi*-endings throughout attested Hittite even in an original *hi*-verb, if this ended in *-š-* (3sg.pret. *tamāšta*, 3sg.imp. *tamāšdu*). It is therefore possible that *tamāš-* was originally *hi*-conjugated after all. It is awkward, however, that this would not have left any trace in attested Hittite. We may further look for an explanation in the fact that the original shape of this root is **demh₂-* rather than **dmeh₂-*, cf. Lat. *domō* ‘to subdue’, Skt. *damⁱ-* ‘to control’, PGM. **tamjan-* ‘to tame’. Although **-s-* caused Schwebelablaut in some old PIE *s*-extended words, as most clearly in **h₂ueg-s-* ‘to increase’ (e.g. Gr. ἀέξω) from **h₂eug-* ‘to increase’ (e.g. Lat. *augeō*), this particular *s*-formation is not paralleled in *s*-presents elsewhere. It is therefore quite likely to be a post-PIE formation, for which a switch to Schwebelablaut is no longer expected (cf. e.g. **h₂erh₃-s-* > *haršⁱ-* ‘to till the soil’). This may mean that the occasional forms with *-ā-*, and possibly the position of the ablaut slot in its entirety, are somehow secondary.⁵⁰ Perhaps the introduction of these features was prompted by the ablaut slot that had secondarily come into being by the development of *-e/i-* in the weak stem (cf. Oettinger 1979: 124). A completely satisfying historical account of this verb, including an explanation for its failure to comply to various morphological tendencies, remains a desideratum.

6.1.2.2.2 **h₂e*

The clear majority of *hi*-inflected verbs in the previous section is in sharp contrast with the clear majorities of *mi*-inflected verbs in the sections preceding it, which suggests that *mi*-verbs whose **-e-* was colored by a following **h₂* were prone to end up in the *hi*-conjugation. We would expect to see the same effect when **h₂* precedes the ablaut vowel. The following table contains an overview of verbs containing this sequence.

⁵⁰ For a similar secondary plene spelled vowel cf. e.g. the one attestation *kuuāš-* for regular *kuuāšš-* ‘to kiss’ (on which see 6.2.2).

PIE root	formation	Hitt.	meaning	conj.
* <i>h₂ed-</i>	* <i>h₂ed-</i>	<i>ḫāt⁻ⁱ / ḫat-</i>	‘to dry up’	<i>ḫi</i>
* <i>h₂ed^hġ^h-</i>	* <i>h₂ed^hġ^h-</i>	<i>ḫatk⁻ⁱ</i>	‘to shut, close’	<i>ḫi</i>
* <i>h₂ems-</i>	* <i>h₂ems-</i>	<i>ḫāš⁻ⁱ / ḫašš-</i>	‘to give birth’	<i>ḫi</i>
* <i>h₂e(N)s-?</i>	* <i>h₂e(N)s-</i>	<i>ḫāš⁻ⁱ / ḫašš-</i>	‘to open’	<i>ḫi</i>
* <i>h₂en-</i>	* <i>h₂en-</i>	<i>ḫān⁻ⁱ / ḫan-</i>	‘to draw water’	<i>ḫi</i>
* <i>h₂erh₃-</i>	* <i>h₂erh₃-</i>	<i>ḫarra⁻ⁱ / ḫarr-</i>	‘to crush, grind’	<i>ḫi</i>
* <i>h₂erh₃-</i>	* <i>h₂erh₃-s-</i>	<i>ḫarš⁻ⁱ (?)⁵¹</i>	‘to till (the soil)’	<i>ḫi</i>
* <i>h₂eu-</i>	* <i>(h₂e-)h₂ou-e?</i>	<i>au⁻ⁱ / u-</i>	‘to see’	<i>ḫi</i>
* <i>h₂emh₁-?</i>	* <i>h₂omh₁-s-?</i>	<i>ānš⁻ⁱ</i>	‘to wipe’	<i>ḫi</i>
* <i>h₂erċ-</i>	* <i>h₂erċ-</i>	<i>ḫar(k)^{-zi}</i>	‘to hold, keep’	<i>mi</i>

Almost all verbs are *hi*-conjugated. This further corroborates the view that an ablaut vowel colored by a preceding **h₂* triggered *hi*-inflection. Note that the very preservation of *ḫ-* points to original *e*-grade (see 5.2).

For *au⁻ⁱ* ‘to see’, we need morphological *o*-grade to explain the loss of **h₂*-. All cognates are based on an adverb **h₂ou-is* ~ **h₂eu-is* ‘manifestly, clearly’ (Skt. *āvīṣ*), to which the verbs **h₂euis-d^h(h₁)-* (Gr. αἰσθάνομαι ‘to perceive’, Lat. *audiō* ‘to hear’⁵²) and **h₂euis-(i)e/o-* (Gr. αἰώ ‘to perceive’) were created. This does not provide us with any information about the vocalism of the more primary verb, whose survival appears to be an Anatolian archaism. Semantically, the *o*-grade formation which is most plausibly continued by *au⁻ⁱ* is a perfect: **(h₂e-)h₂ou-e* ‘has seen’ > ‘saw’, whence **h₂ou-ei* ‘sees’ (cf. Oettinger 1979: 406-408).

Similarly, *ānš⁻ⁱ* ‘to wipe’ requires *o*-grade. The laryngeal lost due to the *o*-grade is probably still visible in *ḫane/išš^{-zi}* ‘to plaster, wipe’ < **h₂mh₁-s-*, if this was originally its zero grade counterpart (see 5.2 with n. 28). As an inherently iterated action, the meaning ‘to wipe’ is most compatible with an analysis as an *o*-grade iterative (cf. the semantically comparable verbs *šarta⁻ⁱ* and *uarš⁻ⁱ* in 6.1.1.2; cf. Oettinger 1979: 437). The combination of

⁵¹ Due to the paucity of attestations, it is not so clear to which conjugation this verb belonged in OH. However, the *ā* in the MS form *ḫāršta* may well point to original *hi*-inflection (Kloekhorst 2008: s.v.). The *mi*-conjugation ending *-ta* is regular for *hi*-verbs ending in *-š-* (see Kloekhorst 2008: s.v., and the discussion of *paḫš-* in the previous section).

⁵² For the development from ‘to perceive’ to ‘to hear’, cf. e.g. Lat. *sentīre* ‘to perceive, feel’ > It. *sentire* ‘to hear’.

o-grade in the root and an *s*-suffix is remarkable. It is possible that the suffix had already become part of the root by the time the *o*-grade iterative was created. If this was not the case, however, the formation was probably a **molH*-type rather than a *CoC-eie/o*-type iterative (for the shape *CoC-s*- cf. e.g. PGM. **wahs(j)an-* ‘to grow’ < **h₂uog-s-*). In addition, in view of the preservation of the laryngeal in *hane/išš-*, the assumption of a *CoC-eie/o*-iterative to which a secondary zero grade variant was created would require the loss of **h_{2/3}* before **o* to have taken place later than the transfer of the *CoC-eie/o*-type to the *hi*-conjugation, which is doubtful.

The one apparent exception to the general trend is *har(k)-^{zi}* ‘to hold, keep’. Here the main cognates are Gr. ἀρκέω ‘to ward off, keep off’ and Lat. *arceō* ‘to keep off, hold off’, which point to a reconstruction **h₂r^k-eie/o-* (cf. LIV²: s.v.; against Gr. ἀρκέω as denominal to ἄρκος ‘defense’ see Beekes 2010: s.v.). We could therefore speculate that this was also the basis of Hitt. *har(k)-^{zi}*. Like *CoC-eie/o*-formations, stems of the type *CC-eie/o-* must have lost the **j* by sound law and have been further adapted to one of the more productive categories. Since the stem did not have **o-* or **a-*vocalism, the choice for the *mi*-conjugation would be unsurprising. Alternatively, we may follow the usual assumption that the Hittite form continues a root formation **h₂er^k- / *h₂r^k-*. If this reconstruction is correct, we may try to find an explanation for its *mi*-inflection in the sound law **eRCC > *əRCC* (see 6.1.1.2) – in this case probably rather **aRCC > *əRCC* – which may have altered the vocalism in such a way that it was no longer a trigger for transition into the *hi*-conjugation. This would suggest that *harra-ⁱ* < **h₂erh₃-* and *hāš-ⁱ* < **h₂ems-* were no input for this sound law, i.e. that the specific alterations of their *RC*-clusters took place before **aRCC > *əRCC*. The consistent spelling with the *CVC*-sign *har* is an additional argument to prefer either of these two scenarios over an interpretation with a real *-a-* (cf. n. 36). See also *hark-^{zi}* ‘to get lost’ below (6.1.2.3.2).

6.1.2.3 **h₃*

6.1.2.3.1 **eh₃*

In this section I will determine the effect of a **h₃* following the ablaut vowel. The following overview contains all synchronically unaffixed verbs

whose original roots contain this sequence. For the nasal infix formations and the suffix $-šša^{-i}$, see 6.2.2 and 6.2.3, respectively. For $*h_3neh_3-$, continued in *hana*⁻ⁱ ‘to sue’, see 6.2.1.

PIE root	formation	Hitt.	meaning	conj.
$*deh_3-$	$*deh_3-$	$dā^{-i} / d-$	‘to take’	<i>hi</i>
$*-deh_3-$	$*-deh_3-$	$pēda^{-i} / pēd-$	‘to carry (away)’	<i>hi</i>
$*-deh_3-$	$*-deh_3-$	$uda^{-i} / ud-$	‘to bring (here)’	<i>hi</i>
$*leh_3u$ ⁻⁵³	$*leh_3u-$	$lāhu^{-i} / lahu-$	‘to pour’	<i>hi</i>
$*peh_3-$	$*peh_3-s-$	$pāš^{-i} / paš(š)-$	‘to swallow’	<i>hi</i>
$*ǵneh_3-$	$*ǵnh_3-s-$	$kane/išš^{-zi}$	‘to recognize’	<i>mi</i>

For roots in which the ablaut vowel is followed by $*h_3$, the distribution among the conjugations is again diametrically opposed to that of the structures without a coloring laryngeal. All verbs with a sequence $*-eh_3-$ ended up in the *hi*-conjugation. This is another clear confirmation that the effects of laryngeal-coloring triggered *hi*-inflection.

It can be understood why the Hittite descendant of the root $*ǵneh_3-$ ‘to recognize’ is not *hi*-conjugated. Its original full grade allomorph was leveled out: the stem *kane/išš-* goes back to $*ǵnh_3s-$, which was generalized from the plural (Kloekhorst 2008: s.v.; 2009). Hence, there was no *o*-colored ablaut vowel to trigger *hi*-inflection. It is possible that the singular stem that was replaced was *hi*-conjugated, i.e. $*ǵneh_3s- > *kanāš^{-i}$ (but cf. 6.1.2.2.1 on the deviant behavior of *š*-final *hi*-verbs). For a similar replacement cf. the *mi*-verb *hane/išš^{-zi}* ‘to wipe’, whose original singular stem is most probably still preserved, due to paradigm split, in the verb *ānš⁻ⁱ* ‘to wipe’ (cf. 6.1.2.2.2).

⁵³ For this reconstruction see Melchert (2011). Given the outcome of 6.1.2.2.1, for our purposes it does not make any difference whether we reconstruct this root with $*h_3$ or with $*h_2$. See 6.1.2.2.1 also for the form *lāhu-* for expected $*lahhu-$ (as for example in the derivative *lahhueššar* ‘pouring cup’); cf. esp. *šāh⁻ⁱ* ‘to stuff’.

6.1.2.3.2 **h₃e*

There are only two verbs in which the ablaut slot was probably preceded by **h₃*.⁵⁴

PIE root	formation	Hitt.	meaning	conj.
<i>*h₃erg-</i>	<i>*h₃erg-</i>	<i>ḫark-^{zi}</i>	‘to get lost, perish’	<i>mi</i>
<i>*h₃erǵ^h-</i>	? (<i>*h₃orǵ^h-</i>)	<i>ārki-ⁱ</i>	‘to mount, copulate’	<i>ḫi</i>

The best candidate for being an old formation starting with **h₃e^o* is *ḫark-^{zi}* ‘to get lost, perish’, which must go back to a root **h_{2/3}erK-*, probably **h₃erg-* (Kloekhorst 2008: s.v.). All forms unequivocally point to *mi*-inflection, which is exceptional considering the general patterning of **h₂e^o*. Notably, however, the root structure of this verb corresponds to that of the one exception to the overall pattern displayed by **h₂e^o*, viz. *ḫar(k)-^{zi}* ‘to hold, keep’ < **h₂erǵ^h-*. Also note again the consistent spelling with the CVC-sign *ḫar*. The parallelism of these verbs supports the idea that the sound law **eRCC*, **aRCC* > **əRCC* bled the transfer of verbs of the shape **h_{2/3}eRC-* to the *ḫi*-conjugation.

Although *ārki-ⁱ* ‘to mount, cover, copulate’ could be mechanically reconstructed as **h₃orǵ^h-* (with **h₃-* on account of Hitt. *arki-* ‘testicle’, Gr. ὄρχις ‘testicle’ < **h₃erǵ^h-i-*), with loss of **h₃* before **o*, its age and even linguistic reality are dubitable. The verb is usually inflected in the middle voice (*arga* < **h₃erǵ^h-o*), and the one active attestation *ārki* (MH/NS) is not only found as *arga* in the duplicate (MH/LNS), but also occurs in the first part of a simile whose second part expresses the same notion with the middle form *argaru*. If it is *sprachwirklich* at all, the possibility of a late backformation (or formal confusion with *ārki-ⁱ* ‘to cut’?) is considerable.

⁵⁴ We may also discuss here the verb *ḫarp-* ‘to change allegiance, to join (a different group)’. This is originally middle, *ḫarp-^{ta}*, and found secondarily inflected in the active (*ḫarp-^{zi}*) only in post-OH times (Melchert 2010). The usual connection with Gr. ὀρφανός ‘orphan’ (etc.), leading to a reconstruction **h₃erb^h-*, is semantically far from obvious (for a rationalization see Melchert 2010: 186). Nevertheless, the root must in any case reflect **h_{2/3}erP-*. To the extent that the formal distribution between the *mi*- and *ḫi*-conjugations was still active at this point at all, the choice for *ḫarp-^{zi}* rather than ***ḫarp-ⁱ* could be explained in the same way as with *ḫar(k)-^{zi}* and *ḫark-^{zi}*, which have identical structures.

However, there is also still a chance that it is old. If so, there is potential comparative evidence to suggest that the original formation was an iterative of the shape **h₃org^h-eie/o-*, namely Gr. ὀρχέομαι ‘to dance; to mount’. If one prefers not to connect this, other options are equally conceivable.

6.1.2.4 *H

This section discusses verbs with a flanking laryngeal of undetermined color.

PIE root	formation	Hitt.	meaning	conj.
* <i>Hek-</i>	*(<i>He-</i>) <i>Hok-e</i> ?	<i>ākⁱ</i> / <i>akk-</i>	‘to die’	<i>hi</i>
* <i>Her-</i>	*(<i>He-</i>) <i>Hor-e</i>	<i>ārⁱ</i> / <i>ar-</i>	‘to arrive’	<i>hi</i>
* <i>Her^k-</i>	* <i>HorK-(eie/o-)</i> ?	<i>ār^kⁱ</i>	‘to cut off, divide’	<i>hi</i>

In the absence of obvious cognates, at least such cognates that allow us better to determine the original shapes, these roots may have started with any of the three laryngeals.⁵⁵ This does not have any impact on their classification: we need morphological *o*-grade in all three cases. If these verbs started with **h₁-*, the vowel can only be explained by *o*-grade. If they started with **h₂-* or **h₃-*, we need *o*-grade to explain the loss of these consonants.⁵⁶

The meanings of *ākⁱ* ‘to die’ and *ārⁱ* ‘to arrive’ make it extremely likely that these are old perfects (cf. Oettinger 1979: 403-404): **(He-)Hok-e* ‘has died’ > ‘died’, whence **Hok-ei* ‘dies’, and **(He-)Hor-e* ‘has arrived’ > ‘arrived’, whence **Hor-ei* ‘arrives’. Indeed, *ārⁱ* ‘to arrive’ has a perfect match in the Skt. perfect *āra* ‘has arrived’ < **He-Hor-e*.

For *ār^kⁱ* ‘to cut off, divide’, the semantic domain of cutting may suggest an original *o*-grade iterative (cf. Oettinger 1979: 415).

⁵⁵ *ārⁱ* ‘to arrive’ is usually reconstructed as **h₁er-* based on a connection with Gr. ἔρχομαι, possibly < **h₁r-ske/o-*, but this may rather go with OIr. *eirg* ‘go!’, *regaid* ‘will go’, and simply come from **h₁er^g^h-* (Beekes 2010: s.v.). Lucien van Beek (p.c.) suggests that the root meaning ‘to arrive, reach’ may rather have been **h₂er-*, identical to **h₂er-* ‘to join’ (Gr. ἀρπίζω, etc.). For a similar development cf. Italian *giungere* ‘to reach’ < Lat. *iungere* ‘to join’.

⁵⁶ For the loss of PAnat. **h₂3-* before **o* see 5.2.

6.2 Affixed formations

6.2.1 Reduplicated formations

Leaving the domain of (synchronically) unaffixed formations, we now turn first to reduplicated formations. Here we expect more morphological *o*-grades: in general in IE reduplicated formations *o*-grade is significantly more frequent than in root formations, especially if the reduplication syllable has **-e-* (cf. LIV²: 16, 21, 24).

PIE root	formation	Hitt.	meaning	conj.
<i>*ǵeus-</i>	<i>*ǵu-ǵus-</i>	<i>kukuš^{-zi}</i>	‘to taste’	<i>mi</i>
<i>*k^wers-</i>	<i>*k^w-k^wrs-</i>	<i>kukkurš^{-zi}</i>	‘to mutilate’	<i>mi</i>
<i>*h₂emǵ^h-</i>	<i>*h₂me-h₂mǵ^h-?</i>	<i>hamank⁻ⁱ / hame/ink-</i>	‘to wrap, tie’	<i>hi</i>
<i>*meh_{2/3}-</i>	<i>*mi-meh_{2/3}-?</i>	<i>mimma⁻ⁱ / mimm-</i>	‘to refuse’	<i>hi</i>
<i>*peh_{2/3}-</i>	<i>*pi-peh_{2/3}-?</i>	<i>pippa⁻ⁱ / pipp-</i>	‘to tear down’	<i>hi</i>
<i>*h₃neh₃-</i>	<i>*h₃e-h₃noh₃-?</i>	<i>hanna⁻ⁱ / hann-</i>	‘to sue, judge’	<i>hi</i>
<i>*pers-</i>	<i>*pe-pors-?</i>	<i>papparš⁻ⁱ</i>	‘to sprinkle’	<i>hi</i>
<i>*uek⁻</i>	<i>*ue-uok⁻?</i>	<i>ueṽakk⁻ⁱ</i>	‘to demand’	<i>hi</i>
<i>*spend-</i>	<i>*se-spond-?</i>	<i>šipānt⁻ⁱ ~ išpānt⁻ⁱ</i>	‘to libate’	<i>hi</i>
<i>*h₁es-</i>	<i>*h₁s(e)-h₁os-?</i>	<i>ašāš⁻ⁱ / ašeš-</i>	‘to seat’	<i>hi</i>

Of these verbs, only *kukuš^{-zi}* ‘to taste’ has clear parallels, if not direct cognates, in Skt. *jujuṣ-*, Av. *zūzuš-* < **-ǵus-* (Watkins 2003). The formation of *kukkurš^{-zi}* ‘to mutilate’ is transparently identical. Since reduplication with a vowel mimicking that of the root is not a normal PIE process, at least the vowel of the reduplication of both verbs will have been innovated, and quite possibly both formations are post-PIE altogether (cf. Yates & Zukoff 2018: 208). Whatever their antiquity, *kukuš^{-zi}* and *kukkurš^{-zi}* are the only verbs in the list that clearly do not contain either **-e-* liable to coloring or **o*, which explains the other unique feature they share: their *mi*-inflection.

Although *hamank⁻ⁱ* ‘to wrap, tie’ is universally connected with **h₂emǵ^h-* (> **h₂eng^h-*) ‘to wrap tightly, strangle’ (Gr. ἄγχω ‘to squeeze tight, strangle’, Lat. *angō* ‘to bind together, strangle’), its exact formation is the subject of debate. For an overview of proposals so far, see Shatskov (2017: 42-44), who rightly dismisses all of them as morphologically

unlikely. Problematically, all proposals operate with an unparalleled variant of the *n*-infix. Most unsatisfyingly, the exceptional *hi*-inflection remains unexplained. In my view, it can hardly be coincidental that this formation contains a $*h_2$, which when in contact with the vowel would account for its inflection. Since the root already contains a nasal, the occurrence of two nasals may not be due to infixation, but could also be due to reduplication. I therefore propose to analyze this verb as a reduplicated formation $*h_2me-h_2m\acute{g}^h-$, which would most likely have produced *hamank-* by sound law.⁵⁷ The vocalism caused by the sequence $*-eh_2-$ then neatly explains its *hi*-inflection. The weak stem *hamink-* could in principle be from a secondary zero grade “ $*h_2m-h_2m\acute{g}^h-$ ” (for the phonetics cf. e.g. *kane/išš-* ‘to recognize’ < $*\acute{g}nh_{3s-}$), but more probably represents a secondary zero grade of a later date, much like e.g. in *šarāp-i* / *šare/ip-* ‘to sip’ < $*srob^h-eie/o-$.

The root-final laryngeals of *pippa-i* ‘to knock/tear down, destroy’ and *mimma-i* ‘to refuse’ are undetermined, and therefore so is the original color of the radical vocalism. $*h_2$ or $*h_3$ would have colored $*-e-$ such that it would trigger *hi*-inflection. Only $*h_1$ would require morphological *o*-grade. A reconstruction with $*h_1$ has been proposed for *mimma-i* ‘to refuse’, which has been related to $*meh_1$, the PIE prohibitive negation, but this connection is not beyond doubt.⁵⁸ If the reduplication syllable has original $*-i-$ rather than $*-e-$, which is synchronically probable at least for

⁵⁷ Although the exact sequence $*eh_2mC$ is not paralleled, we may compare it with $*eh_2m\# > -\acute{a}n$ (e.g. acc.sg.c. $*h_2eh_1seh_2m > h\acute{a}ššan$ ‘fireplace’, $*dueh_2m > tuu\acute{a}n$ ‘to this side’). More in general, it is probable that laryngeals were lost in *VHCC*-sequences (cf. $*peh_2so > paḥša$ ‘protects’, but, if correctly reconstructed, $*dmeh_2sti > tam\acute{a}šzi$ ‘(op)presses’).

⁵⁸ Another interpretation, going back to Sturtevant (1933: 133), connects *mimma-i* with Gr. μίμνω ‘to stay, stand fast’ < $*mi-mn-e/o-$, root $*men-$ ‘to think; to wait’. Apart from the fact that the Hittite verb is not thematic (cf. Dempsey 2015: 295), the *hi*-type in *-ai* rather suggests a root ending in $*h_{2/3}$ (cf. e.g. *tarna-i* ‘to let go’ < $*tr-ne-h_2-$, *paddai* ‘digs’ < $*b^hod^h_2-ei$). *mimma-i* would in principle allow for a reconstruction $*mi-mneh_2-$, if one would like to connect the related root $*mneh_2-$ ‘to think about’, which could just like $*men-$ have developed its meaning from ‘to think’ to ‘to stay’, and then further to ‘to refuse’, but this is quite farfetched. The exact prehistory of this verb must remain unknown.

mimma⁻ⁱ,⁵⁹ this would favor the assumption of original *e*-grade over *o*-grade (cf. LIV²: 16). This, in turn, would point to the reconstructions **mi-meh*_{2/3}- and **pi-peh*_{2/3}-.⁶⁰

ḥanna⁻ⁱ ‘to sue, judge’ has been connected with Gr. ὄνομα ‘to blame’ < **h₃nh₃-*. This is further related to **h₃neh₃-mn* ‘name’ (Hitt. *lāman*), which shows the place of the ablaut slot.⁶¹ It is not fully clear what the exact formation of *ḥanna*⁻ⁱ is. Kloekhorst (2008: s.v.) reconstructs a reduplicated formation **h₃e-h₃nVh₃-*. If this is correct, it cannot be determined directly whether the ablaut vowel was **-e-* or **-o-*, but as a reduplicated formation with **-e-* in the reduplication syllable, the root would probably have had *o*-grade. In either case the *ḥi*-inflection is expected. The original function of this formation is difficult to recover. Although the stem may have been formally identical to that of a perfect, the absence of subject-affecting semantics (see 7) hampers a straightforward identification. Neither is the meaning iterative.

Since the remaining verbs do not contain a coloring laryngeal, their vocalism must go back to a morphologically motivated *o*-grade.

That *papparš*⁻ⁱ ‘to sprinkle’ reflects *o*-grade rather than *e*-grade or zero grade is confirmed by the frequent spelling with *pa-ar* rather than with *pár* (cf. Kloekhorst & Mens fthc.). Although its cognates (mainly ToB *parsa-*, ToA *prāsā-* ‘to sprinkle’) do not show *o*-vocalism, the inherently iterative (in this case distributive) meaning ‘to sprinkle’ would fit an interpretation as an *o*-grade iterative. The iterativity is undoubtedly also the motivation behind the reduplication. The fact that the reduplication vowel mimics the vowel in the root is certainly an innovation, but the age of the reduplicated formation as such remains to be determined. The reduplication may have been added secondarily (cf. *uarš*⁻ⁱ ~ *uauarš*⁻ⁱ ‘to wipe’), or it may have been formed to the original *mi*-base (cf. *ueḡakk*⁻ⁱ ~ *uek(k)*^{-zi} ‘to demand’ below).

⁵⁹ The spelling of *pippa*⁻ⁱ is in fact ambiguous, and could equally well stand for *peppa*⁻ⁱ (*pí-ip-* = *pé-ep-*) (cf. Oettinger 1979: 498, Kloekhorst 2008: s.v.).

⁶⁰ For the loss of **h₂* cf. **trneh₂-ti* > **tarnā-di* >> *tarna*⁻ⁱ (see 6.2.2 n. 71).

⁶¹ Rather than ‘to call names’ (thus Kloekhorst 2008: s.v.), I would envisage the original meaning of the verb **h₃neh₃-* to be ‘to name, to mention by name, to identify by name’, from there ‘to indict, to accuse, to blame’, i.e. to verbally identify someone as a supposed culprit by saying their name.

In the latter case, the verb could continue an old iterative **pe-pors-*, comparable to the following verb, *ueḡakk-*.

The reduplication with *-e-* strongly suggests that *ueḡakk-* ‘to demand, ask’ goes back to **ue-uok-*. Semantically, it is an intensive, or iterative, of the verb *uek(k)-^{zi}* ‘to wish, demand’ (for which see 6.1.1.1.1). This meaning precludes the possibility that this is an old perfect (see Kloekhorst 2008: s.v.). We do not expect a verb with a stative primary meaning (expressed by the present-aorist system, **uek-ti* ‘wants’) to have had a perfect (cf. 7). Rather, the verb is a reduplicated *o*-grade iterative. In formation and meaning it is close to the Sanskrit intensive (iterative), the reduplicated *o*-grade iterative possibly underlying the **molH*-type iterative (see 5.2). With Hoffmann *apud* Oettinger (1979: 433), we may also compare the Skt. 2sg.pres. *vavák-ṣi* ‘you want’ (cf. also the later 3sg.pres. *vivaṣ-ti*), although this most probably constitutes a more or less parallel innovation rather than a direct cognate.⁶²

The main cognates of *šipānt-ⁱ* ~ *išpānt-ⁱ* ‘to libate’ are Gr. *σπένδω* ‘to libate’, ToB *spānta-*, ToA *spāntā-* ‘to trust’, and Lat. *spondeō* ‘to pledge, promise’. The Latin verb goes back to **spond-eie/o-*, which was probably originally iterative. Although this does offer an *o*-grade formation to which the Hittite verb might also go back (thus e.g. Oettinger 1979: 418-419), there is no semantic indication that the Hittite verb does continue an iterative derivation rather than the basic verb as continued in Gr. *σπένδω*. Forssman (1994: 103) reconstructs the unexpected variant *šipānt-* as a reduplicated formation, which he further identifies with the Latin perfect *spopondī* < OLat. *spepondī* < **spe-spond-*. Whether or not the two formations go back to a PIE formation, it is in any case clear that *šipānt-* cannot be a regular outcome of **spond-* or a mere graphic variant of *išpānt-*;⁶³ it must be a morphological variant, for which a reduplicated formation is the only serious possibility.⁶⁴ This leads to a reconstruction

⁶² A preform **ueuokti* rather than **ueuoke(i)* could also directly explain the absence of lenition. But the fortis consonant may also have been restored on the basis of *uekk-*.

⁶³ Thus Kassian & Yakubovich (2002).

⁶⁴ This cannot have been a reduplicated aorist, as Melchert (2016) proposes. An aorist cannot account for the *o*-grade needed to explain the *hi*-inflection. The telic semantics, the most important reason for Melchert to opt for an aorist, are exactly what we expect from a perfect-turned-preterite, as was advocated in 4.2.3.

**si-spond-* or **se-spond-*. Since reduplication syllables may undergo formal innovation, the formal objections that have been raised against Forssman's connection can easily be overcome.⁶⁵ The criticism focusing on the functional mismatch – an action verb in Hittite but a perfect in Latin – is also beside the point: it matches the unjustified semantic argument against deriving the *hi*-conjugation as a whole from the perfect (on which see 4.2.3). The only justifiable argument against identifying *šipānt-* as an original perfect is the fact that 'to libate' is not a subject-affecting meaning (see 7). The identification would therefore require the assumption that perfects were created to verbs which did not originally have one. While this is certainly a theoretical possibility, witness the Latin perfect, the collective Hittite evidence suggests that the perfect did not spread so much beyond its original nucleus (see 7). Still, the fact that the meaning is not iterative but rather that of the base verb fits a perfect interpretation better than an iterative interpretation. However, in this scenario it would in fact be an anomaly that this formation was not (fully) dereduplicated (see 7). This could nevertheless plausibly be related to the removal of the second **s*. Whatever the exact mechanism that caused this,⁶⁶ it rendered the original reduplication syllable unrecognizable as such, and indispensable. The variant *išpānt-* shows the unreduplicated stem, which must have been taken from other instantiations of this root, cf. e.g. *išpanduzzi-* 'libation vessel', which never has the variant *šipant-* (confirming the morphological nature of this variant). Although we must at least be dealing with a reduplicated formation, then, and a perfect interpretation is conceivable, ultimately, the semantics do not allow a straightforward classification.

ašāš⁻ⁱ / *ašeš-* 'to seat' is clearly a reduplicated causative of *eš^{-zi}* 'to sit' < **h₁es-* (6.1.2.1). The historical morphological details as well as the age

⁶⁵ Similarly, one would not want to dismiss a connection between e.g. Gr. ἕστηκα and Lat. *stetī* 'to stand' < **s(t)e-stoh₂-*, or between the reduplication of the PIE perfect and that of the Tocharian pret.ptc. (e.g. ToB *kekamu*, ToA *kakmu* 'having come' < **g^wo-g^wm-uōs*) or that of some Skt. perfects (e.g. *bubodh-* 'to be aware' < **b^hu-b^houd^h-*). Cf. Melchert (2016: 192-194).

⁶⁶ If it was not simply a phonetic development, the removal of the **s* can perhaps be related to the existence of the variant *išpānt-*, whose phonemic composition after the development of a prothetic vowel may have blurred the analysis of **šipānt-* as a reduplicated formation, and would rather have suggested that this variant had a redundant *š*.

of this formation are far from clear, but in any case the \bar{a} can hardly reflect anything other than * \acute{o} . A (probably anachronistic) backprojection could look like * $h_1s(e)-h_1os-$ / * $h_1s(e)-h_1s-$ (cf. Kloekhorst 2008: s.v.). Although causative reduplicated formations are known in the shape of reduplicated aorists in Greek and Indo-Iranian, and from the causative preterite in Tocharian, none of these formations has *o*-grade, and the Hittite formation therefore remains unparalleled.

6.2.2 Infix formations (* $^\circ$ -*ne*-*C*-)

In the following I list all nasal infix verbs.⁶⁷ Given the tendencies found in the previous sections, we would expect * $^\circ$ -*ne*-*K*- and * $^\circ$ -*ne*-*h*₁- to come out as *mi*-conjugated in Hittite, and * $^\circ$ -*ne*-*h*₂- and * $^\circ$ -*ne*-*h*₃- as *ḫi*-conjugated. Morphological *o*-grade is not expected.

formation	Hitt.	meaning	conj.
* h_2u - <i>ne</i> - <i>g</i> ^(h) -	<i>ḫuni(n)k</i> ^{-zi}	‘to bash’	<i>mi</i>
* h_3r - <i>ne</i> - <i>g</i> -	<i>ḫarni(n)k</i> ^{-zi}	‘to make disappear’	<i>mi</i>
* $h_2/3i$ - <i>ne</i> - <i>k</i> -	<i>ḫinik</i> ^{-zi} / <i>ḫink</i> ⁻⁶⁸	‘to grant, bestow’	<i>mi</i>
* <i>ni</i> - <i>ne</i> - <i>k</i> -	<i>nini(n)k</i> ^{-zi}	‘to mobilize’	<i>mi</i>
* <i>sr</i> - <i>ne</i> - <i>k</i> ⁻	<i>šarni(n)k</i> ^{-zi}	‘to compensate’	<i>mi</i>
* <i>str</i> - <i>ne</i> - <i>k</i> ⁻	<i>ištarni(n)k</i> ^{-zi}	‘to afflict’	<i>mi</i>
* <i>tm</i> - <i>ne</i> - <i>k</i> -	<i>tamenik</i> ^{-zi} / <i>tamink</i> ⁻⁶⁹	‘to attach’	<i>mi</i>
* <i>d</i> ^h <i>ur</i> - <i>ne</i> - <i>h</i> ₁ -	<i>duḫarni</i> ^{-zi} / <i>duḫarn</i> -	‘to break’	<i>mi</i>
* $h_1/3rs$ - <i>ne</i> - <i>h</i> ₁ -	<i>aršane</i> ^{-zi} / <i>aršan</i> -	‘to be envious’	<i>mi</i>
* h_2ul - <i>ne</i> - <i>h</i> ₁ -	<i>ḫulle</i> ^{-zi} / <i>ḫull</i> -	‘to smash’	<i>mi</i>
* <i>ti</i> - <i>ne</i> - <i>h</i> ₁ -	<i>zinni</i> ^{-zi} / <i>zinn</i> -	‘to finish’	<i>mi</i>
* <i>sn</i> - <i>ne</i> - <i>h</i> ₂ -	<i>šanna</i> ⁻ⁱ / <i>šann</i> -	‘to hide’	<i>ḫi</i>
* <i>tr</i> - <i>ne</i> - <i>h</i> ₂ -	<i>tarna</i> ⁻ⁱ / <i>tarn</i> -	‘to let (go)’	<i>ḫi</i>
* <i>su</i> - <i>ne</i> - <i>h</i> ₃ -	<i>šunna</i> ⁻ⁱ / <i>šunn</i> -	‘to fill’	<i>ḫi</i>

The overview is telling. As expected, all verbs in **ne*-*K*- and **ne*-*h*₁- are *mi*-conjugated. The absence of a type ***na*^{-zi} shows that no verbs in

⁶⁷ Possibly, we should classify *kanen*^{-(zi?)} ‘to bow, genuflect’ < * \acute{g} -*ne*-*n*- here as well.

⁶⁸ On this verb see Shatskov (2017: 46-48).

⁶⁹ For a discussion and analysis of the stems of this verb, see Shatskov (2017: 53-60). Whatever the exact details, the normal developments must in some way have been distorted by the presence of the root-inherent nasal *-m*- and contamination from the middle stem *tamek*- (which is itself also problematic).

*-ne-h_{2/3}- ended up being *mi*-conjugated.⁷⁰ Since we do not expect *o*-grade in this formation, as the velar-final formations confirm, this already indicates that the verbs in -na-ⁱ descend from *-ne-h_{2/3}-.⁷¹ Independent evidence for the color of the laryngeal comes from the etymological connections of the verbs in question.

For *šanna*-ⁱ ‘to hide’, the received etymology connects Gr. ἄνευ ‘without’ (cf. Kloekhorst 2008: s.v.). I find this very farfetched. Within Hittite, there is a much closer plausible cognate. The root must be *senH-. The one other Hittite verb which goes back to this structure is *šanḫ*-^{zi} ‘to seek, look for’, normally reconstructed as *senh₂- (cf. Kloekhorst 2008: s.v.). With one verb meaning ‘to hide’ and the other ‘to seek’, both obviously part of the same semantic domain, there can in my opinion be no doubt that these two verbs are etymologically related. This suggests that *šanna*-ⁱ goes back to *sn-ne-h₂-.⁷²

⁷⁰ The most important verb that is sometimes claimed to be of exactly such a type, “*ḫarna*-^{zi}” ‘to sprinkle’, is seen as a *mi*-verb only on the basis of the one attestation 1pl.pres. *ḫarnaḡeni* instead of ***ḫarnumeni*, which however occurs in a text whose reliability is questionable (cf. Kloekhorst 2008: s.v.: “I have doubts regarding the reliability of this text, however: cf. the fully aberrant 1pl.pres.act. form *iš-ḫu-ḡa-ḡa-a-ni* (ibid. 18)”), and may moreover well simply show the transition to the *ḫatrae*-class by which the *tarna*-type is later absorbed (cf. e.g. 3sg. *tarnaizzi*). It goes without saying that this form does not justify the assumption of a type **-na-^{zi}.

⁷¹ Kloekhorst’s (2008: s.v. *šanna*-ⁱ) formal objection to a reconstruction with *h₂, to the effect that *CC-nó-h₂-ei would give Hitt. **-naḡi (i.c. *sn-nó-h₂-ei > ***šannaḡi*) does not apply to the current scenario: starting from an originally *mi*-conjugated verb, the original form *-ne-h₂-ti would regularly become *-nā-ti (*-nā-di), with loss of the laryngeal before a stop (Kloekhorst 2008: 77), and then be turned into *-nā-i. The evidence of the nasal infix verbs suggests that other stems continuing *^oeh₂- that still show *h₂ > ḡḡ leveled this from forms in which the laryngeal had not disappeared. It concerns root formations of the type *(C)Ceh₂- (see 6.1.2.2.1) and the suffix *-eh₂- (see 6.2.3), in which the *h₂ was much less dispensable than in *tarna*-formations.

⁷² Oettinger (1979: 159) had thought of this possibility, but rejected it because he did not consider it plausible that ‘to make look for’ changed to ‘to hide’. However, to arrive at an accurate description of ‘to hide’ the only necessary adaptation of the synchronically most expected meaning is to have the causative apply to the object rather than to the subject of *šanḫ*-^{zi} (i.e. ‘to make looked for’ or ‘to make to be looked for’). Cf. Dutch *zoeken* ‘to look for’, *zoekmaken* ‘to make missing’ < *te zoeken maken* ‘to make to be looked for’. Not all the details of the apparent synchronic function of the *n*-infix should be taken as rigorous leading principles in etymological matters, since it is unlikely that this exact function is of PIE date; PIE rather formed causatives with the *CoC-eie/o*-type, also before the departure of Anatolian. Hence the slight

For *tarna*⁻ⁱ ‘to let (go), allow’, two competing etymologies exist. One connects **terh₂-* ‘to cross, pass through’ (Skt. *táratī* ‘comes through’, Lat. *trāns* ‘across’), the other ToB *tarka-*, ToA *tārkā-* ‘to let go, let, allow, emit, dismiss’ (present stem B *tark(ə)na-*, A *tārnā-*) < **TerKH-*, **TrK-ne-H-*. The latter is now usually preferred (cf. LIV²: s.v. **TerKh₂-*, Kloekhorst 2008: s.v.). If this connection is correct, the laryngeal would not be determinable on the basis of etymology.⁷³ From a Hittite perspective, however, it is somewhat awkward that a *-k-* has to be postulated for which there is no internal evidence, which has to be lost in a cluster *-RkC-* in *tarna-* and in a cluster *-ksC-* in the imperfective *tar-šik(k)e/a-*. Moreover, since this is a nasal infix formation, in principle we expect the meaning of the Hittite formation to be causative. The Tocharian verb, however, inherently means ‘to let go’ rather than ‘to go’. Semantically, a connection with PIE **terh₂-* ‘to cross, pass through’ therefore fits much better: ‘to let (go), allow’ can easily be from ‘to make pass (through)’, i.e. ‘to provide someone with the possibility to go (on)’. The semantics of *tarna*⁻ⁱ, which were the reason for Kloekhorst (2008: s.v.) to reject the derivation from PIE **terh₂-* ‘to cross, pass through’, are therefore rather an argument in favor of it. If we connect **terh₂-* rather than the Tocharian verb, this leads to a preform **tr-ne-h₂-*.

šunna- ‘to fill’ is a factitive to *šūuš* ‘full’ < **seuH-u-*. Since **seuh₂-u-* would rather have become ***šūhu-*, the root must have been **seuh₁-* or **seuh₃-* (Melchert 1987: 24). The derived adjective *šu-u-uš* /*sōus*/ ‘full’, with *ō* rather than *ū*, the regular reflex of **-eu-*, further points in the direction of **h₃* (Kloekhorst’s 2008: s.v. reconstruction **-ou-*, with *o*-grade, is morphologically unexpected).⁷⁴ Conversely, **h₃* is confirmed by our expectation to find **h₂* or **h₃* in this verbal type, of which **h₂* has been

divergence from the synchronic function should not be invoked to reject an etymological connection between a formally matching pair of verbs of which one means ‘to hide’ and the other ‘to seek’.

⁷³ Conversely, in view of the origin of the morphological type as proposed here, it follows from Hitt. *tarna*⁻ⁱ that the laryngeal must have been either **h₂* or **h₃*.

⁷⁴ The Palaic 3sg.pret. *šūnāt*, which has been glossed as ‘poured out’, has also been taken as support for **h₃* (Melchert 1987: 25). I prefer not to base any argument on Palaic.

ruled out. We can therefore settle the reconstruction on **seuh₃-*, with *šunna⁻ⁱ* < **su-ne-h₃-* / **su-n-h₃-*.

As it turns out, then, our expectations of the nasal infix verbs of the type **-ne-C-* are completely borne out by the data. Formations in **-ne-K-* and **-ne-h₁-* surface as *mi*-conjugated (*-ni(n)k^{-zi}*, *-ne^{-zi}/-ni^{-zi}*), formations in **-ne-h₂-* and **-ne-h₃-* as *hi*-conjugated (*-na⁻ⁱ*). This provides a strong confirmation of the correctness of the analysis, both of the mechanism of conjugational transfer in general, without which the existence of the *tarna*-type cannot be explained, and of the exact formal triggers as observed on the basis of the unaffixed formations.

One lexeme that may also be treated here is *kuṽašš^{-zi}* ‘to kiss’. Comparing the likely cognate Gr. κυνέω < **k^u-ne-s-* (cf. LIV²: s.v. *k^uas-*), Kloekhorst (2008: s.v.) reconstructs *kuṽašš^{-zi}* as **k^u-en-s-*.⁷⁵ While possible in terms of sound law, this reconstruction is morphologically problematic, since there is otherwise no evidence for the existence of a nasal infix of this type in PIE.⁷⁶ I therefore propose to reconstruct **k^u-n-s-* instead, which is the expected shape of the zero grade stem that must originally have accompanied **k^u-ne-s-* as preserved in Gr. κυνέω. **k^u-n-s-* would regularly have been vocalized as **k^uṽs-* (> **k^wṽs-*) before a consonant, and have produced the attested form *kuṽašš-*, cf. e.g. **d^hur-n-h₁-* > *duṽarn-* ‘to break’, **g^{wh}n-ske/o-* > *kuṽaške/a-* ‘to kill (impf.)’, **k^wr-ske/o-* > *kuṽaraške/a-* ‘to cut (impf.)’ (Kloekhorst 2007b). This suggests that the expected allomorphy **kuneš-* / **kuṽašš-* / **kušš-* was

⁷⁵ This reconstruction was retracted in Kloekhorst (2014a: 286-287) in favor of a hesitatingly postulated reconstruction **kueh₃s-* (~ Skt. *cūṣati* ‘to suck, smack?’) in order to explain the OH/MS attestation with plene spelling, *ku-ṽa-a-aš-zi*. I do not consider this one attestation to have enough weight to justify an adaptation of the root etymology, which entails abolishing the very attractive etymological connection with Gr. κυνέω. The alternative reconstruction is also suspicious given the general tendency to transfer verbs with a sequence **-eh_{2/3}-* to the *hi*-conjugation (although the only exception to the tendency, *tamāšš^{-zi}* ‘to (op)press’, has a similar structure). I therefore prefer to analyze the plene spelling in *ku-ṽa-a-aš-zi* in a different way, for example, as the result of hypercorrection, or like the occasional attestation of *ap-pé-e-ez-zi^o* ‘backmost’, which must prehistorically and throughout attested Hittite have featured a short vowel (cf. Skt. *ápatya-* ‘offspring’). If the plene spelling does spell real length in this case, it may reflect an attempt to (re)create ablaut.

⁷⁶ For *kalank-* ‘to soothe’ and *hamank⁻ⁱ* ‘to wrap, tie’, which have been claimed to go back to *hi*-inflected variants of this structure, see 6.1.1.2 n. 37 and 6.2.1, respectively.

leveled in favor of *kuṽašš-*. Very probably, the epenthetic vowel that developed before a vocalic resonant was not /a/, but rather /ə/ (cf. Kloekhorst 2008: 27-29, and cf. 6.1.1.2), and therefore the *mi*-inflection is expected.

6.2.3 Suffixes

In the following overview I list the inherited athematic verbal suffixes.⁷⁷ On the basis of the other IE languages, we again do not expect morphological *o*-grade, and so we expect *hi*-inflection only in the case of **h₂* or **h₃* adjacent to the ablaut vowel.

formation	Hitt.	meaning	conj.
*-eh ₁ -	-e ^{-zi}	stative suffix	<i>mi</i>
*-eh ₁ -sh ₃ -	-ešš ^{-zi}	fientive suffix	<i>mi</i>
*-neu-	-nū ^{-zi}	causative suffix	<i>mi</i>
*-eh ₂ -	-ahh ⁻ⁱ	factitive suffix	<i>hi</i>
*-ei-	-ai ⁻ⁱ / -i-	verbal suffix	<i>hi</i>
*-seh ₃ -	-šša ⁻ⁱ / -šš-	imperfective suffix	<i>hi</i>

Indeed, all *mi*-conjugated suffixes go back to shapes without a coloring laryngeal adjacent to the ablaut vowel, and all suffixes that did have such a laryngeal ended up in the *hi*-conjugation.

The suffix -ahh⁻ⁱ shows a peculiarity compared to root formations with a similar structure: unlike those, -ahh⁻ⁱ does not lenite its 3sg. to ***-āh-*. The lenition of the root formations, inasmuch as they are the result of transfer rather than original *o*-grade formations, was explained in 6.1.2.2.1 as analogical after the pattern of other members of the same class, where it originated in lenition caused by **ó*. As a suffix, -ahh⁻ⁱ did not become part of this class, and therefore understandably did not adopt its pattern, but instead continued to show the unlenited -hh- as expected from the *e*-graded preform **-eh₂-* (cf. Kloekhorst 2008: s.v.). The -hh- throughout the paradigm cannot be completely due to sound law either, however: as is

⁷⁷ We may also mention here the special cases of the thematic suffixes *-ške/a^{-zi}* and *-ie/a^{-zi}*, whose original alternation of **e* and **o* reached attested Hittite relatively unscathed, apart from a slight expansion of *-e-* in the oldest texts (*-škēmi*, *-iemi*). Their *mi*-inflection, mostly inherited as such from PIE, is unsurprising.

clear from nasal infix verbs such as *tarna-* < **trneh₂-*, part of the paradigm must have shown a development to **-ā-*, e.g. **-eh₂-ti* > **-ā-ti* (**-ā-di*) (see 6.2.2 n. 71). This development must also have taken place in the suffix **-eh₂-*, meaning that *-h₂-* was in this case restored from other forms in the paradigm in which it had not been lost (e.g. **-eh₂-enti* > *-ah₂-anzi*). It can be understood why these two types were leveled in different directions: while forms like *tarna-* had acceptable shapes also after the workings of the sound law, meaning that the now anomalous forms such as **-eh₂-enti* > **-ah₂-anzi* could be leveled out, in *-ah₂-* the *-h₂-* was the most prominent and recognizable part of the suffix, and thus less dispensable. In the root formations *-h₂-* enjoyed similar prominence. The generalization of *-ah₂-* rather than **-ā-* in these cases is therefore unsurprising.⁷⁸

Only one suffix behaves unexpectedly: the suffix *-ai/i-*.⁷⁹ With Kloekhorst (2006a: 118, also Kloekhorst & Lubotsky 2014: 131), this is clearly related to the suffix **-ei/i-* that can be reconstructed for PIE on the basis of non-Anatolian relics, mainly **t^k-ei-ti* / **t^k-i-enti* ‘to cultivate (land)’ (Skt. *kṣeti*, *kṣiyānti* ‘to dwell’, Myc. *ki-ti-je-si* ‘they cultivate’), derived from the root **te^k-* ‘to give birth to, produce’, and **d^hg^{wh}-ei-ti* / **d^hg^{wh}-i-enti* ‘to decay (by or as if by fire)’, from **d^heg^{wh}-* ‘to burn’ (see LIV²: s.vv. **d^hg^{wh}ej-*, **t^kej-*). LIV² (s.vv.) convincingly analyzes this as an originally intransitivizing suffix (‘to burn (tr.)’ → ‘to decay ((as if) by fire)’, ‘to produce’ → ‘to cultivate land, farm’). As an athematic ablauting suffix attached to the zero grade of the root, **-ei/i-* is a complete morphological match of Hitt. *-ai/i-* except for the color of the ablaut vowel. The Hittite suffix is reconstructed as **-oi/i-*, with morphological *o*-grade, by Kloekhorst (2006a, following Oettinger 2002: xxviii), who also reconstructs this form for PIE on the basis of an equation of Hitt. *išpai-i* ‘to become satiated’ and Skt. *sphāya-te* ‘becomes fat’ < (virtual) **sph₁-oi-e-toi* (?) (Kloekhorst 2006a: 115 n. 10, 118 n. 18, following a

⁷⁸ For prominence as a determining factor in the absence or presence of restoration, cf. e.g. the general restoration in Italian of [k] and [g] before the plural *-i* immediately after the accent, i.e. in a more prominent position, but its retention elsewhere, e.g. *stòrico* [-k-], pl. *stòrici* [-tʃ-] ‘historic; historian’, but *fico* [-k-], pl. *fichi* [-k-] ‘fig’.

⁷⁹ The *ai/i*-class originally also included the *mēma/i*-class, its counterpart in polysyllabic stems in which the suffix was not accented (cf. Oettinger 1979: 462-463, Kloekhorst 2008: 145-147, Kümmel 2012).

suggestion by Lubotsky, who further developed this in Lubotsky 2011: 115), to which Kloekhorst & Lubotsky (2014: 133-134) add Hitt. *nai*⁻ⁱ ‘to turn’ < **nh*₁-*oi*-, *nanna*/*i*- ‘to drive’ < **ne-nh*₁-*oi*- ~ Skt. *náyati*, -*te* ‘to lead, bring’ < **nh*₁-*oi*-*e*-, perf. *nináya* < **ne-nh*₁-*oi*-.⁸⁰ If correct, its morphological *o*-grade would immediately explain the *hi*-inflection. However, I am not convinced that the adduced forms warrant the reconstruction of a PIE suffix **oi/i*-. First of all, this reconstruction is morphologically suspicious because PIE verbal suffixes with inherent *o*-grade are otherwise unknown. Moreover, the few forms that constitute the non-Anatolian part of the equation allow for different interpretations: *sphāya*- may have obtained its sequence *Chā* in the same way as did *sthā*- ‘to stand’ < **steh*₂- / **sth*₂-, and while the verb *nī*- / *nay*- < **neiH*- or **nHei*- may indeed result from a reinterpretation of **nH-ei/i*- as a root, its perfect *nináya* is a transparent perfect formation and may have been created at any time after the reinterpretation of the basal verb.⁸¹ The idea that these formations are specifically Indo-Iranian creations is strengthened by the fact that there is no evidence for corresponding forms in the rest of non-Anatolian IE. Indeed, at an earlier stage, i.e. before the reinterpretation of these *i*-presents as roots, and before the post-PIE functional developments of the perfect, such creations are unexpected in view of the meaning of the suffix **-ei/i*-, if this really detransitivized the basic verbal meaning, creating Vendlerian ‘activities’ (for this term and the semantic restrictions of the PIE perfect see 7). These arguments caution against a mechanical reconstruction of Hitt. *-ai/i*- as **-oi/i*-. This reconstruction is furthermore based on the premise that the *hi*-conjugation always owes its vowel to morphological *o*-grade, which can in view of the model developed here no longer be upheld. In view of all this, I prefer a different analysis. It is important to note that a direct descendant of **-ei/i*- is otherwise completely absent in Hittite. To me, this suggests that *-ai/i*- is in fact the direct descendant of **-ei/i*-, whose ablaut vowel came to be altered. As a switch to an *o*-grade variant would be hard to justify morphologically, I think we

⁸⁰ Cf. also De Vaan (2019), who reconstructs **d^hh*₁-*oi/i*- (Hitt. *dai*⁻ⁱ / *ti*-) for PIE.

⁸¹ Cf. Skt. *ā siṣāya* ‘holds fettered’ < **se-sh*₂*oi-e*, perfect to *sināti* ‘to make fettered’ < **si-ne-h*₂-*tī*, ultimately from a reinterpreted *i*-present to the root *sā*- < **seh*₂- (cf. Lubotsky 2011: 109-111, 121).

rather have to look for a solution based in sound law. There are two logical possibilities that may be explored here.

A first option that deserves serious consideration is that **-éi-ti* simply became **-ái-ti* (**-ái-di*) by sound law. The usual assumption, however, is that **ei* was always monophthongized (cf. e.g. Melchert 1994: 145, Kimball 1999: 207-214, Kloekhorst 2008: 99-100). But while **ei* clearly became a monophthong in some contexts (see below), it cannot be regarded as certain that it did in all of them, and a split outcome would in fact not be isolated. The diphthong **ou*, which may *a priori* be expected to show parallel developments to those of **ei*, has both a monophthongized outcome /*ō*/ and a conditioned diphthongal outcome *au* before dentals (e.g. in **h₂ou-* > *au-* ‘to see’: 1sg. *u-uh-ḫi*, 2sg. *a-ut-ti*, 3sg. *a-uš-zi*; cf. Kloekhorst 2008: 58-59, 101). Similarly, **oi* becomes *ě* word-finally (**kói* > *kē* ‘these’, **=oi* > *e* ‘they’, cf. Gr. τοί ‘they’), but *ai* word-internally before dentals (**koinos* > *kainaš* ‘in-law, kinsman’;⁸² cf. Kimball 1999: 216-217, Kloekhorst 2008: 100). *A priori*, one could therefore suppose that **ei* likewise became *ě*, but *ai* word-internally before dentals. But of course, we have to judge this hypothesis on the basis of the evidence. For **ei* > *ě* before non-dentals and word-finally, Kloekhorst (2008: 99-100) adduces *eḫu* ‘come!’ < **h₁éi-h₂ou*, *ḫēu-* ‘rain’ < **h₂eih₃-u-*, *nēa* < **neih_{1/3}-o*, *mēḫur* < **meih₂-ur* and **uors-ei* > *uaršše* (later replaced by *uarši*).⁸³ The only example with **ei* > *e* before a dental, and therefore the only counterevidence for *-ai-* resulting from **-ei-* by sound law before dentals, is *uezzi* ‘comes’, which Kloekhorst reconstructs as **h₂ou-h₁eiti*. A problem with this form is that the verb to which it belongs has secondarily acquired a thematic inflection (*ue/a-^{zj}*), and it cannot be ruled out that *uezzi* was not

⁸² Although the *ai* in *kainaš* must be from **oi* or **ei*, it is not immediately clear which of the two it is. None of the cognates that are usually adduced (e.g. Skt. *śéva-* ‘dear, precious’ < **kVi-uo-*, MHG *hīe* ‘household member’ < **kei-uo-*, Lat. *cīvis* ‘citizen’ < **kei-ui-*, Latv. *siēva* ‘wife’ < **kei-ueh₂-*, OIr. *cóim* ‘dear, nice’ < **koi-mo-*; cf. Kimball 1999: 216, Kloekhorst 2008: s.v.) match *kainaš* in formation. However, perhaps we may further adduce Gr. κοινός ‘belonging to the community’, i.e. ‘common, shared, kindred’, of which **kóinos* could be the substantival counterpart. For the possibility that κοινός belongs to this root, cf. already Chantraine (2009: s.v.). The received etymology rather derives κοινός from **kom-io-* (to **kom* > Lat. *cum* ‘with’).

⁸³ This is usually seen as a case of analogy. Cf. Kümmel (2012) for the possibility of a sound law *-e* > *-i*.

one of the analogically reshaped forms rather than a pivot form; cf. *ie/a*-^{ta(ri)} ‘to go’, of which only the stem form *ija-* < **h₁i-V^o* can directly reflect the older athematic verb, whereas *ie-* is analogical rather than a regular reflex of **h₁ei-*. The exact formal history of the other continuation of **h₁ei-*, found in *pajī-^{zi}* / *pai-* ‘to go’, is difficult to recover, and has likewise been proposed to include a case of leveling which removed the original strong stem (Kloekhorst 2008: s.v.). The preverb that is also part of this verb, however, provides some positive evidence for a development **ei* > **ai*. This preverb developed from an adverb still found as *pē* (e.g. *pē-da-ⁱ* ‘to carry, bring’, *pē har(k)-^{zi}* ‘to have, hold’). This is reconstructed as **h₁p-oi* by Kloekhorst (2008: s.v.), a modification of Eichner’s (1973: 78) reconstruction **po-i*. However, a morphologically much more likely reconstruction would be **h₁p-ei*, a dative existing next to the locative **h₁iep-i* (Gr. ἐπί, etc.). For such a morphological pair cf. e.g. **per-i* (Gr. περί, etc.) ~ **pr-ei* (OPruss. *prei*, Lith. *priẽ*, OCS *pri*). It is therefore likely, in my view, that *pē*, rather than the accented dat.-loc.sg. ending *-ī*, shows the regular outcome of **-éi*. The dat.-loc. ending *-ī* may well have followed a similar path to that of *uaršše* >> *uarši*, i.e. **-éi* > **-ē* >> *-ī*, after the much more frequent unaccented dat.-loc. ending *-i* < **-i*. The evidence of *pajī-^{zi}* / *pai-* ‘to go’ shows that **h₁péi* > *pē* went through a stage **pái*, whose diphthong was retained as such in the unverbated verb, but monophthongized to *é* in word-final position (Kloekhorst 2008: s.v.). Here we would then have a development **éi* > **ái*, later > *é* word-finally. This could mean that 2sg. **-éi-si* and 3sg. **-ei-ti* likewise developed to **-ai-si* and **-ai-ti* (**-ai-di*), retaining the diphthong before a dental, but monophthongizing it in most other positions, including word-finally. These developments would be fully parallel to those of **oi* > *ai* ~ *ě* and **ou* > *au* / ~ /*ǔ*/, and would allow us to reconstruct the morphologically expected *e*-grade rather than a fully unexpected *o*-grade in the adverb *pē* < **pai* (< **h₁p-éi* rather than **h₁p-óí*) and in the verbal suffix *-ai/i-* (< **-éi/i-* rather than **-óí/i-*).

Another possibility is that the outcome *-ai/i-* was caused by the usual suspects for causing coloring of **e* to **a/o*, viz. **h₂* and **h₃* – cf. the origin of the type *padd-ai* < **b^hod^hh₂-ei-*, after which this colored variant was generalized. This option gains probability in light of the fact that the suffix

is in Hittite correlated with roots originally ending in a laryngeal (Jasanoff 2003: 94-95). And indeed, various prominent members of this class may directly continue *e*-grade forms by sound law, e.g. **sh₂-ei-* / **sh₂-i-* > *išhai-* / *išhi-* ‘to bind’, **mh₂-ei-* / **mh₂-i-* > *m-ai-* / *m-i-* ‘to grow’, **pth₂-ei-* / **pth₂-i-* > *pidd-ai-* / *pitt-i-* ‘to run, flee, fly’,⁸⁴ perhaps **nH-ei-* / **nH-i-*⁸⁵ > *n-ai-*, **n-i-*, *nē-* ‘to turn, send’, **spH-ei-* / **spH-i-*⁸⁶ > *išpai-ⁱ* / *išpi-* ‘to become satiated’.⁸⁷ In these verbs, the laryngeal-colored suffix vocalism would expectedly have triggered a transition to the *hi*-conjugation. If the regular outcome of **-ei/i-* was **-ē/i-*, in accordance with the current understanding of the development of **ei*, this alternation would have become quite opaque, which could have been an incentive to generalize the more transparent ablaut of the colored variant of the suffix, with the identical zero-grade **-i-* as the pivot form (e.g. *išh-i-anzi* (etc.) : *išh-āi* = *t-i-anzi* (etc.) : *X* → *d-āi*).⁸⁸ Indeed, if we expect two different outcomes of **-ei/i-* by sound law (**-ē/i-* and **-ai/i-*), and only one of them is found, this directly suggests that the two types created by sound law were leveled in favor of one of the two. In any case, whichever scenario is correct –

⁸⁴ Kloekhorst’s (2008: s.v. *pattai-ⁱ* / *patti-*) reconstruction with **h₁* is based on *pitte^jiant-* ‘fugitive’, with *-e-* rather than *-a-* as in *maj^jiant-* ‘adult man’. However, since intervocalic **j* is lost in Hittite, the exact shape of *pitte^jiant-* cannot be old, and is therefore non-probative. Moreover, the Greek evidence points to **h₂*: *ἔπτατο* ‘flew’ < **pth₂-*, *ποτάομαι* ‘to fly hither and thither’ < **poth₂-eie/o-* (see LIV²: s.v. **peth₂-²*). This contrasts with *πίπτω* ‘to fall’ < **pet-* or **peth₁-*. The Ilr. evidence cannot be used to determine the final laryngeal of ‘to fly’. Here we find only one verb, **pat-* or **patH-* ‘to fly, fall’ (e.g. Skt. *pátati* ‘to fly’), possibly due to a conflation of the two roots (Kümmel 2000: 295-296, LIV²: s.v. **peth₁-*).

⁸⁵ That is, if the root was **neh₃-*, rather than to be identified with **neh₁-* ‘to twist; to sew’ as per Kloekhorst & Lubotsky (2014: 134-135), and if the root was not in fact **neiH-* (cf. Kloekhorst 2008: s.v.).

⁸⁶ The identity of this root with those of the often compared lexemes Lith. *spėti* ‘to be in time, be capable’, Lat. *spēs* ‘hope’ and PGM. **spēdi-* ‘late’, which would point to **h₁* rather than **h₂* or **h₃*, is not more than a possibility.

⁸⁷ Note that the 3sg.pres. in *-āi* (e.g. *dāi* ‘puts’) is non-probative with regard to the original color of the vowel, despite its length: this could also regularly come from **-ai-e(i)*, with a short vowel, as is shown for example by the nominal *i*-stems, e.g. dat.-loc.sg. **-ai-i* > *-āi*, nom.pl.c. **-ai-es* > *-āeš* (see Kloekhorst 2008: 90).

⁸⁸ Note, in addition, that the original full grade of this particular verb, **d^hh₁-ei-*, would then have given *tē-*, and would thus inconveniently have become identical to *tē-^{zi}* ‘to say’. This would have been a problem for roots originally ending in **^oeh₁-* more generally.

o-grade, coloring of **e* by **h₂* and **h₃*, or a development **ei* > **ai* – in each of them the resulting vocalism can immediately explain the transfer of the suffix to the *hi*-conjugation.

The laryngeal in the preform of *-šša⁻ⁱ* / *-šš-* < **-seH-* / **-sH-* must have been either **h₁* or **h₃*, since **-sh₂-* would have been preserved as ***-šh-* rather than developed to *-šš-* in the weak stem (cf. e.g. **h₁(e)sh₂en-* > *išhan-* ‘blood’). Kloekhorst (2018: 101) proposes to compare *-ške/a-* < PIE **-ske/o-*, whose pure velar may point to an earlier **-sk^w-e/o-*. Considering the alternation **k^w* ~ **h₃* in PIE **=k^we* (Myc. =*qe*, Lat. =*que*, Hitt. =*kku*, etc.) ~ PANat. **=Ho* < **=h₃e* (Hitt. =(i)*a*, Luw. =*ha*, Lyc. =*ke*) ‘and’, he convincingly proposes to reconstruct *-šša-* as **-seh₃-* / **-sh₃-*. Even if one does not accept this account, we do not expect *o*-grade in this suffix, and need **h₂* or **h₃* rather than **h₁* in order to explain the coloring of the ablaut vowel, leaving **h₃* as the only option.

Some of these suffixes were used by Jasanoff as prime examples to show the alleged randomness of the distribution of lexical elements among the *mi*- and *hi*-conjugations (see 5.1). The model developed here accurately predicts their conjugation assignment: *-nu^{-zi}* is *mi*-conjugated because it did not contain morphological *o*-grade or *e*-grade colored by **h₂* or **h₃*, *-ahh⁻ⁱ* and *-šša⁻ⁱ* are *hi*-conjugated because the *e*-grade was colored by **h₂* and **h₃*, respectively, triggering a transfer to the *hi*-conjugation.

6.3 Overview and further interpretation

This concludes the discussion of individual lexemes. The following pages provide an overview of all formations discussed in the previous sections, classified according to the interpretations reached.

MI-CONJUGATION

Root formations (including *s-* and *u-*extended roots) with **-e-*

Without coloring

<i>*b^herh₂-</i>	<i>parh₂-^{zi}</i>	<i>*h₂ueg^h-</i>	<i>h₂uek₂-^{zi}</i>	<i>*sperd^h-</i>	<i>išpart₂-^{zi}</i>
<i>*b^hers-</i>	<i>parš₂-^{zi}</i>	<i>*h₂ues-</i>	<i>h₂uiš₂-^{zi}</i>	<i>*stelg^h-</i>	<i>ištalk₂-^{zi}</i>
<i>*d^heh₁-</i>	<i>iē₂-^{zi}, -te₂-^{zi}</i>	<i>*kelh₁-s-</i>	<i>kallišš₂-^{zi}</i>	<i>*sTeNh_{2/3}-</i>	<i>išta(n)h₂-^{zi}</i>
<i>*g^{wh}en-</i>	<i>kuen₂-^{zi}</i>	<i>*kerp-</i>	<i>karp₂-^{zi}</i>	<i>*sterk₂-</i>	<i>ištark₂-^{zi}</i>
<i>*h₁ed-</i>	<i>ed₂-^{zi}</i>	<i>*kers-</i>	<i>karš₂-^{zi}</i>	<i>*teks-</i>	<i>takš₂-^{zi}</i>
<i>*h₁eg^{wh}-</i>	<i>eku₂-^{zi}</i>	<i>*kes-</i>	<i>kiš₂-^{zi}</i>	<i>*ter-</i>	<i>ter₂-^{zi}</i>
<i>*h₁ei-</i>	<i>i₂-^{zi}, paji₂-^{zi}</i>	<i>*k^wer-</i>	<i>kuer₂-^{zi}</i>	<i>*terh₂-u-</i>	<i>tarh₂-^{zi}</i>
<i>*h₁eNs-?</i>	<i>āšš₂-^{zi}</i>	<i>*lesH-?</i>	<i>le/išš₂-^{zi}</i>	<i>*terk^w-</i>	<i>tar(k)u₂-^{zi}</i>
<i>*h₁ep-</i>	<i>epp₂-^{zi}</i>	<i>*leuk-</i>	<i>lukk₂-^{zi}</i>	<i>*trep-</i>	<i>terepp₂-^{zi}</i>
<i>*h₁erk^w-</i>	<i>ārku₂-^{zi}</i>	<i>*mer-</i>	<i>mer₂-^{zi}</i>	<i>*treup-</i>	<i>tarupp₂-^{zi}</i>
<i>*h₁ers-</i>	<i>ārš₂-^{zi}</i>	<i>*neg^{wh}-</i>	<i>neku₂-^{zi}</i>	<i>*uek₂-</i>	<i>uek₂-^{zi}</i>
<i>*h₁es-</i>	<i>eš₂-^{zi}</i>	<i>*nenK-</i>	<i>ni(n)k₂-^{zi}</i>	<i>*ueih₂-</i>	<i>ueh₂-^{zi}</i>
<i>*h₁eup-</i>	<i>upp₂-^{zi}</i>	<i>*pes-</i>	<i>peš₂-^{zi}</i>	<i>*uelh₃-</i>	<i>ualh₂-^{zi}</i>
<i>*h₁ieh₁-</i>	<i>peje₂-^{zi}, uje₂-^{zi}</i>	<i>*selK-</i>	<i>šalk₂-^{zi}</i>	<i>*uelK-</i>	<i>ualk₂-^{zi}</i>
<i>*h₁leng^h-</i>	<i>li(n)k₂-^{zi}</i>	<i>*senh₂-</i>	<i>ša(n)h₂-^{zi}</i>	<i>*uerp-</i>	<i>uarp₂-^{zi}</i>
<i>*h₁ueb^h-</i>	<i>uep₂-^{zi}</i>	<i>*senh₂-u-</i>	<i>ša(n)hu₂-^{zi}</i>	<i>*uetk^w-</i>	<i>uatku₂-^{zi}</i>
<i>*h_{1/3}uenh₁-</i>	<i>uen₂-^{zi}</i>	<i>*ses-</i>	<i>šes₂-^{zi}</i>		
<i>*h₂ueg^(h)-</i>	<i>h₂uek₂-^{zi}</i>	<i>*smen-</i>	<i>šamen₂-^{zi}</i>		

Coloring undone by **h_{2/3}eRCC* > **HəRCC*

<i>*h₂erċ-</i>	<i>har(k)₂-^{zi}</i>
<i>*h₃erg-</i>	<i>hark₂-^{zi}</i>
<i>(*h_{2/3}erP-</i>	<i>harp₂-^{zi}</i>

Nasal infix **-ne-*

Zero grade

Suffixes

<i>*h₂u-ne-g^(h)-</i>	<i>h₂uni(n)k₂-^{zi}</i>	<i>*ġnh₃-s-</i>	<i>kane/išš₂-^{zi}</i>	<i>*-eh₁-</i>	<i>-e₂-^{zi}</i>
<i>*h_{2/3}i-ne-k-</i>	<i>h_{2/3}inik₂-^{zi}</i>	<i>*ġu-ġus-</i>	<i>kukuš₂-^{zi}</i>	<i>*-eh₁-sh₃-</i>	<i>-ešš₂-^{zi}</i>
<i>*h₃r-ne-g-</i>	<i>h₃arni(n)k₂-^{zi}</i>	<i>*h_{1/3}unh₂-</i>	<i>ū(n)h₂-^{zi}</i>	<i>*-neu-</i>	<i>-nū₂-^{zi}</i>
<i>*ni-ne-k-</i>	<i>nini(n)k₂-^{zi}</i>	<i>*h₂mh₁-s-</i>	<i>hane/išš₂-^{zi}</i>		
<i>*sr-ne-ċ-</i>	<i>šarni(n)k₂-^{zi}</i>	<i>*ku-n-s-</i>	<i>kuuāšš₂-^{zi}</i>		
<i>*str-ne-ċ-</i>	<i>ištarni(n)k₂-^{zi}</i>	<i>*k^w-k^wrs-</i>	<i>kukkurš₂-^{zi}</i>		
<i>*tm-ne-k-</i>	<i>tamenik₂-^{zi}</i>				
<i>*ġ-ne-n-</i>	<i>kanen₂-^{zi}</i>				
<i>*d^hur-ne-h₁-</i>	<i>duuarni₂-^{zi}</i>				
<i>*h_{1/3}rs-ne-h₁-</i>	<i>aršane₂-^{zi}</i>				
<i>*h₂ul-ne-h₁-</i>	<i>hulle₂-^{zi}</i>				
<i>*ti-ne-h₁-</i>	<i>zinni₂-^{zi}</i>				

Unclear

<i>*dmeh₂-s-?</i>	<i>tamāš₂-^{zi}</i>
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HI-CONJUGATION

Perfect		*CoC-eie/o-		*molH-type iteratives
* <i>(He-)Hor-e</i>	<i>ār⁻ⁱ</i>	<u>Causative</u>		* <i>b^hod^hh₂-</i> <i>padda⁻ⁱ</i>
* <i>(He-)Hok-e?</i>	<i>āk⁻ⁱ</i>	* <i>do^k-eie/o-</i>	<i>dākk⁻ⁱ</i>	* <i>konk-</i> <i>kānk⁻ⁱ</i>
* <i>(h₂e-)h₂ou-e?</i>	<i>au⁻ⁱ</i>	* <i>log^h-eie/o-</i>	<i>lāk⁻ⁱ</i>	* <i>mol^h-</i> <i>māld⁻ⁱ</i>
* <i>(me-)mouh₁-e?</i>	<i>mau⁻ⁱ</i>	<u>Iterative</u>		* <i>molH-</i> <i>mall⁻ⁱ</i>
* <i>(se-)sokh₁-e?</i>	<i>šākk⁻ⁱ</i>	* <i>srob^h-eie/o-</i>	<i>šarāp⁻ⁱ</i>	* <i>h₂omh₁-s-?</i> <i>ānš⁻ⁱ</i>
* <i>(ue-)uos-e?</i>	<i>uāš⁻ⁱ</i>			* <i>pe-pors-?</i> <i>papparš⁻ⁱ</i>
				* <i>ue-uok^{-?}</i> <i>ueuakk⁻ⁱ</i>

o-grade (original category unclear)

Various possibilities		Quite possibly iterative		Reduplicated causative?
* <i>g^hrob^h-(^o)?</i>	<i>karāp⁻ⁱ</i>	* <i>HorK-(^o)</i>	<i>ār^k-ⁱ</i>	* <i>h₁s(e)-h₁os-?</i> <i>ašāš⁻ⁱ</i>
* <i>h₁orh₁-(^o)</i>	<i>ār^r-ⁱ</i>	* <i>mor^g-(^o)</i>	<i>mār^k-ⁱ</i>	
* <i>h₂uoph₁-(^o)</i>	<i>ḫuuapp⁻ⁱ</i>	* <i>skolh_{2/3}-(^o)</i>	<i>iškalla⁻ⁱ</i>	
* <i>h₂uort-(^o)</i>	<i>ḫuuart⁻ⁱ</i>	* <i>skor-(^o)</i>	<i>iškār⁻ⁱ</i>	
* <i>h₃or^g-(^o)?</i>	<i>ār^k-ⁱ</i>	* <i>sorTh_{2/3}-(^o)</i>	<i>šarta⁻ⁱ</i>	
* <i>loh₁-(^o)?</i>	<i>lā⁻ⁱ</i>	* <i>spor-(^o)</i>	<i>išpār⁻ⁱ</i>	
* <i>stomb^hH-(^o)</i>	<i>ištāp⁻ⁱ</i>	* <i>sporh_{2/3}-(^o)</i>	<i>išparra⁻ⁱ</i>	
		* <i>uors-(^o)</i>	<i>uarš⁻ⁱ</i>	
* <i>h₃e-h₃noh₃-?</i>	<i>ḫanna⁻ⁱ</i>			
* <i>se-spond-?</i>	<i>šipānt⁻ⁱ</i>			

Colored *-e-

Root formations (including s-extended roots) with *-e-

* <i>deh₃-</i>	<i>dā⁻ⁱ, -da⁻ⁱ</i>	* <i>h₂erh₃-</i>	<i>ḫarra⁻ⁱ</i>	* <i>pleh₂-</i>	<i>palāḫ⁻ⁱ</i>
* <i>h₂ed-</i>	<i>ḫāt⁻ⁱ</i>	* <i>h₂erh₃-s-</i>	<i>ḫarš⁻ⁱ</i>	* <i>seh₂-</i>	<i>šāḫ⁻ⁱ</i>
* <i>h₂ed^hg^h-</i>	<i>ḫatk⁻ⁱ</i>	* <i>leh₃u-</i>	<i>lāḫu⁻ⁱ</i>	* <i>tieh₂-</i>	<i>zāḫ⁻ⁱ</i>
* <i>h₂ems-</i>	<i>ḫāš⁻ⁱ</i>	* <i>neh₂-</i>	<i>nāḫ⁻ⁱ</i>	* <i>ueh₂g⁻-</i>	<i>uāk⁻ⁱ</i>
* <i>h₂en-</i>	<i>ḫān⁻ⁱ</i>	* <i>peh₂-s-</i>	<i>paḫš⁻ⁱ</i>		
* <i>h₂e(N)s-?</i>	<i>ḫāš⁻ⁱ</i>	* <i>peh₃-s-</i>	<i>pāš⁻ⁱ</i>		

Nasal infix *-ne-

* <i>sn-ne-h₂-</i>	<i>šanna⁻ⁱ</i>
* <i>su-ne-h₃-</i>	<i>šunna⁻ⁱ</i>
* <i>tr-ne-h₂-</i>	<i>tarna⁻ⁱ</i>

Reduplicated formations

* <i>h₂me-h₂m^gh^{-?}</i>	<i>ḫamank⁻ⁱ</i>
* <i>mi-meh_{2/3}-?</i>	<i>mimma⁻ⁱ</i>
* <i>pi-peh_{2/3}-?</i>	<i>pippa⁻ⁱ</i>

Suffixes

* <i>-eh₂-</i>	<i>-aḫḫ⁻ⁱ</i>
* <i>[h_{2/3}]-ei/i-</i>	<i>-ai/i⁻ⁱ</i>
* <i>-seh₃-</i>	<i>-šša⁻ⁱ</i>

We can generalize as follows. There is a formal distribution between the *mi*- and the *hi*-conjugations. The *mi*-conjugation contains formations in which the ablaut vowel **-e-* was not affected by **h₂* or **h₃*, and zero grade formations. The *hi*-conjugation contains formations with *o*-grade, notably perfects, *CoC-eie/o*-causatives and -iteratives, **molH*-type iteratives, as well as verbs in which the ablaut vowel **-e-* was colored by **h₂* or **h₃*.

The latter category, the largest among the historical categories that make up the *hi*-conjugation, is especially informative: the fact that a morphologically arbitrary feature of the root, viz. its phonological make-up, is found abundantly in the *hi*-conjugation, but is essentially absent from the *mi*-conjugation, clearly betrays a secondary association of (the effects of) this phonological feature with the morphological category of the *hi*-conjugation. Since **h₂* and **h₃* changed the color of an adjacent ablaut vowel **-e-* to match the color of the ablaut vowel of the *hi*-conjugation, it is not difficult to understand the association. The distribution clearly suggests that *mi*-conjugated verbs whose ablaut vowel color came to match that of the *hi*-conjugation were transferred to the *hi*-conjugation. This, in turn, suggests that the various morphological categories with *o*-grade that are also contained by the *hi*-conjugation were likewise transferred on the basis of their vocalism – except, of course, for the original source category of the *hi*-conjugation. There can be no doubt which of the *o*-grade categories this original source was: since the *hi*-conjugation has endings going back to the perfect, its origin clearly lies in the perfect.

It need not bother us that so few members of the *hi*-conjugation, if any at all, can be matched to specific perfects found elsewhere in Indo-European. Such matches are in fact rare for all groups of verbs with historical *o*-grade. And our chances of encountering a match are reduced to begin with: none of these groups is particularly large, even in the unlikely event that all unclear cases originally belonged to only one of these categories. For each of these groups, the surviving lexemes surely constitute only a fraction of the original group size, and many group members must simply have been lost. And the chances are reduced even more because some lexemes retained in Anatolian were most likely replaced in post-Anatolian IE (**h₂eu-*, **ues-*, probably **Heḱ-*). It is therefore not at all bad that we are still left with one good match, *ār⁻ⁱ* ~ Skt.

āra, and have at least a candidate for another match in *šipānt*⁻ⁱ ~ Lat. *spopondī*. For comparison, even though we can reconstruct a few hundred strong verbs for Proto-Germanic, only four of their perfect-continuing preterites can be matched to perfects in other IE languages (**baid*-, **laihw*-, **kwam*-, **warþ*- < **b^he-b^hoid^h*-, **le-loik^w*-, **g^we-g^wom*-, **ue-uort*-, see Ringe 2017: 180-181).

At the categorical level, it makes sense that it was the type deriving from the perfect that was generalized: with primary meanings such as ‘to die’, ‘to arrive’, ‘to see’, this category was more prominent than that of the more peripheral *o*-grade iteratives (‘to dig’, ‘to grind’, ‘to stab’) and that of the derived causatives (‘to make lie down’, ‘to resemble’). And after the perfect had become the main expression of the lexeme it belonged to, taking over the roles of the former present-aorist, it operated in the core of the verbal system, on a par with the *mi*-conjugation; it was no longer a derived category, but a second primary conjugation, which could attract other formations with *o*-grade.

It may be useful to point out explicitly that the original semantic values that the merging morphological categories had had in PIE were clearly no obstacle to the merger. Nor is this expected after the perfect had lost its original value to simply become the main expression of the lexeme it was part of. For all lexemes involved in the merger, all shades of meaning were, as Hittite shows, identifiable simply on the basis of the root, allowing the shape of the (former) perfect to be generalized among formations with *o*-grade in the root – a morphological simplification – without any cost at the semantic level.

The analysis above also provides us with a better position to judge the matter of reduplication. Of the two verbs that can perhaps be linked to existing perfects in other IE languages, *ār*⁻ⁱ ‘to reach, arrive’ and *šipānt*⁻ⁱ ‘to libate’, the latter very plausibly continues a reduplicated formation, and the former might as well, just like the Sanskrit cognate *ār*- < **He-Hor*-.⁸⁹ The first input for the *hi*-conjugation may, then, have contained at least some reduplicated formations after all. These verbs also offer two potential mechanisms for the dissolution of the reduplication: *ār*- may have lost the

⁸⁹ This scenario would however probably require the laryngeal to have been **h₁*, which is not certain (cf. n. 55).

reduplication by sound law; *šipānt-* alternates with unreduplicated *išpānt-*, which was found in derivations and was seeping through to the new basal verb. Most importantly, however, once the perfect had developed to a past tense, and certainly once it had become a conjugation of its own, reduplication was morphologically completely redundant, and indeed a typological anomaly, as the form had now come to be the main expression of the underived meaning, i.e. the unmarked form of the verb. A general process of removal of the marked reduplication, i.e. dereduplication (e.g. **He-Hor-* >> **Hor-*; **ue-uos-* >> **uos-*), would therefore be anything but surprising.⁹⁰ With so few original perfect formations, we can hardly expect to find potential exceptions (and even so *šipānt-* < **se-spond-* may be exactly that).

7 The ultimate origin of the *hi*-conjugation and the semantics of the PIE perfect

Finally, we may return to the ultimate roots of the division between the *mi*-conjugation and the *hi*-conjugation. Why did **h₁es-* ‘to sit, to be’, **d^heh₁-* ‘to put’, **uek-* ‘to want’, etc., keep their original shapes, but did **Her-* ‘to arrive’, **h₂eu-* ‘to see’, **Hek-* ‘to die’, etc., continue their existence as a perfect? The most obvious factor is that a verb had to have a perfect to begin with in order for the perfect to be able to become the verb’s main vehicle of expression.

This brings us to the nature of the PIE perfect.⁹¹ The perfect could not appear in just any lexeme in PIE. A verb had to have a specific semantic frame,⁹² i.e. a specific structure in the range of related meanings that a verb could express, for it to allow expression in the perfect. This semantic frame

⁹⁰ Note how the four inherited Germanic preterites cited above likewise do not show reduplication anymore. Cf. Lazzeroni (2012: 57).

⁹¹ For brief outlines of current thinking on this topic cf. e.g. LIV² (21-22) and Fortson (2010: 104-105). For Greek, the most important basis for our reconstruction of the PIE perfect, see e.g. Allan (2016: § 3.3, with refs., synchronic and prehistoric), whose account is largely accepted here; for synchronic classical Greek, see e.g. Rijksbaron (2002: 35-37), CGCG (420-425).

⁹² For the concept ‘semantic frame’ see Croft (2012).

consisted of a change-of-state event resulting in a state of the subject. The event was expressed with the present-aorist system, the state with the perfect, e.g. pres.-aor. ‘to wake up’, perf. ‘to be awake’; pres.-aor. ‘to stand up/still’, perf. ‘to stand’. It is debated whether the semantic value of the PIE perfect was inherently ‘stative-resultative’, or purely ‘stative’, only sometimes with resultative implication.⁹³ In my view, both descriptions are too narrow, but ‘stative-resultative’ is the more accurate of the two.

A stative-resultative interpretation does not work for every instance of the perfect. An event preceding the state might or might not be implied in a given instance. The frequency of such an implication differed per lexeme. For example, **s(t)e-stoh₂-* was clearly the normal way to express ‘to stand’, without any relevant implication of a previous event of standing up or still – at least not to a larger degree than e.g. the implication of ‘to put on clothes’ for **ues-* ‘to wear’, or ‘to fall asleep’ for **ses-* ‘to sleep’. Similarly, **h₁ge-h₁gor-* could mean ‘to be awake’ rather than ‘to have woken up’. Common paraphrases of the perfect of the type “to have stood up and therefore now stand”, inspired by the idea that all perfects expressed a result state, are therefore not only very forced, but often inaccurate. In other lexemes, a prominent implication of a preceding event was more common, e.g. **g^we-g^wom-* ‘to have come’, rather than ‘to be here’ without any implication of the event of coming.⁹⁴ The latter type of meaning shades into uses of the perfect in which the state of the subject amounts to little more than being someone who has experienced the event once or multiple

⁹³ ‘Stative-resultative’ is the traditional analysis (cf. e.g. LIV²: 21-22, Clackson 2007: 121-122, Kümmel 2000: 65-82, Allan 2016: § 3.3). For the interpretation as a pure ‘stative’, which has become popular in more recent times, see e.g. Sihler (1995: 564-568), Fortson (2010: 105), Ringe (2017: 28), Willi (2018: 232-246), Van Beek & Migliori (2019: 73-77).

⁹⁴ The polysemy of the perfect in this respect has close typological parallels in nominal formations such as passive past participles (ppp.), for which stative-resultative and purely stative meanings may exist side by side in the same lexeme. For example, the Italian word for ‘wet’ is *bagnato*, which is *also*, and originally, the ppp. of the verb *bagnare* ‘to make wet’ (e.g. *ho bagnato la tovaglia* ‘I have wet the tablecloth’). It. *pulito* is both the ppp. of *pulire* ‘to clean’, i.e. ‘cleaned’ (*ho pulito la stanza* ‘I have cleaned the room’) and an adjective meaning ‘clean’ (*una stanza pulita* ‘a clean room’, whence also *un uomo pulito* ‘a tidy man’). The English stative adjective *dead* < **dau-da-* was originally the ppp. (‘died’) of **dau-jan-* ‘to die’, the source of *die*.

times at some point in the past (e.g. ‘to have (once) seen’).⁹⁵ These meanings were the seed for the development eventually to a simple past (‘has come’ > ‘came’, ‘has seen’ > ‘saw’, etc.).

Although some instances of the perfect were purely stative, a description of the perfect as a pure stative with occasional resultative implication is also too narrow, as it does not duly capture the restriction in the type of semantic frame the perfect could occur with. Although not all instances of the perfect implied a preceding event, the *potential* range of meanings expressed by verbs with a perfect did always include a preceding change-of-state event.⁹⁶ The perfect normally occurred in conjunction with

⁹⁵ Examples from Homer: τὸν μὲν ἐγὼ μάλα πολλὰ μάχη ἐνὶ κυδιανείρῃ ὀφθαλμοῖσιν ὄπωπα ‘I have seen him many times with my own eyes in battle that brings glory to men’ (*Il.* 24.391-392), τολμήεις μοι θυμός, ἐπεὶ κακὰ πολλὰ πέπονθα ‘my heart is enduring, because I have suffered many hardships’ (*Od.* 17.284). This use of the perfect can even be extended to verbs whose denoted event does not really affect the subject as it is carried out; the perfect then merely denotes that having carried out the event in the past is a characteristic of the subject, e.g. μυρί’ Ὀδυσσεὺς ἐσθλὰ ἔοργε ‘Odysseus has done thousands of good things’ (*Il.* 2.272). These meanings are clearly closely related to the stative-resultative meaning, and are no sound basis for an analysis of the perfect as a general stative (contra Willi 2018: 232-234).

⁹⁶ This is true for all reconstructable perfects (cf. LIV²). Some Greek verbs have been used to argue that the related present-aorist may also be atelic, meaning that the semantic frame would not necessarily contain an event *leading up to* the state of the perfect. However, none of these have root presents or aorists, and the Greek state of affairs may therefore well be secondary (for this point see Allan 2016: § 3.3). We may assume that the verbs in question underwent similar developments to that seen, for example, in πειθ-, whose original situation, pres.-aor. πείθομαι ~ ἐπιθόμεν ‘to be persuaded, won over’, perf. πέποιθα ‘to trust’, was blurred to some extent because the present also came to express ‘to believe, trust’. Most verbs in question refer to similar mental processes or emotions. Similarly, both meanings of the pair κεύθω ‘to cover, hide, conceal’ ~ κέκευθα ‘to keep covered, contain’ can be regularly derived from the telic meaning that is found in the aorist ἔκυθον ‘covered’ (ὄφρα πύθηαι πατρός, ὅπου κύθε γαῖα καὶ ὄν τινα πότμον ἐπέσπεν ‘to find out about your father, where the earth covered him and what fate he met’, *Od.* 3.15-16), which was, however, all but completely superseded by κρύπτω and καλύπτω. Willi’s (2018: 234-236) prime example is **men-* ‘to think’, a meaning that was however probably also proper only to derived formations (Skt. *mānyate*, probably Gr. μένω ‘to wait’ < *‘to think’): significantly, the only root formation, Skt. *āmata*, is a root aorist (LIV²: s.v., Allan 2016: § 3.3 n. 59); cf. *bṛhaspátir āmata hí tyád āsām, nāma svarīṅām sādane gúhā yát* ‘for Bṛhaspati brought to mind this very name of these who were resounding (with)in the seat – (the name) which was hidden’ (RV 10.68.7, translation Jamison & Brereton 2014).

the present-aorist system in one lexeme, and can be analyzed as secondary to, i.e. *derived from*, the present-aorist system.⁹⁷ What is more, the event expressed with the present-aorist had to result in a state of the subject. This explains why verbs like **d^heh₁-* ‘to put’, **g^{wh}en-* ‘to kill’, **h₁ieh₁-* ‘to throw’, which resulted in a state of the *object* rather than of the subject, as well as Vendlerian ‘activities’⁹⁸ such as **h₁ei-* ‘to go’, did not have a perfect in PIE. An analysis of the perfect as a stative with primarily habitual or characterizing meaning (‘to be a ...-er’, in the paraphrasis of Willi 2018: e.g. 229) cannot explain this distribution.⁹⁹ Purely or even just more prominently stative semantic frames were rather encoded as their own basic lexeme, in the default conjugation, i.e. the present-aorist system, e.g. **h₁es-* ‘to sit’, **uek[́]-* ‘to want’, **ses-* ‘to sleep’, etc.¹⁰⁰ The analysis of

⁹⁷ The few Homeric perfects that have been adduced to show the contrary as an argument for the purely stative interpretation (e.g. Willi 2018: 236-239) all express events of making sound, e.g. ἄνωγε ‘commands’, λέληκε ‘shrieks’, μέμυκε ‘lows’, βέβρυχε ‘roars’. The meanings of these perfects are certainly not stative, but eventive/dynamic, and thus they are atypical under either analysis.

⁹⁸ For the classic lexical semantic categories ‘state’, ‘activity’, ‘accomplishment’ and ‘achievement’, see Vendler (1967), as well as Croft’s (2012) insightful adaptation and elaboration of this framework. States and activities are events that do not have an inherent endpoint (they are ‘atelic’); the difference between them is that states are non-dynamic/non-eventive (e.g. ‘to sit’) and activities are dynamic/eventive (e.g. ‘to walk’). Accomplishments and achievements do have an inherent endpoint (they are ‘telic’, or ‘change-of-state verbs’). The difference is that accomplishments are stretched out in time (e.g. ‘to draw a circle’), whereas achievements are instantaneous (e.g. ‘to die’). Some lexemes allow for multiple ‘construals’, e.g. ‘to eat’ in isolation or with an unbounded object, e.g. ‘to eat bread’, is an activity, but ‘to eat a piece of bread’ is an accomplishment.

⁹⁹ There is no doubt that the perfect can have habitual and related interpretations in Greek. However, this is merely a consequence of its imperfectivity, just like it is with the present. Thus, a case like κλυθί μοι, Ἀργυρότοξ’, ὃς Χρύσην ἀμφιβέβηκας ‘hear me, god of the silver bow, who protects Chryse’ (*Il.* 1.37), could indeed be paraphrased as ‘... who is the protector of Chryse’ (Willi 2018: 229-230), but the reason the perfect is used rather than the present is that the meaning ‘to protect, to have under one’s protection, to have (someone) covered’, which developed from ‘to have gone around, to have covered’ (e.g. νεφέλη δέ μιν ἀμφιβέβηκε ‘a cloud covers it’, *Od.* 12.74, in the description of a high peak), is proper only to the perfect, since the eventive counterpart, ἀμφιβαίνω ‘to go around’, describes the act proceeding *towards* this state.

¹⁰⁰ In such cases, if the ingressive stage was also significant enough to be expressed, this was sometimes done with a derived pres.-aor. of the same root, e.g. **h₁e-h₁s-o* ‘to sit down’ (on which cf. Chapter 6), or alternatively, with a different lexeme (e.g. Gr.

the relevant semantic frame as an event effectuating a state of the subject further brings the perfect closer to the related middle voice, which is indeed often found in the eventive pres.-aor. of verbs with a perfect (e.g. Gr. ἐγείρομαι ‘to wake up’, ἐγρήγορα ‘to be awake’; τήκομαι ‘to melt, dissolve’, τέτηκα ‘to be dissolved’). The middle denotes that the subject is affected by the event (as it takes place),¹⁰¹ the perfect that the subject has been affected by the event (after its completion).

In accordance with the analysis above, many of the most prominent and securely reconstructable examples of PIE verbs with a perfect express changes-of-state+result-states of body or mind, such as body positioning (e.g. **steh₂-* ‘to stand up/still’, perf. **s(t)e-stoh₂-* ‘to stand’), coming and leaving (**g^wem-* ‘to come’, perf. **g^we-g^wom-* ‘to have come’, **leik^w-* ‘to leave’, perf. **le-loik^w-* ‘to have left’), psychosomatic activities (**h₁ger-* ‘to wake up (intr.)’, perf. **h₁ge-h₁gor-* ‘to be awake’), mental activities (**b^heid^h-* ‘to be persuaded’, perf. **b^he-b^hoid^h-* ‘to trust, believe’), perception (**derk¹-* ‘to cast a glance (at)’, perf. **de-dork¹-* ‘to look (at), see’, **ueid-* ‘to see, witness’, perf. **uoid-* ‘to have seen, witnessed’ > ‘to know’, **b^heud^h-* ‘to become aware (of)’, perf. **b^he-b^houd^h-* ‘to be aware (of)’), and living and dying (**génh₁-* ‘(act.) to beget, (med.) to be born’, perf. **gé-ǵonh₁-* ‘to have been born’). Verbs like **Her₁-* ‘to arrive’, **h₂eu-* ‘to see’ and **He^k-* ‘to die’ fit right into these categories, and will have had the perfects **(He-)Hor-e* ‘has arrived’, **(h₂e-)h₂ou-e* ‘has seen’, **(He-)Ho^k-e* ‘has died’ (Hitt. *ār⁻ⁱ*, *au⁻ⁱ*, *āk⁻ⁱ*). On the other hand, verbs like **h₁es-* ‘to sit, to be’, **d^heh₁-* ‘to put’, **uek¹-* ‘to want’, **ses-* ‘to sleep’ (Hitt. *eš^{-zi}*, *tē^{-zi}*, *uek(k)^{-zi}*, *šeš^{-zi}*) did not have a perfect in PIE: their semantic frames (states and changes of state with a result state of the *object*) did not fit expression in the perfect.

γίγνομαι ‘to become’ to εἰμί ‘to be’, in PIE perhaps e.g. **suep-* ‘to fall asleep’ and **ses-* ‘to sleep’, cf. García-Ramón 2002: 120-121). The difference between encoding a certain verbal meaning as a primary stative *mi*-verb with a derived ingressive and as an eventive pres.-aor. with a derived perfect will ultimately be related to the higher prominence or basicness of the meaning of the primary formation, both in terms of frequency and conceptually.

¹⁰¹ For the semantics of the middle voice in ancient Greek see Allan (2003). For the creation of the secondary middle perfect, see Van Beek & Migliori (2019).

Even though the preceding observations already correctly predict the conjugation of most inherited Hittite lexemes that were not transferred for formal reasons, it is still probably not the whole story. Not all verbs that had a perfect will have shifted their main embodiment to the perfect in Anatolian. The new change-of-state preterite will not have fit every verb equally well. Probably, the more stretched out in time the event that led up to the state originally expressed with the perfect, the more prominent the original *mi*-formation will have been. For example, it is quite possible that **h₁ed-* ‘to eat’ had a perfect **h₁e-h₁od-* ‘to have eaten’,¹⁰² but since ‘to eat’ is an event stretched out in time rather than an instantaneous event (an ‘accomplishment’ and usually even ‘activity’ rather than an ‘achievement’, in Vendlerian terms),¹⁰³ the *mi*-formation **h₁ed-ti* that described the process of eating rather than a single moment was prominent enough to prevent a new but not very useful change-of-state preterite from taking over. The same goes for **mer-* ‘to vanish, disappear’. On the other hand, for verbs with punctual verbal meanings (‘achievements’) like ‘to arrive’, ‘to die’, ‘to see’, such atelic construals as justified the continued existence of the *mi*-formation in verbs like **h₁ed-* will not have been nearly as common, and may even have been non-existent (cf. Greek verbs lacking an imperfective stem, and therefore an eventive present tense, such as $\delta\epsilon\iota\text{-}\sigma$ ‘to get scared’, perf. $\delta\epsilon\text{-}\delta\omicron\iota\text{-}$ ‘to be afraid’). In such verbs, the punctual preterite that had developed from the perfect expressed the change of state that was the very essence of the eventive part of the verbal meaning. Accordingly, the perfect could also naturally become the

¹⁰² Thus e.g. LIV² (s.v.). It is not completely certain that the forms on which the reconstruction is based (e.g. Hom. $\epsilon\delta\eta\delta\acute{\omega}\varsigma$ ‘having eaten’, Lat. $\bar{e}d\bar{i}$ ‘I ate’, PGm. $*\bar{e}t$ ‘ate’) are not secondary, since the semantic frame in question is not prototypical for verbs with a perfect, in that the event is usually atelic (cf. also its status as a root present rather than an aorist in non-Anatolian IE), and when it is not, it also significantly affects the object. Nevertheless, the subject is clearly also affected, meaning that the basic requirement for expression in the perfect is fulfilled, as also appears from its occurrence in Homer: $\alpha\acute{\iota}\mu\alpha\tau\acute{\omicron}\epsilon\iota\varsigma\ \acute{\omega}\varsigma\ \tau\acute{\iota}\varsigma\ \tau\epsilon\ \lambda\acute{\epsilon}\omega\nu\ \kappa\alpha\tau\grave{\alpha}\ \tau\alpha\tilde{\upsilon}\rho\omicron\nu\ \epsilon\delta\eta\delta\acute{\omega}\varsigma$ ‘full of blood like a lion that has devoured a bull’ (*Il.* 17.542; note the telicizing effects of $\kappa\alpha\tau\grave{\alpha}$ and $\tau\alpha\tilde{\upsilon}\rho\omicron\nu$).

¹⁰³ See n. 98.

morphological center of the verb, ousting the *mi*-formation and becoming the basis for a new present tense.¹⁰⁴

During the shift from subject-stative-resultative through a present perfect to a simple past, the category may have inspired the occasional new creation, like later Sanskrit created perfects such as *āsa* ‘has been’, and post-classical Greek created forms like τέθηκα ‘I have put’ before merging its function completely with the aorist (and then abolishing it). Verbs with telic meanings that do not result in a state of the subject, such as *šipānt-i* ‘to libate’, might reflect such a development. However, given the low number of verbs which possibly go back to a perfect, and especially in view of the fact that the original distribution between verbs with and without a perfect is still palpable, it appears not to have become too productive. Rather, the new preterites were soon functionally identified with the existing preterites, and were accordingly provided with a present tense through the addition of **-i* (on which see 4.3).

8 Summary and conclusion

We arrive at the following conclusions. In PIE, verbal meanings were by default expressed with a formation from the present-aorist system. This category is continued in the Hittite *mi*-conjugation. Verbs whose pres.-aor. meaning resulted in a state of the subject (e.g. ‘to die’) could express this state with the perfect. In a given instance of the perfect, an event leading up to the expressed state might or might not be implied (e.g. ‘has died’ or ‘is dead’).

In Anatolian, the perfect went down the pathway familiar from virtually all other IE branches by shifting its meaning from a resultative to a simple past (e.g. ‘has died’ > ‘died’), essentially a shift from the expression of a resulting state to that of the event leading up to it, thereby losing its stative

¹⁰⁴ Cf. already Couvreur (1936: 552 n. 1), who gave the following characterization of the semantic tendencies of the two conjugations (albeit as a part of the usual semantic argument *against* an origin of the *hi*-conjugation in the perfect): “La distinction entre les deux conjugaisons, si distinction il y a, est d’un aspect tout autre. Les verbes en *-hi* (2^e conj.) sont perfectifs-ponctuels, ceux en *-mi* (1^{re} conj.) ont l’aspect imperfectif-duratif.”

semantics. Now an eventive and telic past tense rather than a stative present tense, it was functionally equivalent to an aorist (and even took over the 2pl. *s*-aorist ending **-s-te^o*, and later also **-s(-t)*, remedying the inconveniences of the original endings **-é* and **-e*, respectively).

In those lexemes which had a perfect and more punctual semantics, i.e. when the event (leading up to a subject-state) expressed by the pres.-aor. was not stretched out in time, but rather a single change of state moment, the new aorist-like preterite, which now expressed exactly the change of state, i.e. the essence of the verb's meaning, became the morphological center of the verb.

The main morphological device for expressing tense differences in *mi*-verbs, viz. the addition of **-i* in the present tense, was now also applied to those verbs in which the perfect had become the center. Some of these verbs will not have had a *mi*-present in the first place, and for those that did, this innovation resolved the morphological imbalance, compared to the *mi*-conjugation, that existed between the present tense (< PIE present) and the preterite (< PIE perfect). Not only did the expression of tense already operate with a derived present tense in the *mi*-conjugation model; since the other category was a group of (punctual) change-of-state verbs, its members were more frequently expressed in the past tense than in the present tense (e.g. 'arrived' was more frequent than 'arrives'), rendering the innovation of the present tense based on the past tense, rather than the other way around, perfectly natural.

It is quite possible that the perfect inherited by Anatolian was originally reduplicated, and that it was generally dereduplicated after its development to a simple past (like e.g. in Germanic), and certainly when its form had become the unmarked expression of the lexeme.

The main distinctive feature of the new conjugation apart from its endings, its *o*-grade, was the basis for a morphological merger with all other *o*-grade formations. Most notably, it absorbed the **molH*-type iterative (e.g. **molH*- 'to grind', **b^hod^hh₂*- 'to dig'), as well as the *CoC-eie/o*-type causative-iterative (e.g. **log^h-eie/o*- 'to lay down', **srob^h-eie/o*- 'to slurp'), whose suffix had essentially been removed by sound law. In addition, any other formation whose *e*-grade had been colored by **h₂* or **h₃* to **a* or **o*, respectively, was also transferred to the

new conjugation. Apart from in root formations (e.g. **d^heh₁- mi*-conj., **deh₃- ħi*-conj.), this is reflected, for example, in the *n*-infix formations, of which **-ne-K-* and **-ne-h₁-* stayed in the *mi*-conjugation, whereas **-ne-h₂-* and **-ne-h₃-* were the source of the *ħi*-conjugation type in *-naⁱ* (the *tarna*-type). Similarly, e.g. **-neu-* and **-eh₁-* remained in the *mi*-conjugation, but **-eh₂-* and **-seh₃-* received *ħi*-endings. The purely formal transfers constitute the largest of the historical categories that ended up in the *ħi*-conjugation.

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