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Febbraio 2025

THE HITTITE ADJECTIVE FROM A COMPARATIVE PERSPECTIVE (*)

Abstract

Il lavoro propone un'analisi testuale a base quantitativa di una specifica costruzione ittita: il modificatore che indica una qualità (ossia, un «aggettivo» in termini tipologico-funzionali). In pratica, abbiamo raccolto un corpus di testi ittiti e abbiamo estratto tutti i modificatori che indicano una qualità presenti nel corpus (131 types *per 922* tokens*). Tutte queste costruzioni aggettivali sono state scomposte in morfemi e divise in 7 classi: aggettivi semplici, aggettivi preposizionali, aggettivi denominali, aggettivi deverbali, participi, aggettivi prefissati e composti. La frequenza relativa di ciascun tipo di costruzione aggettivale all'interno del corpus è stata calcolata distinguendo types e tokens. Dal conteggio è emerso che gli aggettivi semplici e gli aggettivi deverbali in senso ampio (ossia, participi e aggettivi deverbali in senso proprio) hanno una frequenza simile in ittita (45.8% vs. 42.0% rispettivamente). Alcune riflessioni sull'importanza di questi dati per la ricostruzione della classe aggettivale in PIE chiudono il lavoro.*

(*) This paper is the result of close cooperation between the authors, who agreed on all the aspects of the analysis. However, for academic purposes §§ 1, 2, 3, 3.1, 3.2, 4, 4.6, 5 are attributed to Luca Alfieri, whose research has been carried out in the project "The lexicalization of the adjective class in Indo-European and Semitic" (PRIN 2022WHZJ98, coordinated by L. Alfieri) and §§ 3.3, 4.1, 4.1.1, 4.1.2, 4.2, 4.3, 4.4, 4.5 are attributed to Marianna Pozza, whose research has been carried out in the project "Metalinguistic texts as privileged data source for the knowledge of ancient languages" (PRIN 2020F37EXS_003, coordinated by L. Lorenzetti). We wish to thank R. Francia, A. Del Tomba, V. Pisaniello and P. Ramat for their precious support and advice. Needless to say, all remaining mistakes are our own. The following abbreviations are used: ACC: accusative, ADJ: adjectivaliser, C: common gender, DL: dative-locative, GEN: genitive, H: (written) heterographically, H+: (written) heterographically with a complementiser, INF: infinitive, ITR: iterative, MD: middle, NM: nominaliser, NOM: nominative, NT: neuter, Ph: (written) phonetically, PL: plural, PRT: preterit, PRS: present, PTC: participle, PTCL: particle, SG: singular. The glosses follow the *Leipzig Glossing Rules* (https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf).

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1. Introduction

Most Indo-Europeanists think that the Parts of Speech (PoS) system of Proto-Indo-European (PIE) is almost identical to that in the ancient IE languages such as Latin and Greek, which is based on three major classes (nouns, adjectives and verbs), and each class comprises both primary (i.e. simple, underived) lexemes such as Lat. *bonus* 'good', and derived stems such as Lat. *amabilis* 'lovable' < *amo* 'I love': schematically a similar PoS system can be summed up as [N, A, V] ([1]). Particularly in the oldest phases of the IE family, these three classes are defined through the same – mainly inflectional – features: case, gender and number for the noun; agreement, comparison and exclusive derivational properties (i.e. suffixes that select only adjectives) for the adjective; person, tense/aspect, mood and diathesis for the verb. The features that define these three classes can differ in those modern IE languages where inflection is lost, but the threefold division [N, A, V] is commonly believed to have remained stable over time in all IE languages and is thus considered to be one of the hallmarks of the IE family as a whole ([2]).

However, this view is not completely uncontroversial. The distinction between nouns and adjectives is not as solidly established in PIE (and in Sanskrit) as it is in Latin. The primary comparative and superlative suffixes **-yes-* and **-isth$_2$o-* (or **-is-th$_2$o-*) attach to verbal roots in PIE and in Sanskrit, while the secondary suffixes **-tero-* and **-(t)mo-* attach to any type of stem, be it nominal, adjectival, numeral, pronominal or prepositional. And neither set of suffixes codes the comparative and the superlative functions that are usual in the IE languages: primary suffixes showing an elative-intensifying

([1]) See Beekes (2011), Lundquist & Yates (2018), Fritz & Meier-Brügger (2021) for a similar description of PIE; and see Hengeveld (1992) and Beck (2002) for this type of PoS schema. In the IE languages, nouns and adjectives show almost the same formal endings (barring some exceptions, see Alfieri 2016: 142 fn. 35, 156 fn. 71). However, the functional principles governing the selection of the endings is different in the two cases: adjectives agree, while nouns trigger agreement but do not agree. Differently put, nouns and adjectives represent two distinct classes, since nouns are inherently marked for gender in the lexicon, while adjectives are inherently marked for agreement, but are gender-neutral in the lexicon (Corbett 2006: 4ff., 126ff.). The difference emerges clearly in the glosses: see, e.g., the noun *civi-s* 'citizen(M)-NOM.SG' vs. the adjective *bonu-s* 'good-M.NOM.SG'. For discussion, see Alfieri (2016: 141-142) and Ramat (2023).

([2]) In recent years, many scholars have debated the origin of the feminine gender (Lundquist & Yates 2018: 2094 for an overview). Still, the "gender controversy" does not affect the definition of PIE adjectives particularly, since agreement is recognised as a PIE phenomenon, no matter whether we reconstruct three or two genders. A few scholars who reconstruct genderless adjectives in "early" PIE or Pre-PIE may be mentioned (Matasović 2004: 246-248, Kortland 2017), but their view is not widely followed.

meaning ("to be very X", Cowgill 1970: 114) and secondary suffixes having a contrastive meaning ("to be X compared to Y", Benveniste 1948: 114ff.). Moreover, since comparative and superlative affixes are lacking in Hittite, Tocharian, Armenian and Albanian, synthetic comparison is sometimes claimed to be a post-IE feature, or at least a feature of late "Brugmannian" PIE ([3]). Last but not least, *Wurzeladjektiva* are scant in number, if compared with root nouns and verbal roots (NIL xiv, Kapović 2017: 79); and most PIE adjectives are vocalic stems, and among these the innovative thematic type in *-*e/o*- is by far the most common (Beekes 2011: 219). Thus, certain scholars, starting from Wackernagel (2009 [1920-1924[1]]: 466), Lehmann (1974: 208) and Comrie (1997: 101), suggested that the adjective could be a recent category in the IE family and ventured the idea that, originally, PIE may have been a language "without adjectives", i.e. a language with only two major lexical categories, namely nouns and verbs: schematically, [N, V].

However, the idea that PIE could be a language "without" adjectives has been further developed in two opposite directions in the literature. Some scholars claim that quality concepts are merged with nouns in the PIE lexicon, and thus PIE may have been a language with "noun-like adjectives" at an early stage, i.e. a language with verbs and quality nouns, but no adjectives (Balles 2002, 2003, 2006, 2008, 2009). Schematically, the lexicon of a similar language type can be summed up as [(NA) V], where (NA) refers to the single class of nominal lexemes that have both object and quality meanings ([4]). In this view, the adjective class is indeed recent and would have arisen from appositional nouns added to the feminine motion suffix: *[noun]-ih_2/eh_2-Case > *[adjective]-Agr (already Brugmann 1888: 420, followed by Fritz & Meier-Brügger 2021: 225).

This hypothesis has some points in its favor. In the IE languages, adjectival endings are almost identical to the nominal endings from a formal point of view (see fn. 1), thus the agreement construction might have arisen from the merger between a nominal stem, the feminine motion suffix and the nominal ending: $[\ldots]_N$-ih_2/eh_2-Case > $[\ldots]_A$-Agr. However, despite being defined inflectionally, the adjective is not only a class of constructions (that

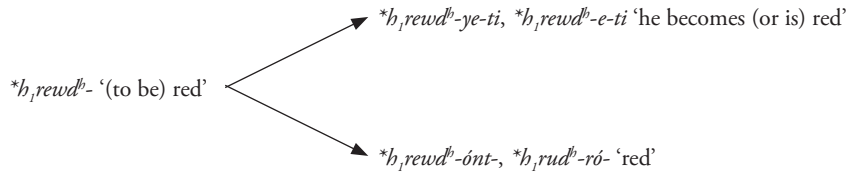
([3]) On PIE comparatives and superlatives, see Keydana, Hock & Widmer (2021).

([4]) Balles (2006: 273-279 and, specifically, 269): "die Mehrheit der Wurzeln mit „adjektivischer" Semantik, als solcher Wurzeln, die Eigenschaften, Zustand, oder Befindlichkeit einer Entität bezeichnen, scheint aber doch eine deutliche Affinität zum (in formaler Hinsicht) „nominalen" Wortschatz gehabt zu haben"; and "der Unterschied zwischen den Wortarten Substantiv und Adjektiv kein lexicalischer, sondern bloß ein syntaktischer war" (Balles 2009: 18).

is, a syntactic class), but also a class of simple lexemes (that is, a lexical class). Therefore, when the origin of the adjective class is discussed, two problems should be distinguished: the origin of the agreement construction, which concerns all types of adjectives, simple and derived, and the origin of the class of simple, primary lexemes inherently marked for agreement in the lexicon. These two things are clearly related, since agreement is one of the main diagnostics for distinguishing nouns and adjectives, but they can be distinguished in principle, since there are languages in which agreement is found, but simple, primary adjectives are not, and the only agreeing items are participles: e.g., Yimas (Foley 1991 for a description of the language; Alfieri 2014a and Bozzone 2016 for discussion). This being so, the agreement construction may indeed have arisen from appositional nouns added to the feminine motion suffix, but it is difficult to understand which quality nouns should be the starting point for the formation of the adjective as a lexical class in PIE, given that PIE underived nouns are not numerous and do not have quality meanings as a rule (e.g., **dʰugh₂tér-* 'sister', **h₂ep-* 'water', **h₂ŕ̥tĥko-* 'bear', etc.), while verbal roots of quality or near-quality meaning are quite common both in NIL and LIV[2] (e.g., **bʰergʰ-* 'hoch werden, sich erheben', **dey-* 'hell (sein), scheinen', **ĥewbʰ-* 'schön werden/sein', etc.).

Other scholars have therefore proposed the idea that, at an early stage, PIE could have been a language without adjectives; however, going in the opposite direction, they have suggested that, though being a late formation, PIE adjectives are linked to change-of-state morphology, which is usually verb-oriented (Koontz-Garboden 2006), and indeed the so-called Caland adjectives are often related to primary verbal forms, especially in Indo-Iranian: e.g., *mandrá-* 'pleasant' and *mandú-* 'happy' with respect to *mádati* or *mándati* 'rejoice, be delight', *mā́ndyati* 'delight oneself, get drunk' and *mādáyati* or *mandáyati* 'exhilarate' (Rau 2009: 139-141, 169-172, 179-185; 2013). Therefore, in this scenario, PIE or, perhaps, Pre-PIE (see below), may be a language with "verb-like adjectives" (Alfieri 2009, Bozzone 2016), that is a language in which quality concepts – typically represented by Caland roots – behave like intransitive verbs in predicate functions and the typical quality modifier is a participle or a deverbal adjective built with one of the Caland suffixes **-u-*, **-ro-*, **-mo-*, **-nt-* and, perhaps, **-i-* (Bozzone 2016: 21) ([5]):

([5]) The status of **i-*adjectives is the most controversial part of the picture. Deverbal *i*-adjectives are found in Sanskrit (*sucí-* 'bright' from *śuc-* 'to shine') and *i*-adjectives derived from PIE verbal roots are found in other IE languages: Hitt. *nakkī-* 'important,



Schematically, the lexical structure of a similar language can be summed up as [N (AV)], where (AV) refers to the class of simple verbal lexemes that refer to both action and quality meanings (6). In this view, therefore, the adjective class may be relatively recent, and adjectival endings may have arisen from nominal endings added to the feminine motion suffix: *[…]-*ih₂/eh₂*-Case > *[…]-Agr. However, the adjective as a class of simple, primary lexemes would rather have arisen from the lexicalisation of participles and participle-like deverbal adjectives built on verbal roots of quality or near-quality meaning: *[verb-NM]-° > *[adjective]-° (Alfieri 2016, 2018 following Belardi 1990, 1993).

According to Bozzone, the reconstruction of verb-like adjectives in PIE depends on a method of reconstruction that combines comparative evidence, language-internal reconstruction and typological considerations. Thus, she ascribes the picture above to Pre-PIE, rather than PIE proper. However, a similar stage might not be too far from the traditional level of reconstruction that we usually label as PIE. Perhaps confirming this idea, while the verb-like encoding of the quality predicate is not the most frequent construction in any IE language, it is relatively common in RV Sanskrit (e.g., *módate* 'is glad', *hr̥ṇîte* 'is angry', etc. see Alfieri 2009, 2020, following Stassen 1997: 359ff.) and the most frequent quality modifier in a sample of 52 hymns of the Rigveda is a deverbal adjective, i.e. a participle (e.g., *uśánt-* 'eager, desirous' from *vaś-* 'to desire, wish', *dʰr̥ṣitá-* 'audacious, bold' from *dʰr̥ṣ-* 'to be bold', etc.) or a derived adjective built on a verbal root of quality or near-quality meaning

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difficult' < *h_1*nek-* 'to seize, carry', Lat. *suavis* 'sweet' < **sweh₂d-* 'to be sweet, tasty', etc. However, full word equations that support the reconstruction of *i*-adjectives in PIE are not found and deverbal **i*-adjectives are usually not reconstructed in PIE. For discussion, see Meissner (2005: 20-25), Balles (2006: 275ff.), Rau (2009: 177, n. 143), Grestenberger (2013, 2014, 2017), Nussbaum (2014), Höfler (2015, 2020), Lundquist & Yates (2018: 2115).

(6) Note that a language in which the quality predicate is an intransitive verb and the quality modifier is a participle is a typical example of a language with verb-like adjective according to Greenberg (1966: 100).

through one of the Caland suffixes (e.g., *śubʰrá-* 'brilliant, white, beautiful' from *śubʰ-* 'to beautify, look beautiful, adorn', *svādú-* 'sweet, tasty' from *svād-* 'to be, make tasty, sweet', etc. see Alfieri 2016, 2021).

Be it as it may, the discussion of PIE adjectival typology has not generated much interest among specialists. Many, if not most, Indo-Europeanists, while admitting that PIE adjectives are scant in number and probably recent, tend to dismiss the topic as too speculative and stick to the traditional view of PIE as a language of type [N, A, V] (Lundquist & Yates 2018: 2114). However, the study of PIE adjectival typology has an important side-effect in two questions debated in contemporary IE scholarship, namely the controversy on the *Natur der Wurzel* and the reconstruction of the Caland suffixes (Alfieri 2023 for discussion). This is not the place for a detailed analysis of either problem, but a few notes may prove useful.

It is well known that two opposite views on the *Natur der Wurzel* have been held since the beginning of IE scholarship. One group of scholars, such as von Humboldt, Pott, Benfey, Brugmann, Delbrück, Hirt and Kuryłowicz, recently followed by Keydana (2022), think that the PIE root is only a diachronic abstraction: a unit of analysis that can be useful for reconstruction but does not represent a linguistic reality for speakers, since the lexicon of all languages, or at least the lexicon of Sanskrit and PIE, is made up of nouns, adjectives and verbs, exactly as is the case in Latin. However, other scholars of no little prestige such as Bopp, A. Schlegel, de Saussure, Meillet, Pagliaro and Belardi, recently followed by Alfieri (2016), believe that the PIE root is not only a diachronic, abstract unit, used as a tool for reconstruction (e.g., Lat. *fero* 'I bring' < PIE **bʰer-* 'to bring'), but also a "synchronic" unit that is real for speakers, although functionally different from a simple verb stem, when it is the input form for productive word-formation rules in Sanskrit or in PIE ([7]): e.g., Skt. *śubʰ-* 'to beautify' + *-rá-* → *śubʰrá-* 'beautiful', PIE **ĥewbʰ-* 'to be(come) beautiful' + **-ró-* → **ĥubʰ-ró-* 'beautiful' (Skt. *śubʰrá-*, Arm. *sowrb*). In this perspective, the root can be a "precategorial" unit (in Bisang's terms, 2008), namely the simple verbal lexeme that builds not only the majority of verbal forms and many nominal forms, as Latin verbs also do, but also the majority of adjectives. Whichever solution is preferred, it is clear that, if PIE is a language of type [N, A, V] or [(NA) V], the root is more likely to be an unreal abstraction (or, at least, a simple verb stem labelled differently as a homage to Indian grammar); on the other hand, if

([7]) The term "synchronic" here is to be understood as "old time synchrony", i.e. the synchronic study of ancient language phases (Janda & Jospeh 2003: 21).

PIE is a language of type [N (AV)], the root is more likely to be a real unit that differs from the simple verb stem, since it would not only build most verbs, as Latin verbs also do, but also the majority of adjectives.

The second problem that cuts across the study of PIE adjectival typology is the reconstruction of the Caland suffixes. The literature on the topic is huge and cannot be reviewed here in any detail ([8]). However, it is well known that Caland derivation can be interpreted in at least two ways (already Nussbaum 1976: 4-5, 100-105). It can be a system of "internal" derivation, that is derivation via suffix "substitution" that starts from already suffixed adjectives, which do not show a related verbal form (e.g., Skt. *rudhirá-* 'red', given that the verbal root ***rudh-* 'to be red' does not exist, see Oettinger 2017, Nussbaum 2022), or from a different nominal form, such as root-nouns or *i*-abstracts (Fritz & Meier-Brügger 2020: 425-426, following Schindler 1980 and Watkins 1971). But it can also be a system of "external" derivation, i.e. derivation via suffix addition that starts from simple verbal roots (see, e.g., the cases of *śubʰrá-* and *mandrá-* above, Rau 2009, 2013, 2014, 2017, following Risch 1974[2] [1937[1]]: 65 and Seiler 1950: 4). Clearly, the two approaches are not mutually exclusive, and scholars discuss at length which type of derivation offers a better solution for a specific scenario. However, it is clear that if PIE is a language of type [N, A, V], the input form for Caland derivation is more likely to be an adjective; if PIE is a language of type [(NA) V], the input form for Caland derivation is more likely to be a noun; and if PIE or Pre-PIE is a language of type [N (AV)], the input form for Caland derivation is more likely to be a verbal root with adjectival meaning. Thus, when the reconstruction of a specific "adjectival" root is under scrutiny, scholars often gloss the verbal component of the root meaning within brackets so as to avoid taking a final stance on the problem (e.g., Höfler 2022).

In sum, the reconstruction of PIE adjectival typology, the controversy on the *Nature der Wurzel* and the reconstruction of the Caland system represent three sides of a single problem. In response to it, a research project has been established (see fn. 1); its aim is to supply the empirical grounds needed for a discussion of PIE adjectival typology and its related issues, providing a typologically up-to-date, text-based, quantitative analysis of the encoding of the quality modifier, the quality argument and the quality predicate construction in the ancient IE languages (see below for definition).

([8]) See Meissner (2005: 6-44), Rau (2009: 67-75) and Dell'Oro (2015) for a history of the question, and Dardano (2007) for a discussion of the Hittite material.

The first outcome of the project is presented below, namely the analysis of the quality modifier in Hittite. The paper is organised as follows: the theory of adjectival typology employed in the paper is described briefly in § 2, showing its application to Classical Latin; some potentially problematic aspects of our approach are discussed in § 3; the Hittite data are analysed in § 4; finally, the significance of the Hittite data for the reconstruction of the PIE adjective class is discussed in § 5.

2. Outline of the theory of adjectival typology employed in the paper

The typological background of the theory of adjectival typology used in this project has been discussed in detail in Alfieri (2014a, 2021). In the following sections, therefore, we will briefly summarise this theory and show its application to Classical Latin (Alfieri 2019, in prep.).

Most typologists agree that the parts of speech (PoS) in two languages – no matter if genetically related or not – cannot be compared in any consistent manner if the comparison does not start from a *pure comparative concept* of PoS (Croft 2016), that is a purely functional concept of adjective, noun and verb that makes no reference to linguistic form. Only after supplying a similar definition of "adjective" can the languages under scrutiny be classified according to how they code the purely functional concept of "adjective" on which the research is grounded (9).

Fortunately, the purely functional definition of PoS required for our approach does not have to be built from scratch: it was already supplied by Croft, who elaborated a conceptual map of PoS (2001: 92, 2022: 6, 13). The map combines two prototypically correlated universal parameters, namely a semantic concept (Object, Quality and Action) and a discourse-pragmatic (more generally, syntactic) function (Referent, Modifier and Predicate). See Table 1:

(9) For a similar view, see Dryer (1997: 116ff.), Croft (2001: 63ff., 2005, 2015: 6ff., 2023), Cristofaro (2009), Croft & van Lier (2012) and Haspelmath (2012, 2023 and, in general, 2007, 2010, 2021). For a discussion of this approach and of the confusion that may arise in the analysis of PoS in the ancient IE languages when this approach is not followed, see Alfieri (2021). For a summary of PoS research in recent years, see Baker & Croft (2017), Bisang (2013) and van Lier (2023).

Tab. 1: Croft's PoS map

	REFERENT	MODIFIER	PREDICATE
OBJECT	**Object Referent**	Object Modifier	Object Predicate
QUALITY	Quality Referent	**Quality Modifier**	Quality Predicate
ACTION	Action Referent	Action Modifier	**Action Predicate**

Each slot in the map represents a zone of conceptual space defined in terms of semantics and syntax, but three slots have a special status. The Object Referent is the NOUN, the Action Predicate is the VERB, and the Quality Modifier is the ADJECTIVE ([10]). The NOUN, the VERB and the ADJECTIVE are not the formal categories of any language, but rather the zones of conceptual-functional space that are the most typical intersections between a discourse function and a semantic notion, hence they are termed "unmarked correlations" (Croft 2001: 89). See Table 2:

Tab. 2: "Unmarked correlations"

	REFERENT	MODIFIER	PREDICATE
OBJECT	**NOUN**	----	----
QUALITY	----	**ADJECTIVE**	----
ACTION	----	----	**VERB**

Croft uses the map to show that the various "adjective" constructions across languages do not differ only in the features by which they are marked, but also in the space on the map that they occupy (that is, their "function"). He thus concludes that each language defines its own classes and PoS cannot really be compared. However, we will use the map in a different manner:

([10]) There is some debate on the prototypical context in which the adjective class has to be defined. In a conversation-based study on adjectives in English and Chinese, Thompson (1988) found that adjectival predicates accounted for 68% of the total uses of adjectives, while modifying adjectives represented only 21%. Thus, she considered the quality predicate as the pivotal context for defining the adjective. However, her results were countered by Croft (1991: 87ff.), who conducted the same test on a four-language sample (Quiché, Nguna, Soddo, Ute) and found that quality modification outnumbered quality predication by around two to one. Moreover, Stassen (1997: 37) showed that, even in languages where adjectives are a well-established class, adjectival predicates lack an exclusive encoding strategy. Therefore, at present, the quality modifier seems a better candidate than the quality predicate, but almost all scholars agree that both contexts (and possibly also the quality argument) should be considered for a solid classification (see Beck 2013 for discussion).

rather than starting from specific linguistic forms and studying the function of these forms (that is, the space that they occupy on the map), we will take the functional slots in the map as the starting point of our research and ask ourselves how the unmarked correlations in Table 4 above are coded in the languages under scrutiny, that is which constructions are used to code these functions in Latin and Hittite.

Rather than discussing our research method in abstract terms, the results obtained in the analysis of Latin are summarised below (Alfieri 2019, in prep. a/b). The first step is the selection of a textual corpus. In this case a Classical Latin text was selected, in the form of Sallust's *De coniuratione Catilinae*. Clearly, this choice does not enable us to establish the most archaic situation in Latin. However, it does allow us to verify the consistency of the model, by an examination of its results in what we might call a controlled environment, i.e. within the language on which western PoS theories based on the threefold division [N, A, V] are grounded ([11]).

Once a corpus for each language was selected, the ADJECTIVE constructions in each corpus were gathered. In Sallust's work 661 ADJECTIVE constructions for 226 types were found. All the constructions so obtained were parsed (see § 3.2 for the criteria of parsing) and each type of word-internal structure was evaluated quantitatively, so as to establish on empirical grounds the most frequent adjectival construction in each language in terms of tokens and, especially, of types (Levshina 2015, 2019, 2021) ([12]). The results are presented below.

Seven different types of ADJECTIVE constructions are found in Latin, but their relative frequency is markedly different.

([11]) This passage is needed for a reason. The purely functional, comparative notions of NOUN, VERB and ADJECTIVE above have been designed with the explicit goal of supplying a functional equivalent of the traditional notions of *noun*, *verb* and *adjective* (that is, they are *retro-definitions* in Haspelmath's terms, 2021: 44). However, when a canonical term is redefined functionally, ambiguity may arise if the concrete linguistic objects that fall under the new definitions of ADJECTIVE do not overlap with the items that are traditionally labelled as *adjectives* in traditional Latin grammars. Therefore, whenever a retro-definition is used, one should make sure that the newly defined functional term "should cover at least 80% of the cases where the term has been applied, and it should not include too many cases which would not be included traditionally" (Haspelmath 2021: 46). A Classical Latin text was thus selected to verify the non-ambiguity criterion above. However, in Alfieri (in prep. b) the data from Archaic Latin are analysed as well.

([12]) This research method is usually called token-based typology. It makes generalisations using the tokens of specific units observed in language use, as approximated by corpora; it is commonly employed to describe frequency preferences among competing patterns which cannot be described through simple categorical judgements (Levshina 2015, 2019, 2021).

1) The first type of construction is the simple adjective, that is a simple adjective stem marked by agreement in gender, number and case; schematically, [adjective]-Agr: e.g., *levi-s* 'light'. This construction totals 527 tokens for 142 types and comprises both adjectives that are indisputably primary (that is, mono-morphemic apart from their ending, e.g., *levis*) and adjectives that show some traces of internal structure, but cannot be formed via rules (e.g., *humanus* 'human', which is related to *homo*, *-inis* but cannot be formed on it; see § 3.2 for a discussion).
2) The second type of construction is the prepositional adjective, that is a preposition followed by an adjectivalising suffix and marked by agreement, or schematically, [preposition-ADJ]-Agr: e.g., *super-ior* 'higher' from *super* 'above, on'. This construction comprises 3 tokens for 3 types.
3) The third type of construction is the denominative adjective, that is a noun stem followed by an adjectivaliser and marked by agreement, or schematically, [noun-ADJ]-Agr: e.g., *civi-li-s* 'civil' from *civi-s* 'citizen'. This construction comprises 40 tokens for 27 types.
4) The fourth type of construction is a deverbal adjective, that is a simple verb stem followed by a nominaliser and marked by agreement; schematically, [verb-NM]-Agr: e.g., *ama-bili-s* 'lovable' from *amo* 'love'. This construction totals 3 tokens for 3 types.
5) The fifth type of construction is a participial adjective, that is a simple verb stem followed by a participial suffix and marked by agreement; schematically, [verb-PTC]-Agr: e.g., *sapi-ent-em* 'wise (acc.)' from *sapio* 'taste, to be wise'. This construction totals 45 tokens for 26 types.
6) The sixth type of construction is the prefixed adjective, that is any nominal stem preceded by a prefix such as *in-* 'not' and *dis-* 'apart, not', or schematically, PRE-$[\ldots]_N$-Agr: e.g., *in-doctus*. This construction gathers 22 tokens for 13 types ([13]).
7) The seventh type of construction is the compound adjective, that is roughly the *bahuvrīhi* type as termed by Indian grammarians, and is sum-

([13]) Latin grammarians treat prefixed adjectives as compounds (see Donatus, Holtz 1981: 624.1 = GL IV.377.3, and Priscian GL II.177.9ff.), and their view is sometimes followed in modern Latin scholarship (e.g., Fryut 2011: 168), although the morpheme *in-* is usually labelled as a negative prefix, not as a compound constituent. Moreover, the two constructions are usually distinguished in contemporary morphological theory, since prefixes are a closed class and are bound forms, while compound constituents are an open class and are free (Hacken 2000: 351). For a history of the progressive distinction of prefixed adjectives and compounds in German grammars, see Olsen (2000: 898); for a discussion on the difference between compounding and prefixation in general, see Iacobini (1999: 371-374; 2004: 100ff.).

med up as […]-[…]-Agr: e.g., *magnanimus*. Prototypical compound adjectives of the *magnanimus*-type are possible in Latin; however, they were severely limited, at least after Archaic Latin, if literary Greek-inspired compounds are excluded (Clackson & Horrocks 2007: 107, 175). As a result, typical compounds of the *magnanimus*-type are not found in our Latin sample, where we find only compounds built with prepositions: e.g., *praeclarus* 'splendid' from *clarus* 'bright' and *prae* 'before, in front' ([14]). This construction is found in 6 tokens for 3 types.

If all constructions are brought together, the following table is obtained (Table 3):

Tab. 3: the ADJECTIVE construction in Classical Latin

	Token	Type
[adjective]-Agr	79.7%	62.8%
[preposition-ADJ]-Agr	0.5%	0.4%
[noun-ADJ]-Agr	6.1%	11.9%
[verb-NM]-Agr	0.6%	2.1%
[verb-PTC]-Agr	6.7%	10.7%
PRE-$[\ldots]_N$-Agr	3.9%	9.9%
$[\ldots]_N$-$[\ldots]_N$-Agr	2.6%	2.0%
Total	100%	100%

Table 3 shows two facts. On a general level, type frequency is more skewed towards rarer (i.e. the peripheral members of their category from a semantic point of view) and more productive (i.e. those with a higher type/token ratio) constructions, if compared with token frequency. Thus, the differences among the various constructions are reduced if type frequency is considered, but the ranking of the various constructions essentially remains constant. In other words, type frequency data are more insightful where the lexicon is concerned, while token frequency is a better measure for language

([14]) Compounds with prepositions occupy an intermediate position between prefixed and compound adjectives, since prepositions are a closed class, albeit larger than the class of prefixes, but are free forms, although not case marked (Strömberg 1946: 141-143 on Ancient Greek). Accordingly, they can be treated as non-typical prefixed adjectives (Beard 1998: 45) or as non-typical compounds (Vogel & Neumann 2000: 930). The latter view is more common in Greek and Latin scholarship and was followed here. However, compounds with prepositions represent merely a handful of cases; thus, the picture in Table 3 does not change substantially, whichever classification is preferred.

usage ([15]). In any case, the relative frequencies of adjectival constructions clearly confirm the traditional classification of Latin as a language of type [N, A, V]. After a brief discussion of some potentially problematic aspects of our approach in § 3, the Hittite data will be described in § 4.

3. On some potentially problematic aspects of our approach

The potentially problematic aspects of our approach boil down to three points: the functional definition of PoS (see § 3.1), the criteria of morphological parsing used in the paper (see § 3.2) and the peculiarities of the Hittite writing system (see § 3.3).

3.1 *The functional definition of PoS categories*

Functional definitions allow a consistent comparison across languages but have their limits. Parsing the semantic continuum action-quality-object into three clear-cut classes is relatively easy if the prototypical members of each class are considered, but hard at the categories' boundaries, which are notoriously fuzzy. The difficulty can be mitigated by referring to the definition of quality concepts that is common in works on adjectival typology – basically, a prototype consistent with the English adjective, which also include some quality notions that are not necessarily coded as "true" adjectives such as *shining*, *scared*, *agitated*, etc. (see § 2). However, a certain degree of fuzziness in the delimitation of the category boundaries is unavoidable any time a category is defined (also) by means of semantics. See the following sentence (ex. 1) ([16]).

1)	*takku*	GU_4	***ḫuišw-and-an***	*kuiški*	*ark-i*	*maḫḫan*
	if	ox	live-PTC-C.ACC.SG	anyone	divide_up-PRS.3SG	as
	tayazil-aš		*apašš=a*		*QATAM*[*MA*]	
	theft(NT).GEN.SG		that_one.C.NOM.SG=too		the very same	

'if anyone (divide)s (up) a living ox, he too is the same as a thief (lit. a person of theft)' (KBo 6.3 iii 69, Hoffner 1997: 81)

([15]) For discussion on the difference between type and token frequency, see Berg (2014) and Levshina (2015, 2019, 2021).

([16]) In Hittite examples, reference is made first to the edition of the text, then to the translation used in the paper; when the translation is in a language other than English, our English translation is supplied before that of the editor of the text.

Should the modifier *ḫuišwant-* 'living, alive' in ex. 1 be considered a non-prototypical Quality Modifier, or rather a non-prototypical Action Modifier? The former option was followed, but an objective reason for ruling out the opposite view is hard to find, since a participle etymologically "participates" in two functions (see Ramat 2023: 573) and any semantic category includes a core of certain members and a periphery of more controversial cases. However, the prototypical nature of semantic categories does not make them unusable, or functional research would not exist at all; in other words, although membership of this or that specific non-prototypical item can be fuzzy, the overall number of a category's members is supposed to remain almost constant or, at least, not to vary in a significant manner if the same semantic category is tested by different researchers (already Stassen 1997: 9ff.).

Syntactic categories are more clearly definable than semantic ones, but they are not watertight. In ancient IE languages, the copula can be omitted, especially in the 3rd person of the present indicative, and the order of constituents is not fixed ([17]): participles tend to follow the noun in all usages in Hittite, while adjectives tend to precede the noun in attributive function and to follow it in predicative function (Francia 2001); still, these are tendencies, not rules and, for instance, attributive adjectives in *-want-* can follow or precede their head noun quite freely (Hoffner & Melchert 2008: 272). Therefore, distinguishing the predicate and the modifier can be difficult, especially when an adjectival predicate with no copula is found. See ex. 2:

2) *ḫalki-aš* *ḫaršār* ***išḫiy-and-[a]*** [z]íz$^{\text{ḪI.A}}$*-aššš=[a]* ([18])
barley(C).GEN.SG head(NT).NOM.PL bind-PTC-NT.NOM.PL spelt$^{\text{PL}}$-GEN.SG=and
ḫaršār ***išḫiy-and-a***
head(NT).NOM.PL bind-PTC-NT.NOM.PL

'the 'heads' of barley (are) bound (together), and the 'heads' of spelt (are) bound (together)' (KBo 17.1 iv 19-20, Otten & Souček 1969: 37 'die 'Köpfe' von Gerste (sind) (zusammen-) gebunden, und die 'Köpfe' von Spelt (sind) (zusammen) gebunden')

([17]) On the optionality of the copula in Hittite, see Hoffner & Melchert (2008: 306, 412) and Cotticelli-Kurras (1992a, 1992b).

([18]) The enclitic conjunction particle *-a* (which is an allomorph of *-(y)a* after a word ending in a consonant) geminates the preceding consonant (*-aš* + *-a* > *-aššša*). The genitive ending *-aš* could be either singular or plural. We follow here the interpretation of Otten & Souček (1969: 65) who state that, despite the presence of the plural determinative $^{\text{ḪI.A}}$, the Hittite equivalent is based on a singular.

Otten and Souček translate *išḫiyant-* as '(sind) gebunden', since no copula is found in the text. However, the passage can be interpreted either as 'the heads of barley are bound together', or as 'the heads of barley bound together….', and a final reason to choose one option over the other is hard to find. However, syntactically ambiguous constructions represent a mere handful of cases among over a thousand clearer ones. Moreover, these cases can be easily overcome in practice by following the syntactic interpretation of the translations used as a reference in the paper and quoted in Appendix § 1. Clearly this does not mean that the interpretation supplied in those sources is the only one possible or the best one; however, we found the interpretation in those sources perfectly reasonable in all ambiguous cases, and we decided to follow it, in order to reassure the reader that we did not manipulate the data with overly subjective interpretations of the Hittite passages. In practice, all cases in which the verb 'to be' is found in the editors' translations, as in ex. 2, were classified as Quality Predicates and duly excluded from our sample.

3.2 *On the criteria of parsing complex words*

The method of morphological parsing employed in the paper follows the standard method of parsing described in any contemporary, morpheme-based textbook on morphology (e.g., Dressler *et al.* 1989): complex words, therefore, are parsed into their composing morphemes, but only complex words that are formed on attested bases via word-formation rules that are fully transparent from the semantic and formal point of view will be parsed, while the derivatives that do not match these criteria are considered to be stored in the lexicon, although they might have some internal structure. In other words, only morphological constituents that are synchronically transparent will be parsed, whereas constituents that can be parsed from a diachronic point of view, but are not synchronically transparent, will be left unparsed ([19]).

These criteria are not new, but they are not identical to those used in modern grammars of ancient IE languages, where usually all derivatives showing the same suffix are grouped together, regardless of whether they

([19]) A similar method of parsing is grounded on the notion of productivity (Bauer 2001, 2005). However, productivity can be evaluated only indirectly in ancient languages, namely through regular parsability. On the various factors that trigger the lexical storage of derived words, see Dressler *et al.* (1987), Aronoff & Anshen (2001), Bertram *et al*. (2000), Bell & Schäfer (2016). On productivity and diachrony, see Sandell (2015).

are formed on attested or unattested bases, on transparent or opaque rules. Consider the items *idālu-* 'bad, evil', *ḫūmant-* 'each, all; whole, entire', *dāyuga-* 'two-year-old' and *ḫappina(nt)-* 'rich' as examples; each word shows traces of internal structure: *idālu-* and *ḫūmant-* show the suffixes *-u-* and *-ant-* (EDHIL 421, 362, HEG A-K 284-285); *dāyuga-* is a compound built on **dā-* < PIE **dwoyo-* 'two' (see *dān* 'for the second time') and *yuga-* 'yearling' (Hoffner & Melchert 2008: 153); and *ḫappina(nt)-* 'rich' is a cognate of *ḫāppar-* 'business, trade', both words being derived from **ḫāpp-* 'abound, be rich' (HEG A-K 162, EHS 274). Thus, *idālu-* is usually described in the section on the *u*-suffix in Hittite grammars, *ḫūmant-* and *ḫappina(nt)-* in the section on the *ant*-suffix, and *dāyuga-* in the section on compounds. A similar choice is comprehensible for historical and didactic reasons. But none of these words can be the result of productive word-formation rules in Hittite, inasmuch as none of the bases needed for forming these words is attested as such (hence the asterisk <*>): **idāl-* and **ḫū(m)-* are not attested at all ([20]); **dā-* is not attested in the necessary form, since no synchronic rule predicts the deletion of *-n-* from *dān*; and Hitt. *ḫāpp-* is not attested in the necessary meaning, since the meaning 'abound, be rich' that is needed to build *ḫappina(nt)-* 'rich' can be attributed to *ḫāpp-* on etymological grounds (that is, if the connection with Skt. *ápas-* 'work', Lat. *omnis* < **op-ni-* is accepted), but, synchronically speaking, Hitt. *ḫāpp-* means 'join, attach (impersonal or middle), arrange itself, work out' and none of these meanings can be the basis for building an adjective meaning 'rich' ([21]). In the following, therefore, semi-transparent words that cannot be formed via rules are considered to be "lexicalised" in Bauer's terms

([20]) Clearly, the forms that are unattested in the Hittite extant texts might be present in other texts that have been lost due to casual chance, or related forms might be present in other Anatolian languages (e.g. Luwian). However, even if these forms were found in Luwian, they could be equally absent from Hittite. And assuming that a form existed in Hittite, although it is not attested, would make the research results more speculative than empirically founded.

([21]) Laroche (1963: 72) translates one occurrence of the verb 'avoir en abondance' (*takkuš-maš UL-ma ḫapzi ta natta ḫazzianzi* 'mais s'ils sont dans le dénuement [lit. 's'il n'y a pas pour eux abondance'], on abat un porc', KBo xi 34 i 5). But this translation is rejected in more recent studies: Neu (1968: 45, fn. 1; 1974: 83) translates 'wenn es sich ihnen aber nicht fügt, stechen sie (es) nicht ab'; Puhvel (HED Ḫ: 251) translates 'but if it does not work out for them, they do not stick [it]', and the whole etymology is rejected by Kronasser, who considers *ḫappina-* "ohne nachweisbares Grundwort" (EHS 182). See also HW² III/1 196, s.v. *ḫap(p)-* 'sich fügen': "kein Zusammenhang besteht mit *ḫappina(nt)-* 'reich', *ḫappar* (sic!) und *ḫappira-* 'Stadt (Dorf)'".

(2001: 27, 43), that is, they are stored in the lexicon, albeit showing some internal, possibly derivative structure.

A peculiar consequence of this approach is found in the analysis of the adjectives in *-ant-* and *-u-*. Consider the following verb-adjective pairs:

— *ḫuiš-* 'live' ~ *ḫuišu-* 'fresh, raw';
— *tepnu-* 'diminish' ~ *tepu-* 'little';
— *karš-* 'cut (off)' ~ *karšant-* 'cut (off)';
— *ḫappinaḫḫ-* 'enrich' ~ *ḫappina(nt)-* 'rich'.

Apparently, *ḫuišu-* has the same structure as *tepu-,* and *karšant-* is identical to *ḫappinant-*. Still, *ḫuišu-* and *karšant-* can be formed on the verbs *ḫuiš-* and *karš-*, which are attested in Hittite, while *tepu-* and *ḫappina(nt)-* cannot be built on **tep-* 'to diminish' and **ḫappin-* 'to be rich', since these verbs are not attested. Clearly, one can say, following Hoffner and Melchert (2008: 51), that *ḫuišu-* and *karšant-* are derived from *ḫuiš-* and *karš-* through the standard type of derivation by affixation that is found in the IE family, while *tepu-* and *ḫappina(nt)-* are built on *tepnu-* and *ḫappinaḫḫ-* through a peculiar type of "derivation by substitution", in which the last suffix of the adjective is deleted with the addition of another suffix: *ḫappina(nt)-* 'rich' > *ḫappinaḫḫ-* 'enrich', *tepu-* 'little' > *tepnu-* 'diminish'. However, the process of derivation by substitution "was synchronically irregular for (pre-)Hittite speakers, suffix addition – not replacement – being the regular pattern" (Hoffner & Melchert 2008: 51). As a confirmation one also finds examples of the same suffixes with the regular process of addition: *tepu-* > *tepaw-ešš-* 'make little' and *mayant-* 'young' > *mayant-aḫḫ-* 'make young'. Therefore, however the process of derivation by substitution is interpreted diachronically, *ḫappina(nt)-* 'rich' and *tepu-* 'little' cannot be formed on any attested Hittite basis from the synchronic point of view and are thus stored in the lexicon, even though they show the suffixes *-ant-* and *-u-* ([22]). Differently put, the suffixes *-u-* and *-ant-* are "true" morphemes in *ḫuišu-* and *karšant-*,

([22]) As mentioned in § 1, derivation via suffix replacement can be interpreted as a system of derivation that starts from an already derived adjective: *tepu-* → **tep-Ø* → *tepnu-*; or as a system of derivation via suffix addition that starts from a verbal root: PIE **dʰebʰ-* 'diminish' → **dʰ*$_{e}$*bʰ-néw-/nu-*, **dʰebʰ-ú-* > Hitt. *tepnu-* (see also Skt. *dabʰnóti*), *tepu-*. In this latter case, the process of derivation is structurally parallel to that seen in Hitt. *ḫuiš-* → *ḫuišu-*, *ḫuišnu-*, and Skt. *pratʰ-* 'extend, be wide' → *pr̥tʰú-* 'wide', *prátʰate* 'spreads out', *prátʰati* 'makes spread out', *pratʰáyati* 'id.' (Rau 2009: 136ff., 146ff., 161ff.). However, since the process of derivation in question is diachronic in both cases, the difference between the two options will not be discussed any further here.

but they are "quasi-morphemes" in *tepu-* and *ḫappina(nt)-*, that is semi-frozen morphemes that are identifiable formally, but unproductive from the functional point of view (Aronoff 1976: 11), not unlike the sequences *-u-* and *-ant-* in *idālu-* and *ḫūmant-* ([23]).

In sum, derivatives that show the same suffix are usually grouped together in Hittite grammars, irrespective of whether they can or cannot be the outcome of productive rules. Conversely, we will distinguish between the two cases and employ the lexicon as a default category that comprises everything that cannot be processed via rules. Besides being in line with contemporary morphological research, this choice has three advantages. Firstly, it does not force us to postulate the existence of unattested words. Secondly, it does not force us to infer the word-class status of unattested words purely on the basis of the suffix attached – note that a large number of suffixes attach to different types of bases in Hittite: e.g., **-ant-* attaches to verbs (*akkant-* 'dead' < *akk-* 'die'), nouns (*irmanant-* 'having sickness, ill' < *irman-* 'sickness') and adjectives (*ikuna-* and *ikunant-* 'cold'), while *-want-* attaches to nouns (*ešḫar-want-* 'having bloodstains' < *ešḫar-* 'blood') and verbs (*kartimmiya-want-* 'angry' < *kartimmiya-* 'be angry'). Therefore, taking a final decision on the word-class status of **ḫum-* on the basis of its occurrence with the suffix *-ant-* is even more arbitrary than considering *ḫūmant-* as lexically stored ([24]). Finally, since the paper focuses on the difference between simple and derived adjectives across IE languages and this difference is significant if, and only if, the number of derived adjectives in some languages is higher than usually thought, using the lexicon as a default category may reduce the number of significant data, but it ensures that, should some data be found, they are not biased in favour of our hypothesis.

([23]) The situation with *i*-adjectives is different: *i*-adjectives built on primary verbs (i.e. the type *ḫuišu- ~ ḫuiš-*) are not found in our sample; one finds only cases of "derivation by substitution", *palḫi-* 'wide' ~ *palḫešš-* 'become wide' from **palḫ-* (parallel to *tepnu- ~ tepu-* from **tep-*), or cases of true denominative verbs such as *nakkī-* 'important' ~ *nakkiyaḫḫ-* 'be(come) a concern for someone' from *nakkī-* (parallel to *tepu- ~ tepawešš-*).

([24]) The suffix **-ant-* can also have an "individualising" function: *ḫamešḫant-* 'the next spring' < *ḫamešḫa-* 'spring-time'. The distribution of *-ant-* and *-want-* is not exceptional: the suffixes *-att-*, *-eššar-* and *-ima-* attach to verbs and adjectives, *-att-* to nouns and verbs and *-ātar* to nouns, verbs and adjectives (Hoffner & Melchert 2008: 53-62). On the suffix *-ant-*, see Dardano (2010), Melchert (2017), Rieken (2017), and Goedegebuure (2018); on *-want-*, see Oettinger (1988, 2022), Frotscher (2013) and Rieken & Sasseville (2014); on *-att-*, see Bermann (1972: 155-156), Laroche (1975) and Rieken (1999: 118ff.).

3.3 *The ambiguities of the Hittite writing system*

Hittite cuneiform is characterised both by phonographic and logographic expressions, such as Sumerograms, usually transcribed in plain caps, and Akkadograms, usually transcribed in italicised caps: e.g. Sum. GAL 'great', Akk. *ELLAM* 'free'. Sumerograms and Akkadograms as a whole are usually referred to by the umbrella label of heterograms, which will be used here (Kudrinski & Yakubovich 2016). It is widely, though not universally, agreed that the Hittites pronounced the corresponding Hittite word when reading a heterogram (Weeden 2011 for a detailed discussion); therefore Sum. GAL 'great' was probably pronounced as Hitt. *šalli-* and Akk. *ELLAM* as Hitt. *arawanni-*. However, in some cases the Hittite word that underlies a heterogram is not attested: e.g., the word for 'son, child' is always written as Sum. DUMU and we do not know the corresponding Hittite word.

Heterograms can be flanked by one or more syllabograms – so-called "phonetic complements" – which suggest the correct reading of the heterogram and its inflection: GAL-*iš* 'great', with -*š* 'nom.sg.' (Hitt. *šalliš*); IGI-*zi* = Hitt. *ḫantezzi* 'first, foremost' (Hitt. *hant-* 'forehead'); EGIR-*izziš* = Hitt. *appezziš* 'last', with -*izziš* referring to the derivational suffix -*izzi-* and the nom.sg. ending -*š*. A heterogram can qualify a Hittite word, but it can also qualify a different heterogram: e.g., GEŠTIN KU_7 'sweet wine', where GEŠTIN = Hitt. *wiyan-* 'wine' and KU_7 'sweet' = Hitt. *maliddu-*/*miliddu-*. As a rule, phonetic complements are written in Hittite, but Sumerograms can be accompanied by phonetic complements in Akkadian: Sum. DINGIR-*LUM*/-*LAM*/-*LIM* for *ilum*/*ilam*/*ilim* 'god' (nom./acc./obl.).

Heterograms can be used as full words, but also as "determinatives", that is a sort of classificatory element settled before, or more rarely after, the noun that it qualifies, so as to identify its semantic content more accurately: Sum. GADA 'linen' in ^{GADA}*tanipu* 'linen towel'; Sum. NA_4 'stone' in ^{NA4}*ḫarra-* 'millstone'. A determinative can flank a Hittite word, but also a heterogram: ^{GIŠ}KÁ.GAL '(city) gate' [^{wooden}door.big]; DINGIR.MEŠ 'gods' [god.PL]; ÉRIN.MEŠ *mekki-* 'big army' [army.PL + big]; ÉRIN.MEŠ ^{LÚ}KÚR 'enemy troops' [army.PL + ^{man}enemy], etc. ([25]). The use of super-scribing determinatives in transliteration is modern, the Hittite texts showing no difference between determinatives and standard heterograms.

([25]) Sum. MEŠ and ḪI.A represent plural markers and are usually super-scribed as determinatives only when the preceding noun is not Sumerian (Hoffner & Melchert 2008: 24).

Heterograms can be independent words, but they can also be the constituents of so-called multi-word expressions, that is a sort of (probably graphic) compound: DUMU.LUGAL 'prince [son + king]'; DUMU.É.GAL 'squire of court, palace attendant [son + house + big]' (where 'big house' stands for 'palace'); MÁŠ.GAL 'he-goat [goat + big]' ([26]). Since compounds are rare in Hittite, though not totally non-existent (e.g., *šallakarta-* 'presumptuousness' < *šalli-* 'big' and *ker/kard(i)-* 'heart' or *annanekeš* 'sisters having the same mother' < *anna-* 'mother' + *nega-* 'sister'), multi-word expressions can stand for a single Hittite word, but also for a Sumerian compound borrowed into Hittite or for one of the rare Hittite compounds. Moreover, distinguishing multi-word expressions and standard sequences of determinative + noun is not always easy: most scholars transcribe the word for 'enemy' as ^{LÚ}KÚR, but CHD, for example, prefers LÚ.KÚR.

Such a complex scribal system triggers two potential ambiguities in the definition of the Quality Modifier construction. The first concerns the phonetic content of heterograms. Probably they stand for the corresponding Hittite words, but at least some heterograms might have been loans, some can stand for different Hittite words of similar meaning, and some might have been pronounced differently in various historical periods or in different regions of the Hittite kingdom (Weeden 2011: 4-9): Sum. ŠU.GI 'old' is probably equivalent to Hitt. *meḫuwant-* (CHD L-M 223) but the word is written only heterographically in the oldest phase of the language (i.e. ^{LÚ}ŠU.GI-*ant-*); its more recent derivatives are written phonetically, but they show some formal variation: *mieḫuwant-*, *miyauwant-*, *miḫunt-, meḫunt-* (HED M 151), and their exact phonetic shape and etymology are debated (EDHIL 569). In the same vein, Sum. ḪUL can stand for Hitt. *idālu-* 'evil' (see ḪUL-*lu-*), but also for its near-synonym *ḫuwappa-* 'evil' (see ^{LÚ}ḪUL-*pa-aš* in KBo 19.101 2 and ḪUL-*an-* in ex. 6, see HED Ḫ 431); and the heterograms SIG_5 and DÙG.GA can represent the Hittite adjective *aššu-* 'good', but also the Hittite verb *lazziya-* 'prosper (act.), to be good (m.p.)' (e.g., SIG_5-*atta(-ri)* = *lazziatta* (3sg.mp.) 'he gets well'). Consequently, ambiguities in the exact reading of a heterogram may easily arise, especially when no phonetic complement is found ([27]). Similar problems do

([26]) The constituents of a multi-word expression can be linked by a dot or a space, both systems being used by modern scholars: DUMU.LUGAL 'prince' or DUMU LUGAL (Hoffner & Melchert 2008: 14).

([27]) On SIG_5 and DÙG.GA, see HH 28, EDHIL 522, HED L-M 71, Weeden (2011: 604 and fn. 58). However, *lazzi-* is rare in Hittite in general and unattested in our corpus, so we took both SIG_5 and DÙG.GA as equivalent to *aššu-* in our count.

not seriously affect our understanding of the semantic content of texts, but they can impair our analysis of ADJECTIVE constructions in terms of their phonological and morphological structure. As a result, the constructions coded heterographically are distinguished from those coded phonetically in the following section of this paper.

The second ambiguity concerns the distinction between Quality Modifier constructions, multi-word expressions and sequences of determinative + noun. In most cases, dictionaries and modern editions agree and no ambiguity is found: e.g., in the sequences GAL-*iš* DUMU.É.GAL 'high palace attendant' and GAL ^{GIŠ}KÁ.GAL 'big (city) gate', the former GAL is an adjective and it is included in our sample, but the latter GAL is the constituent of a multi-word expression, which is duly excluded from our research.

However, certain sequences of heterogram and noun require *ad hoc* analysis. The meaning of the sequences ^{LÚ}ŠU.GI 'old man', $^{LÚ.MEŠ}$ŠU.GI 'the elders (also as a political corporation)', ^{MUNUS}ŠU.GI 'female ritual practitioner; magician' is mainly idiomatic, since they refer to the elders as a political corporation and to magicians (in our texts), rather than to old men and old women in general. Therefore, we took such sequences as substantivised adjectives (that is, as Quality Arguments), and we excluded them from our count of Quality Modifiers. However, when the heterographic adjective ŠU.GI was used to qualify a different heterogram, with no idiomatic meaning, it was considered a heterographic Quality Modifier, as in the case of LUGAL ŠU.GI 'the old king [king + old]'.

A similar reasoning was also applied to the heterographic expressions indicating different kinds of bread. If a heterographic adjective associated with Sum. NINDA 'bread' is found in different contexts, it is considered a true adjective: e.g., NINDA.SIG 'thin bread', given that SIG also qualifies different units of measure, such as KÙŠ 'c. 80 cm.' vs. SIG.KÙŠ 'c. 40 cm.', or NINDA.*EM-ṢÚ* 'sour bread', since *EM-ṢÚ* also qualifies milk, wine etc. However, when a heterographic adjective occurs only in connection with NINDA, it was taken as the constituent of a multi-word expression indicating a special kind of bread: e.g., NINDA.GUR$_4$.RA (= Hitt. $^{(NINDA)}$*ḫarši-*) '(bread) loaf' (lit. 'thick bread'), since GUR$_4$.RA qualifies only NINDA in the whole Hittite corpus ([28]).

([28]) Note that GUR$_4$.RA is found also in ^{LÚ}NINDA.GUR$_4$.RA 'a man who offers NINDA.GUR$_4$.RA' ('Besorger von NINDA.GUR$_4$.RA, Brotopferer', HZL n. 369), which resembles the simple ^{LÚ}NINDA 'bread-server' semantically. However, GUR$_4$.RA can also be considered a compound constituent in this case. Similar to NINDA are examples such as DUMU.NITA 'son', from DUMU 'son' and NITA 'male'. Since NITA

The most complex case in this group is represented by a couple of sequences of determinative and adjectives: e.g., LÚ^{MEŠ}*ašiwantes* / $^{LÚ.MEŠ}$*ašiwantes* 'the poor men' and LÚ^{MEŠ}*ḫappinanteš* / $^{LÚ.MEŠ}$*ḫappinanteš* 'the rich men' (Hitt. *ašiwant-* 'poor' and *ḫappinant-* 'rich') can be interpreted as standard noun-adjective phrases with the noun written heterographically (i.e. 'the poor/rich man'), but also as substantivised adjectives joined to a classificatory determinative (i.e., 'the poor/rich'), and the same problem holds also for KUR*kurur-* 'enemy country' [country + enemy/hostility] ([29]). The meaning does not change in either case and an objective reason for preferring one reading over the other is hard to find. Thus, we checked all the relevant passages, concluding that the solutions chosen by the editors of the text were consistently reasonable, and therefore adopting them. Consequently, we considered such adjectives to be Quality Modifiers when they are interpreted as such in the reference editions, but excluded them when the sequence of logogram plus adjective is interpreted as a substantivised adjective qualified by a classificatory determinative ([30]).

In sum, despite the difficulties related to the interpretation of heterograms, we included them in the count. However, given the delicacy of the matter, we distinguished between heterographic ADJECTIVE constructions (H), heterographic ADJECTIVE constructions with phonetic complements (H+) and phonographic ADJECTIVE constructions (Ph) in our description of Hittite (see § 5).

(HZL n. 132) and NÍTA (HZL n. 16) are never written phonetically and qualify other heterograms as masculine (e.g., DUMU.NITA 'son, male descendant', UDU.NITA 'male sheep, ram', ANŠE.KUR.RA NÍTA 'stallion' ['horse' + 'male'], etc.), we did not list NITA in our sample.

([29]) On *kurur-*, see Hoffner & Melchert (2008: 61, 117), EDHIL 496, HED K 278, HEG A-K 665 and above all Neu (1979).

([30]) Since Hittite adjectives are typically preposed, one might argue that ^{LÚ}*ašiwant-* is better interpreted as a determinative + a substantivised adjective (i.e. 'the poor'). However, determinatives are almost always preposed, irrespective of their roles as true nouns or determinatives. Their position, therefore, is not a discriminator. In the same vein, Bauer (2017: 98) thinks that ^{LÚ} in ^{LÚ}*ašiwant-* almost plays the role of a nominaliser; but Puhvel's translation (HED A 211) 'poor man', which she quotes as evidence for her interpretation, does not necessarily presuppose a nominalisation, the more so since the editors of the texts in our corpus do not behave consistently as Bauer presumes and translate 'the poor/rich' or 'the poor/rich man' with no clear criterion.

4. ADJECTIVE CONSTRUCTIONS IN HITTITE

As in our previous research, a corpus of Hittite texts was collected. However, unlike the procedure adopted for Latin, we opted for a "panchronic" corpus, ranging from Old Hittite (OH, ca. 1650-1450 BCE) to Middle Hittite (MH, ca. 1450-1350 BCE) and New Hittite (NH, ca. 1350-1190), taking into consideration different literary genres (historical texts, laws, prayers, rituals, mythological texts, letters etc., see Appendix § 1 for the full list of texts included in the corpus).

Clearly, this is not tantamount to claiming that no differences exist between OH, MH and NH; on the contrary, a few paleographic-phonological and morpho-syntactic differences are found, but they are not relevant to our analysis ([31]). Moreover, OH documents are not sufficiently numerous to obtain a number of tokens comparable to that obtained for the other IE languages. Two different solutions were thus possible: selecting only NH documents, whose corpus is larger, or stratifying the corpus diachronically, so as to verify whether the internal structure of Hittite adjectives shows some differences between OH, MH and NH. The second option was followed. As a result, we first gathered a small sample of OH, MH and NH documents and analysed each of them separately. However, since no significant difference in the distribution of the various adjective constructions across the three samples was found, we disregarded the stratification of our corpus in the discussion and relied on the texts as they are presented in the reference editions (see Appendix § 1).

Once the sample was collected, all the ADJECTIVE constructions therein were gathered and their internal morphemic structure analysed and evaluated quantitatively. In the sample, 937 ADJECTIVE constructions are found, 570 of which are recorded phonetically and 361 heterographically (the forms attested in contexts that are too obscure for clearly identifying their function have been excluded): 15 of these heterograms were discarded, since in two cases the meaning was doubtful, and in 13 cases the Hittite equivalent was unknown, unrecorded in dictionaries or too uncertain ([32]). We are

([31]) On the differences between OH, MH and NH, see Hoffner & Melchert (2008: xvii, 25), Francia & Pisaniello (2019: 29-30). However, note that in all phases the adjective can both precede and follow the noun it refers to (Francia 2001: 82).

([32]) The heterogram discarded due to semantic ambiguities is Sum. NÍ.TE 'body, self' (Hitt. *tuekka-* 'body'), 2x: it has been found both in connection with DINGIR^{MEŠ} 'Gods' and translated with 'meine persönlichen Götter' by Kümmel (1967: 61) and in connection with ^{TÚG}NÍG.LÁM^{MEŠ} 'precious garments' and translated (ivi: 112) with

therefore left with 922 ADJECTIVE constructions for 131 types, which are divided as follows (Table 4):

Tab. 4: Hittite ADJECTIVE constructions

Hittite ADJECTIVE constructions	Tokens		Types	
1. Phonetic	576	62.5%	102	77.9%
2. Heterographic without complement	295	32.0%	11	8.4%
4. Heterographic with complement	51	5.5%	18	13.7%
Total	922	100%	131	100%

The 916 ADJECTIVE constructions so defined are all "adjectives" in the canonical sense of the term, that is they are word-forms marked by agreement in case, gender and number, and such a construction is schematised as […]-Agr. However, below the level of syntax, at least five different types of stem can be considered a […]-Agr construction, each with a different frequency.

4.1 *The simple adjective*

Just as in Latin, the most frequent type of stem that qualifies as a […]-Agr construction is the simple adjective. This construction is summed up as [adjective]-Agr and is the most frequent construction in the sample, totaling 64 types (48.9%) for 608 tokens (65.9%). In 373 cases the simple adjective in question is written phonetically (ex. 3-4), whereas in 203 cases it is recorded heterographically (ex. 5, Sum. ŠU.GI = Hitt. *meḫuwant-* 'old, elderly') and in 32 cases it is recorded heterographically with a phonetic complement (ex. 6, Sum. ḪUL-*lu-* = Hitt. *idālu-*) ([33]):

'seine eigenen Kleider' ('his own clothes'). The heterograms discarded due to phonetic uncertainties are: Sum. GÙB 'left' (10x), perhaps underlying Hitt.(?)-Luw. *ipala-* (HH 231), Akk. *ḪARPU* 'young' (1x), and Akk. *MAḪRÛ* 'eminent, first-class' (2x).

([33]) The superscripted <^{d}> in ex. 3 is the abbreviation of *deus*. The determinative Sum. ^{KAM} in ex. 4 is usually associated with ordinal numbers and temporal concepts such as 'day', 'year', etc. which we rendered as 'time' in ex. 4 and 'number' in ex. 13. On ^{LÚ}ḪUL-*an* = Hitt. *ḫuwappan* 'evil/bad (being)' and ḪUL-*lu-* = Hitt. *idālu-* 'bad' see § 4.3.

3) *ŪL=war=an* *wemiya-nun* ^{d}*Telipinu-n*
not=PTCL=3SG.ACC find-PRT.1SG ^{God}*Telipinu*(C)-ACC.SG
nakki-n DINGIR^{LAM}
honoured-C.ACC.SG god(C)$^{ACC.SG}$

'I did not find him, Telipinu, the honoured (or mighty) god' (KUB 17.10 i 28-29, HED N 44)

4) DUMU.É.[(GA)]L *šuppi* *watar* *parā* *ep-zi*
court_squire pure.NT.ACC.SG water(NT).ACC.SG toward take-PRS.3SG

'the court squire holds pure water' (KBo 17.7 i 14, Otten & Souček 1969: 18 'der Hofjunker hält reines Wasser')

5) *Ù* LUGAL **ŠU.GI** *apiya* *tāli-š*
but king old there leave-PRT.3SG

'but he left there the old king' (KBo 22.2 Rs. 14, Otten 1973: 13 'aber den alten König beließ er')

6) *nu* **ḪUL-*lun*** UD^{KAM}*-an* ^{LÚ}ḪUL*-an* *šalla[(nuškizzi)]*
and bad.C.ACC.SG day^{time}-C.ACC.SG ^{man}evil-C.ACC.SG raise.ITR.PRS.3SG

'and is raising a bad day as an evil (being)' (KUB 17.7 obv. i 6, García Trabazo 2002: 183 'y está criando un mal día como un (ser) maligno')

As mentioned in § 4.2, the class of simple adjectives includes both adjectives that are totally mono-morphemic (group 1), and those which show some internal structure, although they cannot be formed via rules (group 2).

4.1.1 Purely simple adjectives

Group 1 comprises adjectives that are purely simple (that is, basically mono-morphemic), showing almost no internal structure at all, and is divided into three sub-groups: *i*-adjectives (group 1a), *u*- and *a*-adjectives (group 1b) and miscellaneous forms (group 1c). These three groups as a whole comprise 37 types for 427 tokens (202 Ph, 193 H, 32 H+), that is, they present the clear majority of types and of tokens in their group.

Sub-group 1a is the most numerous and comprises 19 fairly common *i*-adjectives for 253 tokens (97 Ph, 147 H, 9 H+, Appendix § 2.1.1): e.g., *šuppi-* 'pure' (20x), *šalli-* 'big, important' (12x), *nakkī-* 'important, difficult'

(8x), *parkui-* 'pure, clean' (9x), but also SIG = *ḫaḫḫari-* 'thin, flexible (?)' (12x), GÍD.DA = *daluki-/daluka-* 'long' (42x), GE_6 = *dankui-* 'black' (31x), etc. ([34]). The classification of the adjectives in this group is straightforward in that they are interpreted as simple, primary adjectives in all Hittite dictionaries. However, a couple of more complex cases are also found in this group and require some discussion.

Formally speaking, Hitt. *kappi-* 'small' can be a simple adjective, but it might also be formed on the verb *kapp(ai)-* (EDHIL 439, HED K 62). However, the verb *kapp(ai)-* is inferred only due to the participle *kappant-* 'small' and the suffix *-i-* is not commonly productive in Hittite (Hoffner & Melchert 2008: 54ff.). One can thus argue, with Hoffner & Melchert (2008: 53), that the adjective *kappi-* and the verb *kappant-* are both stored in the lexicon as primary words, being derived diachronically from the unattested root **kapp-*, which is perfectly parallel to **tep-* with regard to *tepu-* (see § 4.2). A similar case is Hitt. *ḫarki-* 'white, bright', which lives side-by-side with a related verb, which is spelled as *ḫar-ki-eš-zi* (KBo iv 2 i 44-45), *ḫar-ki-e-eš-zi* (KUB xv 39 + xii 59 ii 16), *ḫar-ki-i-e-eš-zi* (dupl. 1112/c + iii 4) and *ḫar-ki-i-iš-zi* (xxvii 67 ii 28). These spellings can be interpreted as *ḫark(i)ešš-* (HED Ḫ 170), *ḫarkiyešš-* (EDHIL 307) and *ḫarkešš-* (HEG A-K 177); the meaning is the same (i.e. 'become white'), but the morphological interpretation of each form changes (see § 4.2): *ḫarkiyešš-* is a denominative verb built on *ḫarki-*, parallel to *tepaw-ešš-* from *tepu-*; *ḫarkešš-* is a case of derivation by suffix replacement built on *ḫarki-,* parallel to *tepnu-* from *tepu-*, and *ḫark(i)ešš-* is compatible with both views. However, the spelling <*-ki-i-*> is more likely to refer to the denominative *ḫarkiyešš-*; derivation by substitution is a matter of etymology rather than of productive morphology, and *i*-adjectives built on athematic verbal stems through derivation by affixal addition are not found. Consequently, *ḫarki-* is here classified as a simple adjective with no internal structure.

Sub-group 1b comprises 11 *u-* and *a*-adjectives for 105 tokens (78 Ph, 5 H and 22 H+, Appendix § 2.1.2). The most frequent item in the group is *idālu-* 'bad, evil' (45x), but the adjectives *ḫalluwa-* 'deep' (6x) and the ideograms ḪUL+ = *idālu-* (11x) and ZAG+ = *kunna-* 'right (hand or side), favourable' (11x) are also common. In this case, the classification of most adjectives in this group is likewise straightforward, but some items require further discussion. Hitt. *šuu-* 'full' (2x) is problematic from a graphic point

([34]) The meaning and etymology of *ḫaḫḫari-* 'thin, flexible', epithet of GI 'reed' (twice in the Ullikummi-epic) remains conjectural (HED Ḫ 6-7, HEG A-K 122).

of view: the spelling <*šu-u-*°> can be interpreted as *sū-* and <*šu-u-u*°> as *suwu-*, with a hiatus-filling glide (Melchert 1994: 54 ff., HEG S2 1127); Berman (1972: 188-189) and Weitenberg (1984: 136) thus think that ***šuu-*** is the derivative of the verb *šuwa-* 'fill, be full' plus a suffix *-u-*; however, the verb is more commonly quoted as *šuwai-* (Oettinger 1979: 295, HEG Š2 1128; 1219: "sicherlich denominativum", HW² 200), hence as a denominative belonging to the *ḫatrai-*class (*contra*, EDHIL 797), and if this explanation is accepted, *šuu-* is a simple adjective ([35]).

Sub-group 1c comprises 7 adjectives of miscellaneous forms for 69 tokens (27 Ph, 41 H and 1 H+, Appendix § 2.1.3). They include frequent adjectives such as *tamāi-/tame-* 'other, second' (25x) and *kurur* 'enemy, hostile' (2x), but also heterograms such as Sum. KU_7 'sweet' = Hitt. *maliddu-/miliddu-* '(honey)sweet' (15x), Sum. SA_5 'red' = Hitt. *mit(t)a-/miti-* 'red' (15x), etc.

4.1.2 Underived adjectives

Group 2 is not as numerous as group 1 in terms of tokens, but it includes fairly common adjectives. It comprises adjectives that are not strictly mono-morphemic and may show some internal structure, although they cannot be formed via rules in Hittite. For the sake of convenience, they will be referred to as "underived" adjectives, and these are further divided into three sub-groups, namely adjectives showing the empty suffix *-ant-* (group 2a), adjectives built on unattested bases with the suffix *-ant-* or *-want-* (group 2b), adjectives arising from the lexicalisation of former compounds (group 2c) and miscellaneous cases (group 2d). These four sub-groups as a whole include 27 types for 181 tokens (171 Ph, 10 H, 0 H+), that is, they represent a small minority of tokens and a minority of types in their group.

Sub-group 2a includes 12 adjectives taken from unattested bases through the suffixes *-ant-* and *-want-* for 112 tokens (105 Ph, 7 H, Appendix § 2.2.1). The most common adjective in the group is *ḫūmant-* 'each, all; whole, entire' (88x), which sums up most of the tokens of the group (see § 4.2), while the remaining adjectives in the group are not highly frequent:

([35]) A partly similar situation is found with *daššu-* 'strong; heavy; difficult' (7x): Kloekhorst (EDHIL 854) considers it a deverbal *u*-adjective from *dašš-*, but the basis **dašš-* is not attested as such (the causative *daššanu-* is parallel to *tepnu-* from **tep-*, see § 4.2), thus *daššu-* was listed among the primary adjectives.

e.g., *mišriwant-* 'brilliant' (5x), *leliwant-* 'travelling swiftly, winged, urgent' (5x), *enant-* 'trained, tamed' (3x), *innarawant-* 'having vigour' (1x), *ašiwant-* 'poor' (1x), etc. The *ant*-less or *want*-less form of these adjectives are never attested, so these adjectives are considered as underived, though showing some internal structure (see § 4.2) ([36]).

Sub-group 2b includes 5 adjectives that are built on attested adjectival stems enlarged through the empty suffix *-ant-* and, in one case, *-ni-* (EHS 222) for 18 tokens, all written phonetically (Appendix § 2.2.2): e.g., *dapi-* / *dapiyant-* 'all, every, each, entire', *ḫappina-* / *ḫappinant-* 'rich' (see § 4.2), *dannara-* / *dannarant-* 'empty, smooth', etc. ([37]). Clearly, the internal structure of these adjectives is [adjective-ADJ]-Agr. Still, since such structures are not found in the other IE languages and the lexeme that enters the construction is already an adjective, the adjectives in this group were classified with the other underived adjectives for the sake of convenience. A special case in this group is *arawan(n)i-* 'free': it is a *-ni*-adjective built on the adjective *arāwa-* 'free' which, in turn, may be a *wa*-adjective (EHS 193) formed on the noun *arā-* 'friend, belonging to one's social group' (HED A: 116), or on the adverb *āra* 'right, properly' (EDHIL 198); however, the link between *āra* 'right', *arā-* 'friend' and *arāwa-* 'free' is mainly etymological, given the semantic distance between the derivatives, and *arawan(n)i-* is listed independently from *arā-*/ *āra* in many, if not most, sources (HEG A-K: 55, HW^2 257, HH 20).

Sub-group 2c includes 5 adjectives that arise from lexicalised compounds for 24 tokens (Appendix § 2.2.3). Besides *dāyuga-* 'two-year-old' (4x, see § 4.2), the remaining cases are as follows. Hitt. *ḫašantaralli-* 'pertaining to a new-born' (1x) is a hapax attested in gen.sg. *ḫa-ša-an-ta-*{*ra-*} *al-li-ya-aš* referred to DUMU (KUB 17.65 Vs. 52) and it may come from the participle *ḫaš-ant-* (see *ḫaš(š)-* 'procreate') + *arallai-* 'associate, join', a denominative built from *ara-* 'friend, fellow' (HED Ḫ 215), but the etymology is uncertain. Hitt. *šaḫuiḫu(i)ššuwali-* 'legitimate (by birth)' (1x, see KUB 1.1 iii 40, Otten 1981: 20) might be a hybrid from Luw. **šaḫui* 'legitimate' and Hitt. *ḫuišwali-* = Luw. *ḫuidwali-* 'alive' (*contra* Weitenberg

([36]) In some cases, the *ant*-less or *want*-less forms of these adjectives might have existed in Proto-Hittite (or PIE): e.g., the stems **mišri-, *leli-* and **innara/u-* can be inferred due to *mišriwaḫḫ-* 'make brilliant' and *mišriwešš-* 'become brilliant' < **mišriwant-eš* (HEG L-M 217), *leliwaḫḫ-* 'make haste, hurry', *in(n)nara(wa)ḫḫ-* 'make strong', *inarraweššš-* 'become strong', etc. However, none of these stems is attested as such. Note that **innara-* might continue the old compound **h$_1$en-h$_2$nor-* 'having vigour inside', but the etymology is rejected by EDHIL 387.

([37]) The suffixes *-ant-* and *-ni-* are traditionally considered as empty in the cases above, since the forms with or without the suffix do not show any difference in meaning.

1984: 417), unless it is a ghost word (CHD Š 12) ([38]). Hitt. *šaudišt-/šauitišt-* 'weanling' (6x) is the lexicalised outcome of the compound **so-wetes-* 'of this year', formed from the PIE numeral **som-* 'one' or, more likely, the demonstrative pronoun **so-* and **wet-es-* 'year' (EDHIL 738-9) ([39]). Hitt. *šuppišduwara-* 'brilliant' (9x) may be a derivative from *šuppi-* 'pure' and **išduwara-*, a non-attested verbal noun from *išduwa-* 'be(come) manifest, be revealed' (Neu 1970: 69), but it remains unclear whether *šuppišduwara-* has anything to do with *šuppi-* 'purified' (EDHIL 791).

Sub-group 2d comprises 5 adjectives whose origin and internal structure are uncertain or non-generalisable for 27 tokens (Appendix § 2.2.4). Hitt. *annal(l)a/i-* 'former, earlier, old' (11x) and *annawali-/annauli-* '(of) equal (rank), peer' (1x) can be traced to the pronoun *anna-* 'that, the already mentioned one' followed by the Luwian suffix *-alla/i-* (Hoffner & Melchert 2008: 56, 62), or to the Hittite noun **wal(l)i-* 'strong, fame, pride' (HED A 65), but the derivation is only etymological. Hitt. *kuriwana-* 'independent' (2x) might be traced to the verb *kuer-/kur-* 'cut' or to the noun *ku(e)ra-* 'field cut, territory' (which is a derivative of *kuer-/kur-*) and the Luwoid suffix *-wan(n)a/i-*, but the link between 'to cut', 'field' and 'independent' is not totally straightforward (HED K 266, HEG A-K 649). Hitt. *šakuwaššar(a)-* 'complete, entire, full; legal, correct' (7x) can be traced to *šakuwa-* 'eyes', plus the IE suffix **-sro-* (with gemination of /s/ before /r/, see Kimball 1999: 443) or the suffix *-ššara-* of unclear origin, which is usually added to nouns denoting human/divine males to refer to the corresponding female being (EHS: 109 ff.; HEG Š1 861 ff.; HED: 109 ff.; Hoffner & Melchert 2008: 59); however, the entire etymology is uncertain (CHD Š 60-64, HEG Š1 749-752). Hitt. *šanezzi-/šanizzi-* 'pleasant, excellent, first-class' (4x) can be a derivative of *šani-* 'the same' and the suffix *-ezzi(ya)-* (EDHIL 723), but Berman (1972: 201) considers it to be a formation of obscure origin. Hitt. *warpan(n)ala-* (2x) is only attested in contexts connected to a sacrificed sheep (KUB 24.5 ii 12 + KUB 24.5 + KUB 9.13 i 30); Kümmel (1967: 11) translates this word as 'gewaschenes', taking it as a *-la-* adjective built on the verbal noun **warpatar-* 'washing' (**warpatn-alla-*) or **warpana-* 'washed' (Hitt. *warp-* 'wash' < PIE **werp-*, see LIV^2 690, following Oettinger 1979: 234), but its meaning and structure are uncertain (HED W 1119, HEG W-Z 350, Berman 1972: 126).

([38]) See HEG Š1 699 for a more detailed discussion on the various etymological proposals.

([39]) Hitt. *šaudišt-* is found only in connection with the ideograms GU_4 'bull' and ANŠE.KUR.RA.MUNUS.AL.LÁ 'horse' meaning 'weanling calf' and 'weanling foal' in our corpus.

4.2 *The prepositional adjective*

The second ADJECTIVE construction in the sample is the prepositional adjective, that is a simple adverb/preposition – mostly local adverbs – followed by an adjectivalising affix and marked by agreement (40). This construction is summed up as [preposition-ADJ]-Agr and is not frequent, being found in 7 types (5.3%) for 72 tokens (7.8%, Appendix § 3). Out of the 72 tokens, 55 tokens are coded phonetically (ex. 7), 1 is coded heterographically (ex. 8, Sum. LIBIR.RU = Hitt. *karūili-* 'former, ancient'), and 16 tokens are coded heterographically with a phonetic complement (ex. 9, Sum. EGIR-*izzi-* = Hitt. *appezzi-*):

7) [*kuššan*] *pittenu-zzi=ma* *nu* ***ḫant-ezziya-š***
as_soon_as run_off_with-PRS.3SG=then and opposite-ADJ-C.NOM.SG
LÚ-*aš* *kuit kuit* *p[e-šta*
man-C.NOM.SG whatever(NT).ACC.SG give-PRT.3SG
ta=aš=še *šarnik-zi*
and=3SG.NOM=3SG.DL compensate-PRS.3SG

'[as soon as] he runs off with her, he shall compensate the first man for whatever he g[ave]' (KBo 6.3 ii 6, Hoffner 1997: 38)

8) ^{TÚG}NÍG.LÁM^{MEŠ} *kuę* *ḫand[a-* *[w]aššiy-anzi*
^{dress}precious_robe^{PL} which.NT.NOM./ACC.PL prepar[e? put_on-PRS.3PL
I^{NUTIM} **LIBIR.R[U**? (41)
one^{set} old

'they put the (party)robes which are prepared on an old set' (KBo15.2 Vs. 3-4, Kümmel 1967: 57 'die Festgewänder die vorbereit[et sind?] zieht man [ihm], an eine Garnitur alt[e?')

9) [E]**GIR-*izzi*=*ma*=*šši*** *ṬUPPU* *nawi* *wemiya-wen*
last-ADJ=but=3SG.DL tablet not_yet find-PRT.1PL

'but we have not yet found its [sc. of the ritual] last tablet' (KUB 30.57 lk. Kol. 7, Dardano 2006: 49 'aber die [le]tzte Tafel von ihm haben wir noch nicht gefunden')

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(40) As is well known, adverbs, prepositions and preverbs are barely distinguished in ancient IE languages; see Cuzzolin, Putzu & Ramat (2006) on PIE, and Francia (2002), Melchert (2009) and Boroday & Yakubovich (2018) on Hittite.

(41) LIBIR.RU is an Akkadisation of Sum. LIBIR.RA 'alt' (Kümmel 1967: 226), and probably stands for Hitt. *karūili-* 'former, ancient' (EDHIL 458, HED K 114).

The prepositional adjective is not frequent, especially in terms of types, but it is more frequent in Hittite than in Latin. The most frequent adjectivalising suffix is *-zzi(ya)-* < PIE **-tyo-* ([42]): *ḫantezzi(ya)-* 'first, foremost' < *ḫanti-* 'opposite, against' (19x) ([43]), *appezzi(ya)-* < *āppa* 'behind, back' (8x) and *šārazzi(ya)-* 'up(wards), aloft' < *šāra* 'id.' (1x). However, the suffix *-ili-* is also found in *karū(i)li-* 'former, ancient' < *karū* 'early, formerly' (15x), *šannapili-* 'empty' < *šannapi* 'scattered (here and there)' (1x), while *araḫzena-* 'external' < *araḫza* 'around, away' (5x) and *kattera-* 'lower, inferior' < *katta-* 'downwards' (6x) might be formed via the unclear suffixes *-ena-* and *-era-*, if they are not cases of lexicalisation to be listed in § 5.1, group 2d ([44]).

4.3 *The denominative adjective*

The third ADJECTIVE construction is the denominative adjective, that is a simple noun stem followed by an adjectivalising affix and marked by agreement (Appendix § 4). This construction is summed up as [noun-ADJ]-Agr and is extremely rare, since it is found in only 5 types (3.8%) for 7 tokens (0.8%), all of which are recorded phonetically (ex. 10-11) ([45]):

10) *ŪL=war=an* *šak-ti* *^{d}Kumarbeš=wa*
not=PTCL=3SG.ACC know-PRS.2SG $^{\text{God}}$Kumarbi=PTCL
kuin ***nuttar-iya-n*** DINGIR^{LIM}*-in* DINGIR$^{\text{MEŠ}}$*-aš*
who.C.ACC swiftness-ADJ-C.ACC.SG deity(C)$^{\text{god.OBL.SG}}$-ACC.SG god(C)$^{\text{PL}}$-ACC.PL
IGI-*anda* *šamnai-t*
against create-PRT.3SG

'knowest thou him not, the new-fangled deity whom Kumarbi has created to confront the gods?' (KUB 33.106 III 32-33, HED N 127)

([42]) The forms in *-iya-* are typical of OH, while those in *-i-* are most frequent from MH onwards (EDHIL 233).

([43]) Hitt. *ḫanti-* is the dat.-loc. sing. of *ḫant-* 'forehead, front', which is grammaticalised as an adverb (Hoffner & Melchert 2008: 61, HEG A-K 156).

([44]) On the suffix *-ena-*, see Pozza (2023).

([45]) IGI-*anda* in ex. 14 stands for Hitt. *menaḫḫanda* 'against, facing, opposite, before'. As for the interpretation of the Akk. complement *LIM*, which is probably based on a rebus reading of the Akkadian word *ilu* 'god' in the oblique singular *ili*, see Weeden (2011: 188-193).

11) *wešš-anda=ma* ***išḫar-want-uš*** TÚG$^{HI.A}$-*uš*
wear-PRS.MD.3PL=then blood-ADJ-C.ACC.PL garments^{PL}-C.ACC.PL

'they wear blood-red garments' (KBo 17.1 i 24-25, HED E/I 311)

The most frequent suffix used to build denominative adjectives is *-i(ya)-*: e.g. *nuntariya-* 'swift, new-fangled' < *nuntar-* 'haste, swiftness' (2x) and *walliwalli(ya)-* 'quick (?), strong (?)' < *walli-* 'glory, pride' (1x) ([46]). But also the suffixes *-ala-*, *-ant-* and *-want-* are found: *genzuwala-* 'kindhearted, merciful' < *genzu-* 'mercy' (1x), *iyatnuwant-* 'growing, luxuriant' < *iyatar/iyatn-* 'growth, fertility' (2x) and *ešḫarwant-* 'having bloodstains' < *ešḫar-* 'blood' (1x) ([47]).

4.4 *The deverbal adjective*

The fourth ADJECTIVE construction is the deverbal adjective, that is a simple verb stem followed by a nominalizing affix or, more precisely, by an adjectivaliser, and marked by agreement. This construction is summed up as [verb-ADJ]-Agr and is attested in 16 types (12.2%) for 139 tokens (15.1%). Of these, 57 cases are written phonetically (ex. 12), 72 cases are written heterographically (ex. 13, Sum. DÙG.GA = Hitt. *aššu-* 'good, fine') and 10 cases are written heterographically with a phonetic complement (ex. 14, Sum. TI-*an* = Hitt. *ḫuišwan* 'living' < *ḫuišwai-* 'be alive') ([48]):

([46]) Hitt. *walliwalli(ya)-* 'impetuous, stormy, powerful' is probably to be traced to *walli-* 'glory, pride', but the formation is not fully clear since it is attested only in the genitive singular *walliyaš pedan* 'place of glory' (HEG W-Z 260).

([47]) Hitt. *ešḫarwant-* can be a denominative adjective in *-want-* built on *ešḫar-* 'blood', but it can also be the participle to **išḫarwai-*, which in turn would be the denominative verb built on the non-attested noun **išḫaru-* 'bloodiness', connected to *ešḫar-* 'blood'. The former option is preferable, since the verb stem **išḫarwai-* and the noun **išḫaru-* are not attested (Oettinger 1988: 284, Hoffner & Melchert 2008: 61). For a more detailed discussion of the various etymological proposals, see Otten & Souček (1969: 53), HEG (A-K 115) and Rieken (1999: 483).

([48]) On the determinative Sum. ^{KAM} in ex. 13, see fn. 34. The glide [y] in *auriyaš* (ex. 12) is a hiatus-filling glide (Francia & Pisaniello 2019: 38, Melchert 1994: 132, *passim*). The determinative Akk. *ŠA* (ex. 13) is usually glossed 'of, that, which, that of' (CAD Š1: 1); originally, it is a determinative pronoun that usually introduces a genitive or a subordinate clause. For the details regarding the reading of the Sumerogram KALAG.GA (ex. 13), see Weeden (2011: 526). The word ^{GIŠ}*ḫaršandanaḫiti* is a hapax (HEG A-K: 184, HW^2 Ḫ: 344), possibly of Luwian origin, but its internal structure is unclear.

12) KUŠE.SIR$_{ḪI.A}$ *liliwand-u*[*š*] *šarkui-t* *n=aš=kan*
leather$_{shoe^{PL}}$ winged-C.ACC.PL put_on-PRT.3SG and=1SG=PTCL
parg-aw-aš *auriy-aš* *šarā* *pa-i*[*t*
rise-NM-C.DL.PL watchtower(C)-DL.PL above go-PRT.3SG

'on his feet as shoes the swift winds he put and he went up to lofty lookouts' (KUB 33.106 + ii 3-4, HED L 83 and A 233)

13) [DUB] I^{KAM} ***ŠA*** **Ì.DÙG.GA** ***ŠA*** *ᶠĀzzari* MUNUS$_{woman}$A.ZU *ḫurla-š*
[tablet] 1^{number} of oil.fine of woman$_{Āzzari}$ woman$_{doctor}$ *ḫurla*-GEN.SG

'A Tablet: of fine oil, (written) by Āzzari, the Hurrian Doctor' (KBo 31.8+ Text I.a Vs. 8, CTH 276.1, Dardano 2006: 23 'Eine Tafel: vom Feinöl, (verfasst) von Āzzari, der hurrischen Ärztin')

14) [GIŠ$_{wood}$*ḫaršandanaḫiti* **KALAG.GA**-*uš* N]A$_4^{ḪI.A}$-*uš* *tarn-eš*[*k-it*$^{(?)}$]
wood$_{head-piece}$ strong.ACC.PL stone^{PL}-ACC.PL set-IMPF-PRET.3SING

'[as head-piece, strong ston]es he set' (KUB 36.12 Rs. iii 23, CTH 345, García Trabazo 2002: 221 '[como cabezal²], pus[o] [fuertes piedr]as)

The adjectives in this class are relatively frequent and are divided into four groups. Group 1 includes 4 very frequent *u*-adjectives built on verbal roots for 108 tokens (28 Ph, 71 H and 9 H+, Appendix § 5.1) ([49]). Adjectives in this group are represented by *ḫuišu-* 'fresh, raw' < *ḫuiš-* 'live' (1x, see § 4.2), and *šarku-* 'eminent, powerful' < *šark-* 'ascend' (4x, see the iterative *šarkiške/a-* 'be eminent') ([50]). Since they are not numerous and their analysis is complex, they are discussed in detail below. Hitt. *aššu-* 'good' < *ašš(iya)-* 'be loved, be good' is quite frequently written phonetically (13x) and it covers the majority of tokens written logographically (71x): Kloekhorst (EDHIL 215-116; 224-225) interprets *aššiya-* as a denominative built on *aššu-* through suffix substitution; however, the bare stem *ašš-* is found twice (*a-aš-ša-a-ri*, *a-aš-ša-an-ta-ri*) and denominative verbs in *-iya-* are not usually built from *u*-adjectives (HED A 205); thus, the stem *ašš-* can be the basis of both the adjective *aššu-* and the secondary verb *aššiya-* (Weitenberg 1984: 96, EHS 483) ([51]).

([49]) On the close functional relation between adjectives in *-u-* and participles, see Gusmani (1968: 91-119), Weitenberg (1984: 80-86) and Dardano (2007).

([50]) On *šarku-*, *šark-* and *šarkiške/a-*, see CHD (Š 268), Gusmani (1968: 94) and the discussion in EDHIL (734).

([51]) For a similar case, see also Hitt. *parku-* 'high, tall' < *park(iya)-* 'raise' (10x): most attestations are inflected according to the *-iya*-class, but the bare stem *park-* is found in a few forms such as *pár-kán-zi*, *pár-ga-aḫ*[*ḫa-ri?*], *pár-ak-ta-ru*. According to EDHIL 637 the stem *parkiye/a-* was only used in the active and *park-* in the middle.

Group 2 includes 4 deverbal adjectives built on reduplicated verbal stems for 6 tokens, all of which are written phonetically and are not particularly frequent (Appendix § 5.2): e.g., *aršaršur(a)-* 'flowing' < *arš-* 'flow' (1x), *lelaniyant-* 'angry' < *elaniya-* 'assail, plague' (2x, see the iterative *elaneški-*, HED E/I 268-269), *uriwarant-*/*wariwarant-* 'burning' < *warant-* < *war-* 'burn' (2x) and *šišširyant-* 'sealed, pure, untouched' < *šišiya-* '(im)press, to seal' (1x) ([52]). Strictly speaking, these adjectives should be summed up as [RED-verb-NM]-Agr, rather than as [verb-NM]-Agr. However, for practical purposes these two types are merged.

Group 3 includes 5 deverbal adjectives of miscellaneous formation for 18 tokens (16 Ph, 1 H and 1 H+, Appendix § 5.3). The adjectives in this group are formed on an attested verbal stem, with suffixes that are usually acknowledged as productive suffixes in Hittite grammars. In two cases, the suffix is *-a-*: *ḫuwappa-* 'evil, ill' < *ḫuwapp-* 'be hostile towards, do evil against' (7x) and *ḫatuga-* 'terrible' < *ḫatuk-* 'be terrible' (2x) ([53]), while *tarḫuili-* 'strong, powerful' < *tarḫu-* 'prevail, to conquer' (1x) includes the suffix *-ili-* and *armawant-* 'pregnant' < *armai-* 'be pregnant' (2x) includes the suffix *-want-* ([54]). Finally, $^{A.ŠÀ}$*terippi-* 'ploughed field (nt.)' (4x) can be interpreted as a neuter noun written heterographically (Sum. A.ŠÀ 'field') and qualified by a deverbal adjective (*terippi-* 'ploughed' < *teripp-* 'plough'), or as a deverbal neuter noun (*terippi-* 'ploughed field') qualified by a determinative ([55]).

Group 4 includes 3 adjectives for 7 tokens in which either the verbal nature of the basis on which the adjective is built is very probable, though not totally uncontroversial, or the verbal nature of the adjective is beyond doubt, but the verb from which the adjective is derived is somehow problematic (Appendix § 5.4). Hitt. *annanuḫḫa-* 'trained' is built on *annanu-* 'train' (3x) through the unclear (perhaps archaic) suffix *-ḫḫa-* (HED A 61). Hitt. *ku(wa)li(u)-* 'soothing, calm' (2x) is usually seen as a deverbal adjec-

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([52]) It belongs to the group if this verb is a reduplicated form from *šaye-*/*šiya-* 'id.' (EHS 572, HEG Š2 1067).

([53]) See EDHIL 336, EHS 346, HZL n. 196, Weeden (2011: 526).

([54]) Hitt. *armawant-* might be a denominative adjective in *-want-* from **arma-* 'moon; month' (written only heterographically, see Sum. ^{d}EN.ZU, ITU$^{(KAM)}$, Akk. ^{d}*SÎN*), according to EHS 266, and HEG (A-K 62) posits an underlying noun **arma-* 'pregnancy', perhaps related to **arma-* 'moon'. *Contra*, however, HED A 157, which is followed here.

([55]) According to HEG T3 333, the latter reading is more likely because of the *figura etymologica* $^{A.ŠÀ}$*terippi-* $^{A.ŠÀ}$*terippiya-* 'Pflügfelder pflügen', 'to plough ploughfields'. Note that $^{A.ŠÀ}$*terippiya-* 'plough' is not a mere derivative of *teripp-*, as is visible from the use of the determinative (EDHIL: 872). The stem forming suffix can be *-i-* or the unclear (perhaps Hurrian) suffix *-pi-* (EHS: 224).

tive built on **ku(wa)liya-* 'flow, temporise', but the existence of the verb **ku(wa)liya-* is inferred due to the verbal noun *kulieššar* 'wavering, passivity', the causative *kuliya(wa)ḫḫ-* and the inchoative *kuliyaweš-*, *ku(wa)li(y)eš-* (Weitenberg 1984: 118, HED K 303), and HEG 624 considers *ku(wa)li(u)-* a primary adjective on which causative and inchoative denominatives are built. Hitt. *išḫaškant-* 'bloody' (2x) may be a participle from **ešḫar-šk-* with **-ršk-* > **-šk-* (see the hapax *eš-ḫa-ri-eš-ki-it-du* in EHS 456, 491, 506, and HEG A-K 115), or a syncopated participle of the iterative verb *ešḫaneš-ki-* taken from the stem **ešḫaniya-* 'bloody': **ešḫan(i)škant-* > *ešḫaškant-/išḫaškant-* (HED E/I 309) ([56]); both verb stems are ultimately traceable to the noun *ešḫar* 'blood'.

4.5 *The participial adjective*

The fifth ADJECTIVE construction in the sample is the participial adjective, that is a verb stem followed by the participial suffix *-ant-* and marked by agreement. This construction is summed up as [verb-PTC]-Agr and is represented by 39 types (29.8%) for 96 tokens (10.4%, Appendix § 6) ([57]). Of these, 82 cases are written phonetically (ex. 15), 4 cases are written heterographically (ex. 16, Sum. TUKU[.TUKU] = Hitt. *kartimmiyawant-* 'angry' < *kartimmiya-* 'be angry') and 8 cases are written heterographically with a phonetic complement (ex. 17, Sum. TI-*an* = Hitt. *ḫuišwan* 'living' < *ḫuišwai-* 'be alive') ([58]):

15)	*mān*	***alwanzaḫḫ-and-an***	UN-*an*	*parkunu[-mmi* ([59])
	when	bewitch-PTC-C.ACC.SG	man-ACC.SG	purify-PRS.1SG

'when I purify a bewitched person' (CTH 277.6A rev. ii 6, Dardano 2006: 165 'Wenn ich einen verzauberten Menschen kultisch reini[ge')

([56]) The occurrences of this adjective are *iš-ḫa-aš-kan-tu-uš* (KBo XVII 4 ii 6-7) and *eš-ḫa[-aš-]kán-ta* (KBo iii 34 i 20).

([57]) Among the many publications concerning the syntax of participles as adjectives in Hittite and its relation with the verbal system, see Frotscher (2013), Frantikova (2015) and Rieken (2017).

([58]) In ex. 17, the *ḫarpa-* is some sort of ritual hill ('Haufen, Hügel' in Kümmel's glossary). In ex. 16, KÙ.BABBAR means 'silver', Ḫattuša being 'the silvery city'; the sign <ˡ> refers to the presence of a sign drawn in an unusual or incorrect way.

([59]) Both *parkunumi* (i.e. <*pár-ku-nu-mi*>) and *parkunummi* (i.e. <*pár-ku-nu-um-mi*>) are found, due to the frequent alternations between single and geminate spellings in an intervocalic position (see Pozza 2011, 2012).

16) [(*man* ^{UR})]^{U}KÙ.BABBAR-*ši* LUGAL IGI$^{!!}$ **TUKU.TUKU**
[if ^{cit})]^{y}Ḫattuša-DL.SG king in_front_of angry

'If in Ḫattuša an angry God in front of/on the$^{?}$ king' (KBo 7.74 + KBo 31.27 obv. ii 8, Dardano 2006: 153 '[…(Wenn)] in Ḫattuša ein vor dem$^{?}$/auf den$^{?}$ König zorniger (Gott)')

17) (*n)]u=kan* GUD.MAḪ **TI-*an*** *ḫarp-i* UGU *penniy-anzi*
and=PTCL bull live-PTC.NT.ACC.SG *ḫarpa*-DL.SG above drive-PRS.3PL

'then they drive a living bull up onto the *ḫarpa*-' (KUB 24.5 Vs. 11, Kümmel 1967: 9 'Dann treibt man einen lebenden Stier auf den *ḫarpa*- hinauf')

The adjectives in this class are numerous, but none of them has a high frequency. They include standard *ant*-participles built on verb of quality or near-quality meaning. The most frequent cases are *arnu(w)ant-* 'pregnant (animal)' < *arnu-* 'transport, deport, make go' (8x), *unuwant-* 'decorated' < *unu-* 'adorn, decorate' (7x), *miyant-* 'in bloom' < *mai-/mi-* 'grow up, to prosper' (4x), etc. ([60]).

In most cases, the verb on which the participle is built is primary. However, in a few cases, a causative or a denominative verb is found: *arnu-* 'transport, deport, make go' (see above) is the causative of *ar-* 'arrive'; *ḫuišwant-* 'living, alive' (9x) is from *ḫuišwai-* 'be alive', which is the denominative verb built on *ḫuišu-* 'fresh, raw', which, in turn, is the deverbal adjective built on the simple verb *ḫuiš-* 'live' (see below, group 2); *takšulant-* 'peaceful' (1x) is the participle of *takšulai-* 'agree, make peace', which may be a denominative built on *takšul-* 'agreement, peace'; and *daššanuwant-* 'strengthened' (1x) is built on *daššanu-* 'make strong', which may be the denominative of *daššu-* 'strong, powerful'. Strictly speaking, therefore, the structure of the adjective is [adjective-VRB]$_{V}$-NM-Agr (VRB = "verbaliser"). However, since these are the only denominative verbs in the corpus, we merged them with non-denominative verbs (for a further possible case, see *išḫaškant-* 'bloody' in group 5).

([60]) We listed in this group *ḫattant-* 'clever, intelligent' < *ḫat(t)-*, *ḫatta-* 'pierce, to hit': the link between the verb and the adjective is certain (see It. *penetrante* 'penetrating, acute, intelligent' < *penetrare* 'pierce, penetrate'), but the semantics of the derivative is not certain, and Dardano (2007) separates the participle *ḫattant-* 'perforated, penetrated' from *ḫat(t)-*, *ḫatta-*, and *ḫattant-* 'clever, intelligent' (i.e. 'penetrating'), the verbal adjective built on the same root.

4.6 *Summary of the ADJECTIVE construction in Hittite*

The interpretation of the structure of Hittite ADJECTIVE constructions is complex, probably more so than in other IE languages. Compared to the Latin corpus, Hittite is not abundantly documented and is quite repetitive (type/token ratio is 226/662 = 0.34 in Latin, but only 131/922 = 0.14 in Hittite). A Hittite adjective therefore has a higher chance of being primary due to the relative dearth of bases from which it can be built in our corpus (e.g., *ḫūmant-*, 88x in the sample). Moreover, most Hittite suffixes are compatible with different word classes and the frequency of heterograms reduces the number of words whose structure can be securely analysed. Thus, it is not uncommon that a single Hittite adjective is interpreted as deverbal by one scholar but as denominative by a different scholar, and in some cases it is impossible to establish with certainty the exact Hittite word hidden under a heterogram, especially when the heterogram lacks complements (see § 3.3 and § 4.4 on SIG_5 and DÙG.GA, which total 71 tokens if taken together). Nonetheless, if all the adjectives constructions i the corpus are gathered, the following table is obtained (see Tab. 5 below) ([61]):

Table 5 confirms that the quantitative differences among the constructions are smaller from the perspective of type frequency, but the relative ranking of the constructions essentially remains constant (see § 3). The main difference between type and token frequency concerns the adjectival constructions [adjective]-Agr and [verb-PTC]-Agr: in Hittite, simple adjectives are the most frequent ADJECTIVE construction both in terms of tokens and of types, but the difference with respect to participles changes from 65.9% simple adjectives vs. 10.4% participles to 48.9% simple adjectives vs. 29.8% participles if type frequency is considered. Only deverbal adjectives decrease in frequency from tokens (15.1%) to types (12.2%), due to the high frequency of *aššu-*, especially in its logographic forms (SIG_5 and DÙG.GA). Moreover, if participles are grouped with deverbal adjectives – which is not strange, given that both constructions are formed on a verbal stem attached to an adjectivalising suffix from a morphological viewpoint (i.e.

([61]) Each token is coded phonetically, heterographically without complement or heterographically with complement, each option excluding the others. However, each type can be written in different ways. These types were therefore classified according to their usual (not exclusive) written form: e.g., the simple adjective *šalli-* 'big, important' is written phonetically (12x), heterographically without a complement (GAL, 42x), or heterographically with a complement (GAL+, 8x); however, it is listed in row nr. 2, since it is usually written heterographically without a complement.

Tab. 5: Summary of Hittite ADJECTIVE constructions

	Tokens		Types	
	Quantity	Percent	Quantity	Percent
1. [adjective]-Agr	**608**	**65.9%**	**64**	**48.9%**
1. Phonetic	373	40.5%	47	35.9%
2. Heterographic without complement	203	22.0%	15	11.5%
4. Heterographic with complement	32	3.5%	2	1.5%
3. [preposition-ADJ]-Agr	**72**	**7.8%**	**7**	**5.3%**
5. Phonetic	55	6.0%	6	4.5%
9. Heterographic without complement	16	1.7%	0	0%
3. Heterographic with complement	1	0.1%	1	0.8%
4. [noun-ADJ]-Agr	**7**	**0.8%**	**5**	**3.8%**
6. Phonetic	7	0.8%	5	3.8%
10. Heterographic without complement	0	0%	0	0%
11. Heterographic with complement	0	0%	0	0%
2. [verb-ADJ]-Agr	**139**	**15.1%**	**16**	**12.2%**
3. Phonetic	57	6.2%	15	11.4%
7. Heterographic without complement	72	7.8%	1	0.8%
8. Heterographic with complement	10	1.1%	0	0%
2. [verb-PTC]-Agr	**96**	**10.4%**	**39**	**29.8%**
3. Phonetic	84	9.1%	36	27.5%
7. Heterographic without complement	4	0.4%	2	1.5%
8. Heterographic with complement	8	0.9%	1	0.8%
Total	**922**	**100%**	**131**	**100%**

they share the same *lexeme word class* in Haspelmanth's view, 1996); Indian grammarians considered them to be the same kind of construction (Alfieri 2014b); and the distinction between participial suffixes and nominalizers is not consistent across the IE languages – simple adjectives are only slightly more frequent than deverbal adjectives in this broader sense (i.e. deverbal adjectives and participles), which add up to 42.0%. This means that the construction type [adjective]-Agr is the most common adjectival construction in Hittite, while the construction type [verb-NM]-Agr (i.e., the sum of [verb-ADJ]-Agr and [verb-PTC]-Agr) has a high frequency, close to that of simple adjectives, from the perspective of type frequency.

5. Discussion and conclusion

In § 1 we showed that most scholars think that PIE was a language of type [N, A, V] or a language with "true" adjectives; some believe that PIE was a language of type [(NA) V] or a language with noun-like adjectives; and a few have claimed that PIE or Pre-PIE was a language of type [N (AV)] or a language with verb-like adjectives. Alfieri (2021) reviewed the literature on PoS typology and argued that questions such as "what are the adjectives of PIE?" or "does PIE possess or lack adjectives?" are intrinsically typological questions that cannot be answered objectively, unless starting from purely comparative concepts of the "adjective" (following Croft 2016). Thus, we proposed a functional definition of the "adjective" in § 2 and described our working method, applying it to Latin (Alfieri 2019, in prep. a/b). After reviewing some potentially problematic aspects of our approach in § 3, the Hittite data were described in § 4. If the data in § 4 and those in § 2 are viewed together, the following picture emerges. See Table 6:

Tab. 6: the ADJECTIVE construction in Classical Latin and Hittite

	Classical Latin		Hittite	
	Token	Type	Token	Type
[adjective]-Agr	79.7%	62.8%	65.9%	48.9%
[preposition-ADJ]-Agr	0.5%	0.4%	0.8%	5.3%
[noun-ADJ]-Agr	6.1%	11.9%	7.8%	3.8%
[verb-ADJ]-Agr	0.6%	2.1%	15.1%	12.2%
[verb-PTC]-Agr	6.7%	10.7%	10.4%	29.8%
PRE-$[\ldots]_N$-Agr	3.9%	9.9%	0%	0%
$[\ldots]_N$-$[\ldots]_N$-Agr	2.6%	2.0%	0%	0%
Total	100%	100%	100%	100%

Table 6 shows a simple fact: PoS categories are not the same across different languages, not even when these languages are genetically related and the investigated categories are defined through the same inflectional features. Differently put, the adjective class is usually considered to be a syntactic category defined through inflection. However, this definition conceals the derivational differences between the various ADJECTIVE constructions in the IE languages. Below the level of inflection, ADJECTIVE constructions in Latin and in Hittite differ both in the total number of constructions available and in their

relative frequency. Hittite displays five constructions in the same functional space in which Classical Latin shows seven. Moreover, deverbal adjectives and participles are far more frequent in Hittite than in Latin (12.2% and 29.8% vs. 0.6% and 6.7%), and the same holds true for prepositional adjectives, which are not, however, particularly common. On the other hand, simple adjectives constitute the vast majority of ADJECTIVE constructions in Latin, but not in Hittite, where they account for slightly under 50% of ADJECTIVE constructions, and are almost as frequent as deverbal adjectives in the broader sense (i.e., deverbal adjectives proper plus participles): 42.0% vs. 48.5%. As a result, Classical Latin and Hittite fall within the same PoS type [N, A, V], since the simple adjective is the most frequent ADJECTIVE construction in both languages. However, Classical Latin is a prototypical representative of that type, while Hittite is more peripheral, since the simple adjective construction is only slightly more frequent than the deverbal adjective construction in the broader sense (i.e. deverbal adjectives proper plus participles), which is exactly the construction expected in a language of type [N (AV)] (i.e. one with "verb-like" adjectives), and neither construction surpasses 50% ([62]).

The distribution of adjectival morphology in Latin and in Hittite seems to confirm this view. In both languages, agreement defines adjectives on the level of syntax and the adjective is also a class of simple morphemes clearly defined at the level of the lexicon. However, suffixes that select only adjectives are common in Latin: this is the case with the comparative and superlative suffixes (bar a few exceptions, see Alfieri 2021: 319-320), as well as with the nominalisers *-tāt-* and *-itudin-*: *gravis* 'heavy' → *gravitas* 'seriousness', *magnus* 'big' → *magnitudo* 'bigness'. Conversely, in Hittite, comparative and superlative suffixes are not attested, and most suffixes attach to different bases (see fn. 25), but no suffixes attach exclusively to adjectives, barring cases of subtractive derivation (e.g., *parku-* 'high' → **park-Ø* → *parkešš-* 'become high', *pargašti-* 'height'), which are not, however, synchronically regular (see § 3.2). As a result, while in Latin the threefold division [N, A, V] seems to hold in a uniform manner at all levels of language analysis (i.e., lexicon, word-formation and syntax), in Hittite it

([62]) The frequency of deverbal adjectives in Hittite might seem like an illusion due to the low number of constructions attested in Hittite – the lower number of constructions, the higher their average frequency. However, simple adjectives and denominative adjectives show a lower frequency in Hittite than in Latin, although Hittite shows a lower number of constructions. Thus, the frequency of deverbal adjectives and especially of participles may be partly due to the lower number of constructions in Hittite, but it is also a specific feature of the Hittite language.

holds in the lexicon and in syntax, but sometimes it seems to blur at the level of word-formation.

Providing a diachronic interpretation of the data in Table 6 is premature without considering the other IE languages. However, some preliminary remarks may prove useful. Denominative adjectives are uncommon in Latin (11.9%) and are decidedly rare in Hittite, where they amount to only 5.3%. Accordingly, although adjectival endings may also derive from the nominal endings, the data in Table 4 do not offer any support for the de-nominal origin of the PIE adjective class, defined as a class of simple lexemes, nor for the classification of PIE as a language of type [(NA) V] (i.e., one with "noun-like" adjectives). Moreover, compound and prefixed adjectives are IE constructions, since both types of adjectives are spread all over the IE languages, and a few lexicalised compounds are found in the Hittite lexicon (see group 2c § 4.1.2 and Appendix § 2.2.3). Nonetheless, ascertaining the most typical ADJECTIVE construction in PIE is more difficult. The simple adjective is the most obvious choice, since it represents the majority of constructions in both Latin and Hittite, and most scholars think that PIE is a language of type [N, A, V]. However, deverbal adjectives in the broader sense (that is, deverbal adjectives plus participles) are almost as frequent as simple adjectives in Hittite and the simple adjective construction has a frequency above 50% only in Latin. One may therefore claim that the high frequency of deverbal adjectives in Hittite is a conservative feature, which was lost in Latin, while the frequency of simple adjectives being above 50%, and the presence of a dedicated adjectival morphology, may be two innovative features of Latin, which had not yet been developed in Hittite.

A possible confirmation of this view comes from some recent research. In Alfieri (2016, 2021), it was shown that the deverbal adjective construction in the broader sense (that is, deverbal adjectives plus participles) is the most frequent ADJECTIVE construction in a sample of 52 hymns from the Rig-Veda, being four times more frequent than the simple adjective (40.0% vs. 9.7%) and about twice as frequent as the compound adjective (47.6% to 20.6%) ([63]). In the same vein, a study on the first book of the Odyssey (Alfieri & Gasbarra 2021) showed that the simple adjective is the most frequent ADJECTIVE construction in Homeric Greek, but it is not as frequent as in Latin (48.1% vs. 79.1%), whereas the deverbal adjective

([63]) It is worth noting that Indian grammarians usually merge participles and deverbal adjectives under the single label of *kṛt*-derivatives (Skt. *kṛdanta-* 'words ending (*anta-*) with a *kṛt*-suffix'), since both types of words are built from verbal roots by means of a primary suffix (termed *kṛt* in Indian grammar). For discussion, see Alfieri (2014b).

is not as frequent as it is in Sanskrit and Hittite, but is more frequent than it is in Latin (7.3% vs. 12.9%, token frequency). Unfortunately, the works above are based on a lesser refined methodology than the one employed here: they analyse only on token frequency, which may noticeably differ from type frequency; do not divide participles and deverbal adjectives analytically, and do not exploit the notion of lexicalisation as deeply as we did in this work. Moreover, all data in Table 6 can be interpreted in different ways, according to whether the lexicon is seen as a repository of already derived words, as claimed in the lexicalist approach (see Keydana 2022), or as a repository of simple morphemes (that is, verbal roots and primary nouns), as is claimed in Indian grammatical tradition and in morpheme-based approaches (see Alfieri 2023, 2024 for discussion). A fresh look at the data in Indo-Iranian and in Greek is therefore required. However, the data in Table 6, especially if compared with those in Alfieri (2016, 2021) and Alfieri & Gasbarra (2021), suggest taking in serious consideration the possibility that the typical ADJECTIVE construction in PIE is *[verb-NM]-Agr (i.e., verbal adjectives in the broader sense), rather than *[adjective]-Agr (i.e., simple adjectives).

Needless to say, although *[verb-NM]-Agr was accepted as the typical PIE quality modifier construction, PIE does not automatically become a language of type [N (AV)] or a language with verb-like adjectives in Dixon's sense: many typologists – probably the majority – think that the most important environment for establishing the adjectival typology of a language is the quality modifier construction, while others think that the quality predicate better suits this role (see fn. 11); moreover, most typologists at present consider that all the syntactic slots in Croft's table should be checked for a more solid classification (the quality predicate, the quality modifier and the quality argument), since the result obtained in one slot need not be identical to those obtained in the others (see Beck 2013 for discussion). Moreover, the structure of the PIE lexicon as it emerges from NIL and LIV^2 has to be verified, the criteria whereby a PIE root can be considered verb-adjectival or purely adjectival (i.e. non-verbal) have to be established, and the total number of derived adjectives and adjectival-non-verbal roots in the PIE lexicon has to be calculated, before making a final decision on whether PIE is better considered to be a language of type [N, A, V] or of type [N (AV)], how the Caland system worked originally, and which is the better conceptual definition of the root in PIE and in Vedic Sanskrit.

In other words, the data in the paper do not provide a final answer to the cluster of problems described in § 1. However, in our view they succeed in achieving four results. Firstly, we have established that PIE adjectival typology, the debate on *Natur der Wurzel* and the reconstruction of the Caland suffixes represent three sides of a single problem. Secondly, this problem can be discussed in a fully empirical manner, by analysing the encoding of the quality predicate, quality argument and quality modifier constructions across the IE languages, and cross-checking these data with the scholarship of PIE lexicography. Thirdly, the classification of PIE or Pre-PIE as a language of type [(NA) V] is not consistent with the Hittite data (nor with those in Rig-Vedic Sanskrit as discussed by Alfieri 2016, 2021). Fourthly, most scholars take for granted that the most typical ADJECTIVE construction in PIE is *[adjective]-Agr (i.e. simple adjectives); however, the Hittite data show that the deverbal ADJECTIVE construction in the broader sense, namely *[verb-NM]-Agr (i.e., [verb-ADJ]-Agr plus [verb-PTC]-Agr taken together) is a plausible candidate, and it may even become the most likely candidate, if deverbal adjectives and participles are grouped into a single class of deverbal adjectives, following the practice of Indian grammarians (Alfieri 2016, 2021), and a non-lexicalist approach to word-formation is preferred.

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LUCA ALFIERI
l.alfieri@unimarconi.it
MARIANNA POZZA
marianna.pozza@uniroma1.it

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APPENDIX

1. The corpus

CTH1 = Neu (1974)
CTH3 = Otten (1973)
CTH 8-9 = Dardano (1997)
CTH 81 = Otten (1981)
CTH 105 = Kühne and Otten (1971)
CTH 106 = Otten (1988)
CTH 262 = Güterbock and van den Hout (1991)
CTH 276-282 = Dardano (2006)
CTH 291-292 = Hoffner (1997)
CTH 321, 324, 342.1, 342.2, 344, 345 = García Trabazo (2002)
CTH 360.1 = Rieken et al. (eds.), hethiter.net/: CTH 360.1 INTR 2009-08-31
CTH 371 = Del Monte (2003)
CTH 373, 376 = García Trabazo (2002)
CTH 376C, 377 = Del Monte (2003)
CTH 378.2, 384, 391.1 = García Trabazo (2002)
CTH 396 = Carruba (1966)
CTH 404.1, 404.2, 406, 414 = García Trabazo (2002)
CTH 416 = Otten and Souček (1969) CTH 419 = Kümmel (1967)
CTH 422 = García Trabazo (2002) CTH 430 = Beckman (1983)
CTH 461 = Burde (1974)
CTH 480, 483 = García Trabazo (2002) CTH 625 = Otten (1971)
CTH 631 = Neu (1970)
CTH 727 = García Trabazo (2002)
CTH 832 = Dardano (1997)
HBM = Alp (1991).

2. Simple adjectival constructions, i.e. [adjective]-Agr

Total: 64 adjectives for 608 tokens (373 Ph, 203 H, 32 H+)

2.1 *Group 1, simple adjectives that show no internal structure*

Total: 37 adjectives for 427 tokens (202 Ph, 193 H, 32 H+)

2.1.1 Sub-group 1a: i-adjectives

Total: 19 types for 253 tokens (97 Ph, 147 H, 9 H+):

	Phon.	Het.	Het. +
ḫaḫḫari- 'thin, flexible (?)', SIG ([64])	2x	12x	
ḫanti- 'special (vel sim.)' ([65])	4x		
ḫarki- 'white, bright', BABBAR (3x), UD (1x) ([66])	5x	4x	
kaki- 'poor, lousy (?)'	1x		
kappi- 'small', TUR	1x	15x	
mekki- 'much, many, numerous'	5x		
nakkī- 'important, difficult' ([67])	8x		
parkui- 'pure, clean'	9x		
šalli- 'big, important', GAL, GAL+	12x	42x	8x
šani- '(one and) the same'	1x		
šuppi- 'purified, sacred'	20x		
taki- 'other, stranger (?)'	2x		
daluki-/daluka- 'long', GÍD.DA	10x	42x	
dammeli- 'fresh, untouched (by human hand)'	6x		
dampupi- 'unskilled, barbaric'	2x		
dankui- 'black, dark', GE_6, GE_6+	5x	31x	1x
ukturi-/wakturi- 'firm, steady', SAG.UŠ	2x	1x	
ulili- 'green' ([68])	1x		
warḫui-/warhuwai- 'rough, raw'	1x		
Total	97x	147x	9x

([64]) The meaning and the etymology of *ḫaḫḫari-* 'thin, flexible', epithet of GI 'reed' (twice in the Ullikummi-epic) remains conjectural (HED Ḫ 6-7, HEG A-K 122).

([65]) Etymologically it is traced to *ḫant-* 'forehead', but Puhvel (HED Ḫ 95) and Beckman (1983: 133, 137, 139, 268) consider it as a simple adjective having the meaning 'special (vel sim.)', 'separate', even if the adjectival use might have emerged from an originally adnominal use (as in *ḫanti tuppi* 'copy tablet').

([66]) Sum. UD 'day(light)' probably stands for Hitt. *šiwatt-* 'day', but it also means 'white' just like BABBAR (see HZL n. 316) and has been found in connection with SÍG 'wool' (see García Trabazo 2002: 257: "lana blanca").

([67]) Hitt. *nakkī-* 'important, difficult' builds the de-adjectival verb *nakkiyaḫḫ-* (see the spellings <*na-ak-ki-ya-aš-zi*> and <*na-ak-ke-ya-a[n-zi*]> in HED N 260).

([68]) The meaning and etymology of *ulili-* is uncertain. It has been interpreted as 'green, vegetation' (HEG U 38, EHS 122, 213), but translated by García Trabazo (2002: 491) as "en el verde bosque", as an attribute of ^{GIŠ}TIR 'forest, wood'.

2.1.2 Sub-group 1b: *u*- and *a*-adjectives

Total: 11 types for 105 tokens (78 Ph, 5 H, 22 H+):

	Phon.	Het.	Het. +
ḫalluwa- 'deep'	6x		
idālu- 'bad, evil', ḪUL+	45x		11x
iuga- 'yearling', MU.1	3x	5x	
kunna- 'right (hand or side), favourable', ZAG+	2x		11x
mīu- 'soft, smooth'	1x		
panku- 'all, entire'	1x		
šuu- 'full'	2x		
dannatta/i- 'empty'	5x		
daššu- 'strong; heavy; difficult'	7x		
tepu- 'little'	4x		
šappiduwa- 'terrible'	2x		
Total	78x	5x	22x

2.1.3 Sub-group 1c: adjectives of miscellaneous forms

Total: 7 types for 69 tokens (27 Ph, 41 H, 1 H+):

	Phon.	Het.	Het. +
kurur 'enemy, hostile'	2x		
tamāi-/tame- 'other, second'	25x		
Akk. *EM-ṢÚ* 'sour, bitter' for Hitt. *šiwa/i-* 'sour (?)' (Weeden 2011: 481)		1x	
Sum. GIBIL 'new', GIBIL+ for Hitt. *newa-* 'new, fresh'		6x	1x
Sum. KU_7 'sweet' for Hitt. *maliddu-/miliddu-* '(honey)sweet' (HED M 169)		15x	
Sum. NIR.GÁL 'strong, awe-inspiring' for Hitt. *muwat(t)al(l)a/i-* 'potent, mighty' (HED M 198)		4x	
Sum. SA_5 'red' for Hitt. *mit(t)a-/miti-* 'red' (HED M 145, HEG L-M 218, Weeden 2011: 602)		15x	
Total	27x	41x	1x

2.2 *Group 2, simple adjectives which show some internal structure*

Total: 27 types for 181 tokens (171 Ph, 10 H, 0 H+)

2.2.1 Sub-group 2a: adjectives taken from unattested bases through the suffixes *-ant-* and *-want-*

Total: 12 types for 112 tokens (105 Ph, 7 H):

	Phon.	Het.	Het. +
ašiwant- 'poor';	1x		
enant- 'trained, tamed'	3x		
ḫūmant- 'each, all; whole, entire'	88x		
ḫaršallant- 'at odds, enraged' ([69])	1x		
innarawant- 'having vigour'	1x		
leliwant- 'travelling swiftly, winged, urgent'	5x		
mišriwant- 'having brilliance' ([70])	5x		
ummiyant- '?' ([71])	1x		
Sum. ŠU.GI, if it stands for Hitt. *mehuwant-* ([72])		1x	
Sum. ŠE 'fat', if it stands for Hitt. *warkant-* 'fat' ([73])		2x	
Akk. *ŠIḪRU* 'small, young', if it stands for Hitt. *ammiyant-* (Weeden 2011: 608)		1x	
Sum. ZA.GÌN 'blue', if it stands for Hitt. *andara(nt)-* 'blue' (Weeden 2011: 649)		3x	
Total	105	7	0

([69]) It may be the participle of the unattested verb **ḫaršal(l)ai-* or a denominative adjective from the unattested noun **ḫaršalla-*, but neither basis is attested (HED Ḫ 186, HEG A-K 183).

([70]) Etymologically **mišri-* in *mišriwant-* can be traced to **miš-* 'to twinkle' (from PIE **meys-* 'to shimmer') + suffix *-ri-* (Hoffner and Melchert 2008: 59). However, the etymology is not beyond doubt (EDHIL 582).

([71]) An adjective of unclear meaning qualifying birds (see the acc.plur. *um-mi-ya-an-du*-uš in KBo vi 14 I 9).

([72]) The Hittite word can be derived from the verb *mai-* 'to grow' (Eichner 1973: 56-57, Oettinger 1979: 471) or from the noun *mēḫur-* 'period' (EDHIL 569), but both connections are only etymological.

([73]) The meaning 'fat' is in connection with Sum. GUD.MAḪ 'bull' (Otten 1971: 67), and the logogram stands for Hitt. *warkant-* 'fat' according to Tischler (HEG: s.v.).

2.2.2 Sub-group 2b: adjectives that are built on attested adjectival stems enlarged through the empty suffix *-ant-* and *-ni-*

Total: 6 types for 18 tokens (18 Ph, 0 H, 0 H+):

	Phon.	Het.	Het. +
dapi- / *dapiyant-* 'all, every, each, entire'	1x / 6x		
ḫappina- / *ḫappinant-* 'rich'	0 / 1x		
maninkuwa- / *maninkuwant-* 'near'	0 / 4x		
dannara- / *dannarant-* 'empty, smooth'	2x / 3x		
arawa- / *arawanni-* 'free'	0 / 1x		
Total	18x	0	0

2.2.3 Sub-group 2c: adjectives that arose from lexicalised compounds

Total: 5 types for 24 tokens (21 Ph, 3 H 3):

	Phon.	Het.	Het. +
ḫašantaralli- 'pertaining to a new-born'	1x		
šaḫuiḫu(i)šš̆uwali- 'legitimate (by birth)'	1x		
šuppišduwara- 'having brilliance, brilliant'	9x		
šaudišt-/*šauitišt-* 'weanling';	6x		
dāyuga- 'two-year-old', MU.2.	4x	3x	
Total	21x	3x	

2.2.4 Sub-group 2d: adjectives whose origin and internal structure are uncertain or non-generalisable

Total: 5 types for 27 tokens (27 Ph, 0 H, 0 H+):

	Phon.	Het.	Het. +
annal(l)a/i- 'former, earlier, old' (11x) and *annawali-*/*annauli-* '(of) equal (rank), peer' (1x)	12x		
kuriwana- 'independent'	2x		
šakuwaššar(a)- 'complete, entire, full; legal, correct'	7x		
šanezzi-/*šanizzi-* 'pleasant, excellent, first-class'	4x		
warpan(n)ala- 'washed (?)'	2x		
Total	27x	0	0

3. Prepositional adjectives, i.e. [preposition]-ADJ-Agr

Total: 7 types for 72 tokens (55 Ph, 1 H, 16 H+):

	Phon.	Het.	Het. +
ḫantezzi(ya)-, IGI-*zi* 'first, foremost' < *ḫanti-* 'opposite, against'	19x		4x
appezzi(ya)-, EGIR-*izzi* 'backmost, rear' < *āppa* 'behind, back'	8x		4x
šārazzi(ya)-, UGU-*azzi* 'up(wards), aloft' < *šāra* 'id.'	1x		8x
araḫzena- 'external' < *araḫza* 'around, away'	5x		
kattera- 'lower, inferior' < *katta-* 'downwards'	6x		
karū(i)li-, LIBIR.RA 'former, ancient' < *karū* 'early, formerly'	15x	1x	
šannapili- 'empty' < *šannapi* 'scattered (here and there)'	1x		
Total	55x	1x	16x

4. Denominative adjectives, i.e. [noun]-ADJ-Agr

Total: 5 types for 7 tokens (7 Ph, 0 H, 0 H+):

	Phon.	Het.	Het. +
genzuwala- 'kindhearted, merciful' < *genzu-* 'mercy'	1x		
iyatnuwant- 'growing, luxuriant' < *iyatar/iyatn-* 'growth, fertility'	2x		
nuntariya- 'swift, new-fangled' < *nuntar-* 'haste, swiftness'	2x		
ešḫarwant- 'having bloodstains' < *ešḫar-* 'blood'	1x		
walliwalli(ya)- 'quick (?), strong (?)' < *walli-* 'glory, pride'	1x		
Total	7x		

5. Deverbal adjectives, i.e. [verb-NM]-Agr

Total: 16 types for 139 tokens (57 Ph, 72 H, 10 H+)

5.1 *Group 1:* u-*adjectives*

Total: 4 types for 108 tokens (28 Ph, 71 H, 9 H+):

	Phon.	Het.	Het. +
aššu- 'good', SIG_5 (8x), SIG_5+, DÙG.GA (63x) < *aš(i-ya)-* 'to be loved, to be good'	13x	71x	9x
ḫuišu- 'fresh, raw' < *ḫuiš-* 'to live'	1x		
parku- 'high, tall' < *park(iya)-* 'to raise'	10x		
šarku- 'eminent, powerful' < *šark-* 'to ascend'	4x		
Total	28x	71x	9x

5.2 *Group 2: deverbal adjectives built on reduplicated verb stems*

Total: 4 types for 6 tokens (6 Ph, 0 H, 0 H+):

	Phon.	Het.	Het. +
aršaršur(a)- 'flowing' < *arš-* 'to flow'	1x		
lelaniyant- 'angry' < *elaniya-* 'to assail, plague' (attested in the iterative *elaneški-*, see HED E/I 268-269)	2x		
uriwarant-/wariwarant- 'burning' < *warant-* < *war-* 'to burn'	2x		
šišširyant- 'sealed, pure, untouched' < *šišiya-* 'to (im) press, to seal'	1x		
Total	6x	0	0

5.3 *Group 3: deverbal adjectives of miscellaneous forms*

Total: 5 types for 18 tokens (16 Ph, 1 H, 1 H+):

	Phon.	Het.	Het. +
armawant- 'pregnant' < *armai-* 'to be pregnant'	2x		
ḫatuga- 'terrible', KALA.GA, KALA.GA+ < *ḫatuk-* 'to be terrible'	2x	1x	1x
ḫuwappa- 'evil, ill' < *ḫuwapp-* 'to be hostile towards, to do evil against'	7x		
tarḫuili- 'strong, powerful' < *tarḫu-* 'to prevail, to conquer'	1x		
$^{A.ŠÀ}$*terippi-* 'ploughed field (nt.)' < *teripp-* 'to plough'	4x		
Total	16x	1x	1x

5.4 *Group 4: deverbal adjectives of uncertain origin*

Total: 3 types for 7 tokens (7 Ph, 0 H, 0 H+):

	Phon.	Het.	Het. +
annanuḫḫa- 'trained' < *annanu-* 'to train'	3x		
ku(wa)li(u)- 'soothing, calm' < **ku(wa)liya-* 'to flow, temporise'	2x		
išḫaškant- 'bloody' < **ešḫa(r)šk-* or *ešḫa(ne)ški-*, both ultimately traceable to the noun *ešḫar* 'blood'	2x		
Total	7x	0	0

6. Participial adjectives, i.e. [verb-PTC]-Agr

Total: 39 types for 96 tokens (84 Ph, 4 H, 8 H+):

	Phon.	Het.	Het. +
ānt- 'hot' < *ā(i)-/i-* 'to be hot'	2x		
alwanzaḫḫant- 'bewitched' < *alwanzaḫḫ-* 'to bewitch'	1x		
annanuwant- 'trained' < *annanu-* 'to train'	1x		
armaḫḫant- 'pregnant' < *armaḫḫ-* 'to make pregnant'	1x		
arnu(w)ant- 'pregnant (animal)' < *arnu-* 'to transport, to deport, to make go'	8x		
aššiyant- 'beloved' < *aššiya-* 'to be loved, to be good'	2x		
gulšant- 'carved' < *gulš-* 'to engrave, to inscribe, to write'	2x		
ḫandant- 'arranged' < *ḫandai-* 'to arrange', to fix; to determine'	5x		
ḫarkant- 'vacated' < *ḫark-* 'to disappear, to perish'	3x		
ḫattant- 'clever, intelligent' < *ḫat(t)-*, *ḫatta-* 'to pierce, to hit'	1x		
ḫuišwant- 'living, alive', TI+ < *ḫuišwai-* 'to be alive'	9x		5x
ḫuittiyant- 'pulled' < *ḫuett-/ḫuttiya-* 'to draw, to pull'	1x		
iškarant- 'set, lined up' < *iškai-* 'to sting, to prick; to line up'	2x		
kappuwant- 'numbered' < *kappuwai-* 'to count'	1x		
kariyant- 'covered' < *kariya-* 'to cover'	1x		
karšant- 'cut (off)' < *karš-* 'to cut (off)'	1x		

	Phon.	Het.	Het. +
kartimmiyant- 'angry', TUKU, TUKU < *kartimmiya-* 'to be angry'	1x	2x	2x
kinant- 'assorted' < *kinai-* 'to (as)sort'	1x		
lagant- 'tilted, inclined' < *lak-* 'to turn (one's ears or eyes towards)', to train'	1x		
lukkant- 'lighted' < *lukk-* 'to get light, to light up, to dawn'	1x		
miyant- 'in bloom' < *mai-/mi-* 'to grow up, to prosper'	4x		
neyant- 'turned' < *neya-* 'to turn, to send'	2x		
paršant- 'broken' < *parš-* 'to break, shatter'	1x		
patalḫant- 'fettered' < *patalḫai-* 'to fetter'	1x		
šekkant- 'conscious' < *šakk-* 'to know, to experience'	1x		
šullant- 'hostile' < *šullai-* 'to become arrogant'	3x		
šuwant- 'filled' < *šuwai-* 'to fill'	3x		
taggaliyant- 'enclosed' < *taggaliya-* 'to enclose, to embrace'	1x		
takšulant- 'peaceful' < *takšulai-* 'to agree, to make peace'	1x		
tariyant- 'exhausted' < *tariya-* 'to exert, to get tired'	4x		
taruppant- 'selected' < *tarupp-* 'to collect'	1x		
daššanuwant- 'strengthened' < *daššanu-* 'to make strong'	1x		
tiššant- 'advanced' < *tiššai-* 'to advance(?)'	1x		
unuwant- 'decorated' < *unu-* 'to adorn, to decorate'	7x		
waššant- 'dressed' < *weš(š)-/wašš* to be dressed; to wear'	1x		
zanu(w)ant- 'cooked' < *zanu-* 'to cook'	4x		
zeyant- 'cooked' < *zeya-* 'to cook'	3x		
Sum. NÍG.SI.SÁ+ 'right, fair' for Hitt. *ḫandai-* 'to fix, to arrange' (HZL n. 279, Cotticelli-Kurras 1989, Weeden 2011: 278)			1x
Sum. GAR.RA 'coated with' for Hitt. *hališšiya-* 'to coat with, to enclose' (Weeden 2011: 497, EHS 499 fn.1)		2x	
Total	84x	4x	8x