Voices in stone: Studies in Luwian historical phonology

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CHAPTER 4

The Spelling of Dental Stops in Cuneiform Luwian

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Abstract: This chapter investigates the use of the cuneiform signs TA and DA in the spelling of dental stops in (Kizzuwatna) Cuneiform Luwian. It is shown that depending on the phonetic environment, different spelling patterns are found, indicating a phonetic contrast. Furthermore, it appears that the spelling distributions discovered for Cuneiform Luwian correspond well to those found in the contemporaneous Middle/New Hittite corpus (Kloekhorst 2010; Kloekhorst 2013; Kloekhorst fthc.), allowing us to draw conclusions on their phonetic realisation. Where Cuneiform Luwian *does* differ from Hittite in spelling etymologically similar sequences, the divergences are mostly explainable in phonetically trivial ways. However, there are a few instances where the preponderance of certain spelling patterns challenge our current understanding of the phonological systems of Cuneiform Luwian and Proto-Anatolian. Most notably, Cuneiform Luwian spelling suggests that the intervocalic lenis phoneme was voiceless, providing evidence that the Proto-Anatolian fortis-lenis opposition was one in consonantal length, rather than voice.

4.1 Introduction

When the Hittites took over the Old Babylonian (Akkadian) cursive cuneiform script and started composing their own texts, they adopted its great variety of CV (consonant-vowel) signs. The syllabary does not only differentiate signs according to their vocalic quality (e.g. KA 𒆏, KE/I 𒅀, KU 𒆠) but also according to consonantal voicing (e.g. KA 𒆏 vs. GA 𒄀; KU 𒆠 vs. GU 𒄿). In general, the Old Babylonian scribes used these signs to distinguish different consonants and vowels with great consistency, cf. Von Soden and Röllig 1991: xxx–xxxi. For Hittite, scholars commonly agree that different signs (KA vs. KU) were used in a similar way to mark differences in vo-

calic quality. It is a matter of contention, however, whether the Hittites also used the consonantal variants of signs (KA vs. GA) contrastively. The idea that voiceless and voiced signs in pairs like TU vs. DU and KE/I vs. GE/I are used interchangeably is prompted by the fact that many words are attested with both variants. This is exemplified by Hoffner and Melchert (2008: 16), who write in their authoritative Hittite grammar: "[W]hen writing Hittite, the scribes do not even use contrastively those CV signs with initial stop that distinguish voicing in the Akkadian syllabary: *a-ta-an-zi* and *a-da-an-zi* 'they eat', *ta-ga-a-an* and *da-ga-a-an* 'on the ground', *ad-da-aš* and *at-ta-aš* 'father'."[1]

In recent years, however, this view has been challenged in a series of articles by Kloekhorst (2010; 2013; fthc.), demonstrating that Hittite text compositions from all time periods show a non-random use of the cuneiform signs TA 𒋫 and DA 𒀭. This, Kloekhorst argues, indicates a phonetic and phonological contrast. More specifically, consistent use of the sign TA would mark the presence of a voiceless stop [t(ː)], while the (occasional) use of DA would indicate a voiced [d] or ejective [t(ː)ʔ] stop.[2]

In this chapter, I will investigate whether also the Cuneiform Luwian data show any significant patterns in the use of the signs TA and DA. If Cuneiform Luwian lexemes and morphemes show non-random spelling distributions so that some morphemes/lexemes are spelled consistently with TA and others with DA just as happens in Hittite, then this may be taken to indicate that they sounded different to the scribe. In that case, we can use spelling phenomena to determine the phonetics of the CLuw. dental stops in greater detail.[3]

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[1] See Kloekhorst 2010: 199f. for a general overview of previous literature where similar opinions are expressed.

[2] Note that the choice of sign merely denotes the *quality* of the consonant. Consonantal length, as is well known, is expressed by geminate spellings in certain environments. Thus: <Vt-ta> = [tːa], while <V-ta> marks [ta]/[da], cf. Melchert 1994a: 18.

[3] One might argue that patterns in the use of TA and DA represent mere spelling conventions which do not reflect the actual pronunciation of the writer or speaker. Even if this were the case, however, these conventions come from earlier times when they *did* correspond faithfully to pronunciation. A good example is MoEng. *knight* vs. *night*: both words are pronounced identically, but written with or without <k>. Synchronically, the *k*-spelling of *knight* is certainly an arbitrary convention, but historically, it was pronounced as [kn]

After closely examining the Cuneiform Luwian dental stop spellings, I will compare them to those found in Middle and New Hittite compositions (Middle Script/New Script, henceforth: MS/NS), as these are contemporary to the Luwian textual material. As is well known, the Cuneiform Luwian material is attested much more poorly than Hittite, which means that identification of spelling patterns and comparisons to Hittite are often based on very little material.

4.2 Data

As my corpus, I used Melchert's *Cuneiform Luwian Lexicon* (1993), which is an index containing Luwian words from two distinct sources. On the one hand, it contains words found in Luwian texts written in cuneiform, as collected by Starke (1985); on the other hand, Melchert's lexicon lists Luwian words scattered throughout Hittite texts (often, but not always, marked with a so-called *Glossenkeil*). On the basis of mainly morphosyntactic arguments, Yakubovich (2010: 15–75) has argued extensively that these two groups reflect dialectal variants: the Luwian material within Hittite contexts reflects a Luwian dialect spoken in Hattuša we may call 'Empire Luwian', while material from the Luwian texts proper appears to have been composed elsewhere, mainly in the Kizzuwatna area, and is therefore said to represent a Luwian dialect called 'Kizzuwatna Luwian'.

With this in mind, I have separated the Empire Luwian material from the Kizzuwatna Luwian material, so as not to confound any differences in phonetics and spelling there may exist between these two dialects. Another reason to treat Luwian words from these two contexts in isolation (at least for the time being), is that we do not know to what extent the Luwian material found in Hittite contexts was adapted to Hittite spelling and phonology. In order to avoid as much non-Luwian influence as possible, this chapter

as it is still is in German *Knecht* and Dutch *knecht* (as opposed to MoGerm. *Nacht*, MoDu. *nacht*). I would argue that it is unlikely that we find such etymological spellings in Cuneiform Luwian, especially since there are no signs of cuneiform being used to write Luwian before the Hittites adopted the script. Spelling patterns in the cuneiform material are therefore best taken at face value, unless there are strong indications to do otherwise.

will focus solely on the Kizzuwatna Luwian material. In total, 845 (undamaged, unemended) attestations of the signs TA and DA were extracted from Melchert's lexicon. These have been classified according to their phonetic environment: I distinguish TA and DA used to spell word-initial stops, intervocalic geminate stops, intervocalic singleton stops, post-nasal stops and post-consonantal (non-nasal) stops, cf. Table 4.1.

	TA-/ DA-	**-VTTA-/ -VDDA-**	**-VTA-/ -VDA-**	**-nTA-/ -nDA-**	**-CTA-/ -CDA-**	**Total**
TA	128	179	222	103	66	698
DA	39	15	32	51	10	147
Total	167	194	254	154	76	845
TA%	77%	92%	87%	67%	87%	83%

Table 4.1: Cuneiform ('Kizzuwatna') Luwian TA/DA in Luwian contexts

It is immediately clear that TA is much more common than DA in all environments distinguished here, occurring slightly less than five times as often (698x TA vs. 147x DA ≈ 5 : 1) in total. This overall ratio, however, does not hold for each phonetic environment. The TA : DA ratio varies quite a bit between post-nasal dental stops (2 : 1) and word-initial position (3 : 1) on the one hand, and intervocalic geminates (12 : 1) on the other, for instance. This suggests that the use of TA and DA is not random, but sensitive to the phonetic environment in which they are used. Statistical analysis confirms this idea: the relationship between phonetic environment and spelling appears to be highly significant: $X^2(4, N = 845) = 48.24$, $p < .001$.[4] This conclusion

[4] For this analysis, a chi-square test of independence was used. This statistical test assesses whether two variables (in this case: phonetic environment and spelling with TA or DA) are independent or not. The result of this analysis ($p < .001$) indicates that if we assume that phonetic environment and choice for TA/DA are completely unrelated, the chance of finding the observed distribution in Table 4.1 is lower than 0.1%. It follows that we should reject the hypothesis that the phonetic environment has no bearing on the use of TA/DA, and adopt the alternative hypothesis: the phonetic environment greatly influences the choice for TA/DA in the Cuneiform Luwian material. After removing two texts with an exceptional

supports the idea that spelling variation in Cuneiform Luwian reflects underlying phonetic differences, at least to a certain degree.

In the following sections, each of the environments will be treated in turn to see if we can find any clear spelling patterns. Assuming that these are indicative of a phonetic contrast, I will try to uncover the phonetic values of the dental stop underlying these patterns. I will start with the intervocalic geminates, as the distribution of TA vs. DA appears to be most skewed in this environment.

4.3 Intervocalic geminates (*-Vt-ta-/-Vd-da-*)

As is well known, geminate spelling in Cuneiform Luwian marks a fortis stop, representing the regular reflex of PIE **t*. It is also used to spell the result of Čop's Law (Čop 1970, Kloekhorst 2006/2008), a sound law describing how original lenis dental stops (< PIE **d*$^{(h)}$) were fortited in pre-Proto-Luwic.[5]

At first sight, fortis stops in Cuneiform Luwian appear to be written in all three theoretically possible different ways: some morphemes/lexemes are spelled consistently with the sign TA; others are spelled with the signs TA and DA alternating; lastly, there is also a handful of items spelled consist-

distribution of TA and DA spellings (KUB 25.39 and KBo 29.38 [23 attestations in total], cf. Sections 4.3 and 4.5), the relation between environment and spelling is found to be even more significant ($X^2 = 53.14$). Pairwise analysis on the remaining 821 attestations using the Bonferroni-adjusted *p*-value of .005 confirms that the most significant differences are found 1. between intervocalic geminates and postnasal stops ($X^2 = 36.00$, $p < .001$); 2. intervocalic singletons and postnasal stops ($X^2 = 24.91$, $p < .001$); 3. between intervocalic geminates and word-initial stops ($X^2 = 17.22$, $p < .001$).

[5] It is still debated whether the result of Čop's Law merged with the inherited fortis stops (Kloekhorst 2006/2008: 133) or remained phonetically distinct (thus, e.g., Melchert 1994a: 20 and Rieken 2010b: 305). Orthography could help us decide in this matter: if the result of Čop's Law is spelled differently from inherited fortis stops (< PIE **t*), then it becomes attractive to think that these two elements were also distinct phonetically. If they are spelled identically, however, the phonetic difference between the two may not have been very substantial. Unfortunately, the dataset at hand does not allow us to make any conclusions regarding this discussion: there do not seem to be clear results of Čop's Law that are spelled with TA or DA. Thus, we cannot decide whether they are spelled identically to inherited fortis stops or not.

ently with the sign DA. The most common items (3 attestations or more) are given below, cf. Table 4.2.

Spelling	Lemma	TA	DA
TA only	*-ttari*/*-ttaru* (3sg.pres./imp.med.-pass.)	10	-
	paratta- 'impurity' (vel sim.)	4	-
	muḫattara- '?'	3	-
	-attar(/*-attn-*) (abstract suffix)	3	-
TA/DA	=*tta* (sentence-initial particle)	65	2
	-tta (3sg.pret.act.)	55	7
	ḫatta° 'to chop, (to) hoe'[1]	13	1
DA only	*paddaliia-* 'carry off' (vel sim.)	-	3

[1] For ease of reading, I have included the spellings of derived forms in these counts. Thus, the entry *ḫatta*° includes CLuw. *ḫatta-* (3/0) 'violent blow', *ḫattašt*(*a*)*r*(*i*)- (2/0) 'violence, terror', *ḫattai*(*a*/*i*)- (2/1) 'violent', ^{GIŠ}*ḫattara-* (4/0) 'hoe' (vel sim.) and *ḫattari*(*ia*)- (2/0) 'to hoe' (vel sim.).

Table 4.2: Spelling of Cuneiform Luwian intervocalic geminate dental stops

It is immediately clear that DA-spellings are very rare in the spelling of intervocalic geminates. Furthermore, a closer look at the group of items spelled with alternating TA/DA reveals that several of their DA-spellings are unlikely to be straightforwardly representative for the CLuw. spelling of the result of PIE **-t-*.

In this group of alternating TA/DA spellings, we will first focus on the 7 DA-spellings used to write the fortis verbal ending *-tta* (3sg.pret.act.; < PIE **-to*). It turns out that three of these stem from the same text: KUB 25.39 (NS, CTH 773: "Song of Ištanuwa").[6] The same text also contains one of the two DA-attestations of the particle =*tta* as well as the single DA-form of *ḫattaia*/*i-*

[6] These are: *ḫu-u-i-ia-ad-da* 'he ran' (KUB 25.39 iv 8), *u-up-pa-ad-da* 'he brought' (KUB 25.39 iv 18) and *ua-ú-ua-li-pa-ad-da* 'he wrapped' (KUB 25.39 iv 1). It has been proposed that the Songs from Ištanuwa (CTH 773) were composed in a special dialect of Luwian,

(2/1) 'violent'. Since it contains so many unusually spelled forms, I regard KUB 25.39 as not representative of the spelling practice of the overall corpus and argue that we can safely remove it from consideration for now.[7]

Apart from the three remarkable DA-spellings in KUB 25.39, there is not much evidence for DA-spellings in Cuneiform Luwian geminates. Most of them are overshadowed in frequency by TA-spellings, and the few items that do show consistent DA-spelling are all so rare, that their spelling with 'consistent' DA may well be due to chance (the only one attested more than three times is CLuw. *paddaliia-* [0/3] 'to carry off'). I do not see a reason to assume a different phonetic realisation based on these DA-spellings. In conclusion, Cuneiform Luwian intervocalic geminates are in principle spelled with consistent TA, which is the regular way to write the result of PIE **t*.[8]

4.3.1 Comparison with Hittite and phonetic interpretation

In Hittite texts written in MS/NS, words with geminate spellings fall in one of two categories, as described in Kloekhorst fthc. 2. The first group consists of words that are overwhelmingly spelled with TA, e.g. *ki-it-ta-ri* 'he lies' (over 200x TA; 3x DA; < PIE **ḱéi-to*) and *kat-ta* 'down' (over 700x TA, 0x DA; < PIE **ḱmto*). Like Cuneiform Luwian, these spellings seem to reflect the regular result of PIE **t*. According to Kloekhorst (fthc. 4), this spelling represents a long voiceless stop [t:] in Hittite, which matches the phonetic interpretation assumed in Melchert 1994a: 20. In addition, both Kloekhorst (2008: 21–25) and Melchert (1994a: 62) have argued that this was also the underlying phonetic value of the Proto-Anatolian intervocalic fortis stops. Since the Cuneiform Luwian spelling pattern shows a spelling pattern which is identical to the one found in Hittite (near-consistent TA), it is most likely

as they seem to exhibit several grammatical archaisms (cf. Melchert 2003: 147). However, given that other texts from the "Ištanuwian corpus" (e.g. KUB 35.139, KBo 29.32) do not show any unusual spellings, the unusual spellings in KUB 25.39 are more likely to represent the peculiarities of a particular scribe than a dialectal difference in pronunciation.

[7] In contrast to the other texts, the scribe of KUB 25.39 appears to have spelled *all* verbal endings with the sign DA: 3sg.pret.act. *-(d)da* (4x), 3sg.pres.med.-pass. *-da-ri* (1x), 3pl.pret.act. *-nda* (1x). No variants with TA are found in this text.

[8] The four remaining DA-spellings used to write the 3sg.pret.act. *-tta* may have a principled explanation. The relevant forms are discussed in the Appendix.

that the phonetic interpretation of the Hittite intervocalic fortis stops is also applicable to the CLuw. intervocalic voiceless stops: [tː].[9]

The second spelling pattern found in Hittite (MS/NS) to write geminate dental stops consists of a handful of items that are spelled (near-)exclusively with the sign DA (e.g. *padda-^{i}*/*padd-* 'to dig': 0x TA, 32x DA; *uddar*/*uddan-* 'word': 11x TA, 193x DA). These words all go back to PIE dental stops immediately followed by a laryngeal. Kloekhorst (fthc. 1f.) therefore argues that the laryngeal appears as a glottalic element on the stop, yielding a long postglottalised/ejective stop [tː^{ʔ}].[10] As far as we can tell, Cuneiform Luwian provides no evidence for any such category, although decisive evidence is lacking. We have seen that the consistency of DA spellings in items such as *paddali*(*ia*)- 'to carry off' (0/3) is possibly due to chance. On the other hand, none of the CLuw. words spelled with geminate dental stops is safely reconstructable with a dental stop followed by a laryngeal, so that we cannot know how the scribes would have spelled the reflex of this sequence in cuneiform writing.

To conclude, I think it is safe to argue that the CLuw. data conform well to the Hittite (MS/NS) data: intervocalic geminates (< PIE **t*) are in principle spelled with consistent TA-spelling, marking a long voiceless stop [tː]. The few DA-spellings we find are not likely to write the regular reflex of intervocalic PIE **t* in Cuneiform Luwian and are too rare to justify a second phonetic realisation of these stops.

4.4 Post-nasal position (°*n-ta-*/°*n-da-*)

The most common spelling pattern of Cuneiform Luwian dental stops after *n* shows an alternation of TA and DA, cf. Table 4.3 (only items with 3+ attestations).

The Cuneiform Luwian results of both Proto-Anatolian fortis */t/ (< PIE **t*) and lenis */d/ (< PIE **d$^{(h)}$*) appear to be spelled with TA and DA after *n*,

[9] Consonantal length as a feature of geminate spelled stops in CLuw. does not appear to be universally accepted. Yates (fthc. 35) is uncertain about the phonetic interpretation of CLuw. geminate vs. singleton spellings, while Rieken (2010b: 305) allows for the possibility that the gemination in spelling is graphic.

[10] The stops are phonetically long, given their geminate writing, cf. footnote 2.

Spelling	Lemma	TA	DA
TA only	*-anta* (distributive suffix)	5	-
	=ta (sentence-initial particle)	4	-
	āššiu̯antattar/-atn- 'poverty'	4	-
TA/DA	*-nta* (3pl.pret.act.(iter.))	29	9
	ānta 'inside'	15	22
	zanta 'down'	9	7
	āpparant(a/i)- 'future'	3	1
	īnta '?'	2	1
DA only	*wandaniu̯a-* '?'	-	3

Table 4.3: Spelling of Cuneiform Luwian postnasal dental stops

e.g. *-anta/-anda* (3pl.pret.act. ending < PIE **-nto*), *ānta/ānda* 'inside' (< PIE **-nd$^{(h)}$-*) and *zanta/zanda* 'down' (< PIE **ḱmto*).

There are only a few words spelled with consistent TA or DA in this position. The most frequent are the distributive suffix *-anta* (5x TA, e.g. KUB 35.71 Vs. ii 2 *ta-u̯a-an-ta-an*[*-za* 'eyes' [dat.-loc.pl.]), followed by *=ta* (locatival particle) and *āššiu̯antattar/-attn-* 'poverty' (both 4x TA), and *u̯andaniia-* '?' (3x DA). It is likely that the spelling consistency of most, if not all of these morphemes and lexems is due to chance, and I see no reason to assume a different phonetic realisation of post-nasal dental stops based on these items.

4.4.1 Comparison with Hittite and phonetic interpretation

The most prominent spelling pattern for Cuneiform Luwian dental stops in post-nasal position has a clear correspondence in Middle and New Hittite. Also in MS/NS Hittite, most sequences continuing PIE **-nT-* end up being spelled with alternating TA and DA spellings, e.g. Hitt. *ši-pa-an-ta/da-an-*

zi 'they libate' (3pl.pres.act.) < PIE **spend-* and Hitt. *e-ša-an-ta*/*da* 'they sit down' < PIE **-nt-*, cf. Kloekhorst fthc. 7f.[11] It is clear that in both languages, we are dealing with a merger of all PIE dental stops after **n*. In Hittite, Kloekhorst (fthc. 7f.) argues that the spelling alternation of TA and DA represents a voiced stop.[12] He thus interprets the stops phonologically as short (lenis) stops which were allophonically voiced in this position: /t/ [d]. The voicing was optionally expressed using the sign DA. The same analysis is applicable to the Cuneiform Luwian post-nasal dental stops, and we can likewise interpret them as being phonetically voiced: [nd] /nt/.

One marked difference between Cuneiform Luwian and Hittite involves CLuw. *ānt*/*da* 'inside', cognate to Hitt. *anda* 'id.'. Hittite *anda* is spelled almost exclusively with DA (Kloekhorst fthc. 7 notes more than 2400 times spellings with DA and only 2 with TA). This spelling pattern is completely unique, as there are no other commonly attested words showing consistent DA-spelling. Kloekhorst (fthc. 7) has argued that the consistent DA-spellings of this word mark the presence of a glottalised stop [t^{ʔ}], showing that PIE **-nT-* (> Hitt. [nd]) yielded something that was phonetically different from PIE **-nTH-* (> Hitt. [nt^{ʔ}]). Its Luwian counterpart *ānt*/*da* (18x *ānta* ~ 22x *ānda*), on the other hand, behaves no different from most other items containing *-nT-*. This indicates that the phonetics of CLuw. *ānt*/*da* were not any different from those of the other combinations of *-n-* + dental stop, and that the distinction between PIE **-nT-* and **-nTH-* was lost in the prehistory of Luwian. Both are spelled in exactly the same way and seem to have merged in a voiced stop [nda], whose voiced character was optionally expressed using the sign DA.

Another difference between Hittite and Cuneiform Luwian is that the Hittite data contains a group of post-nasal dental stops which are spelled consistently with TA and, according to Kloekhorst's (fthc.) interpretation

[11] In OS (Old Script) texts, the reflex of PIE **-nd-* is kept distinct from that of PIE **-nt-* and **-nd^{h}-* (Kloekhorst 2013: 131–139). The former are spelled with consistent TA: *ši-pa-an-ta-an-zi*, while the latter are alternatingly spelled with TA and DA. This distinction is given up, however, in the post-OH period.

[12] Voicing of post-nasal stops is typologically trivial and well-attested, cf. Kümmel 2007: 53f. listing attested cases in Indic, Iranian, Armenian, Middle Greek and Uralic etc. See also Section 3.4.1 for the Hieroglyphic Luwian data.

of Hittite cuneiform spelling, should represent a voiceless dental stop: [nt], e.g. Hitt. *ku-(e-)en-ta* 'he killed' (3sg.pret.act.; never **ku-(e-)en-da*). According to Kloekhorst, this spelling represents the expected 3sg.pret.act. ending [-ta] found after stems ending in a voiceless consonant. From there it spread to nasal-final stems such as *kuen-* as well, creating new instances of [nt] through analogy. Cuneiform Luwian does not seem to provide any evidence for such a class, although this may be due to the fragmentary nature of the material.[13]

4.5 Intervocalic singletons (°*V-ta-*/°*V-da-*)

In Kizzuwatna Cuneiform Luwian, the spelling of intervocalic short stops (singletons) shows a very strong preference for TA (87%) over DA (13%). We can distinguish two groups: morphemes/lexemes written with TA only and those which are spelled with TA and DA alternating. Examples attested four times or more are listed below, cf. Table 4.4. There are no items spelled exclusively with the sign DA that are attested more than twice.

Most Kizzuwatna Cuneiform Luwian words and lexemes with an inherited lenis dental stop appear to be spelled with the sign TA. This applies not only to original lenis stops (< PIE $*d^{(h)}$), as in *pāt̲a-* 'foot' (7x TA) < PIE **pod̲-*, but also to original fortis stops (< PIE **t*) which have been lenited, as in *mallit̲-* (5x TA) 'honey' (< PIE **mélit̲-*).[14]

Similarly to the geminates, the singletons show several spellings with the sign DA that appear to be found in a few texts only. We have already seen KUB 25.39, which does not only show unusual DA-spellings for intervocalic geminates (see Section 4.3 above), but appears to do so for the lenited verbal endings of the medio-passive: *ḫa-a-aš-ši-da-ri* '?' (3sg.pres.med.-pass.; iv 4) and *ú-u̯i*$_5$*-ši-da* 'he pressed' (3sg.pret.med.-pass.; iv 12). Another text with several unusual DA-spellings is KBo 29.38, which has one count of the nom.-

[13] There are no comparable cases of a 3sg.pret.act. ending *-tta* attached to a CLuw. verbal stem in *-n-*.

[14] In pre-Proto-Anatolian, intervocalic long (fortis) stops (< PIE **t*) were shortened (lenited) whenever they were not preceded by a short accented vowel: Pre-PAnat. *[t:] > PAnat. *[t] /V́(...)V_V (cf. Adiego 2001, Section 5.5.1).

Spelling	Lemma	TA	DA
TA only	*tātariy̯amman-* 'curse'	26	-
	ḫīrūn/*ḫīrūt*(*all*(*i*))- '(pertaining to an) oath'	21	-
	-aḫit- (abstract suffix)	12	-
	pāta- 'foot'	7	-
	tītīt- 'pupil of the eye'	5	-
	=ta (sentence-initial particle)	4	-
	mallit(*all*(*i*))- 'honey'	4	-
TA/DA	*=ata* (nom.-acc.sg.n. + nom./acc.pl.)	49	2
	-ta (3sg.pret.act./med.-pass.)	33	7
	^{d}*Tiu̯at-*; *tiu̯atani*(*i̯a*)- 'Sun-god; to curse'	8	2
	at-; *at*(*a*)*ri*(*i̯a*)- 'to eat; to feed'	3	6

Table 4.4: Spelling of Cuneiform Luwian intervocalic singleton dental stops

acc.sg.n. particle *=ada* (rev. 12), a pret.3sg.act. form *at-ti-i-da* (rev. 15) and a geminate DA-spelling of the locatival particle *=tta* (rev. 12; cf. Section 4.3). Given that KUB 25.39 and KBo 29.38 contain so many strange spellings, they are probably not representative for the rest of the corpus, and it is therefore probably best to leave them out of consideration for now.[15] The remaining DA-spellings occur in lexemes and morphemes where they are for the most part vastly outnumbered by TA-spellings.[16]

[15] The same text contains $^{[GI]Š}$*da-ru-u̯a-aš-ša* 'wood' (gen.adj.nom.-acc.pl.n.), whose spelling should now also be regarded with suspicion.

[16] A notable exception to this is the verbal root *at-* 'to eat', attested both in the form of the root verb *at-*/*az-* 'to eat' (1/4) and the verbal stem *atri*(*i̯a*)- 'to feed' (2/2). The latter shows plene writing in between the *t* and the *r* in [*a*]-*da-a-ri-it-ta*: (3sg.pret.act., KUB 35.15 ii(!) 2) and is presumably the same verb as HLuw. EDERE-*tà-ri-i-tu* (3sg.imp.act., MALPINAR § 7), spelled with the sign <tà> that is normally found in between vowels. Both indicate that the dental stop was intervocalic here. Nevertheless, we can be sure that at some point in time, the stem must have contained a cluster *-tr-*, as suggested by CLuw. *at-ra-ḫi-ša* 'food, nour-

The few items that are spelled with consistent DA-spelling either have unclear etymologies/analyses, such as *mūdamūdalit-* (0/2) '?' or occur only once (e.g. *ḫa-an-ta-wa-da-ḫi-ša* in KUB 35.123 iv 7). The consistency of their spelling may thus well be due to the scantiness of the material, and I conclude that it is very unlikely that DA was used to spell the regular reflex of the Proto-Anatolian lenis dental stop.

4.5.1 Comparison with Hittite and phonetic interpretation

If we apply Kloekhorst's analysis of Hittite cuneiform spelling to the Cuneiform Luwian data, the latter's group of near-consistent TA-spellings seems to indicate the presence of a voiceless element. This is in clear contrast with etymologically identical data from Hittite, Hieroglyphic Luwian and Lycian, all of which show evidence for a voiced reflex of the Proto-Anatolian lenis dental stop.

Hittite: In Hittite, both TA and DA are used interchangeably to write intervocalic lenis dental stops. In fact, as Kloekhorst 2013: 139 remarks regarding Old Hittite, "there is not a single well attested word that shows an exclusive spelling with TA or with DA." In MS/NS texts, the situation remains unchanged. This spelling pattern, Kloekhorst argues, represents a voiced stop [d].

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ishment' (KUB 35.133 iv 14) and its Hittite cognate *ētriie/a-* 'to feed'. To explain the unusual clustering of DA spellings in the spelling of these stems, we could assume voicing of the stop in this cluster: *[tr] > [dr]. In this way,we can interpret the alternation of TA and DA as the scribes' attempt to write a voiced stop [d], similarly to dental stops after *n* (Section 4.4) and *l* and *r* (Section 4.6). The addition of the thematic suffix **-ie/o-* must have been completed in Proto-Anatolian already, given that both Hittite and Luwian show this formation. In Luwian, the resulting cluster *[driV] was apparently realised as *[dr̥i̯V], with *[r̥] developing regularly into Luwian [ar]. This explains the full vowel we see in the 3sg.pret.act. finite verbal form [*a*]*-da-a-ri-it-ta*. The voiced dental may have been taken over by the base verb *at-* 'to eat', explaining why we find unusually many DA-spellings for this root as well. If this scenario is true, this means that Pre-Luwian must have had both voiceless and voiced short stops in between vowels, indicating a phonemic contrast (*/t/ vs. */d/). This scenario is very speculative and accounts only for these unusual spellings. It does not affect the central point made here, that lenis stops in Cuneiform Luwian are normally spelled with TA rather than DA.

Lycian: Proto-Anatolian intervocalic lenis stops are spelled with the sign <d> in Lycian. In intervocalic position, this sign is generally believed to represent a voiced element. Most likely, however, <d> did not spell a voiced *stop*, given that Lycian expresses this using <ñt>, cf. Lyc. *Ñtarijeusehe* (gen.) ← **Dārayauš*. Rather, it is commonly assumed that Lyc. <d> represented a voiced fricative [ð] (Morpurgo Davies 1982/1983: 252, Hajnal 1995: 15).

Hieroglyphic Luwian: In Hieroglyphic Luwian, the reflexes of lenis stops and lenited fortis stops are spelled with <tà>, cf. Rieken 2008. The sound represented by this sign was in all likelihood voiced, since it alternates with [r] from the end of the ninth century onward ('rhotacism', cf. Melchert 2003: 179f. Goedegebuure 2010: 76–78). It is unlikely, however, that it represented a voiced stop [d], given that this was probably expressed by both <ta> and <tá>, cf. Rieken 2010b: 304, Section 3.4.3. Therefore, it has been proposed that the HLuw. intervocalic lenis obstruent was in fact a voiced fricative [ð], similar to Lycian <d> [ð] (Hajnal 1995: 32[11], Rieken 2010b: 306).

Thus, the Proto-Anatolian lenis dental stop seems to have yielded varying reflexes in its daughter languages. Cuneiform (Kizzuwatna) Luwian appears to have had a voiceless phoneme. Given the reflexes in the other languages mentioned above, a stop [t] or a fricative [θ] are the most plausible options. If it were a fricative, I personally would have expected to find more cases of spellings with the sign ŠA (or perhaps even ZA).[17] For this reason, I will assume in the remainder of this chapter that the consistent TA spellings in Luwian represent voiceless stops, although an interpretation as fricatives is far from impossible.[18] For now, the most important conclusion to

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[17] This would be comparable to Palaic, where the voiceless labiodental fricative /f/ (occurring in loanwords from Hattic) was spelled with the special signs U̯A$_{a}$ and U̯U$_{ú}$, alternating with PA and PU (Melchert 1994a: 195). Of course, this does not necessarily have to be the case for the dental fricative [θ] as well.

[18] If it is a fricative, the change from stops to fricatives can be pushed back to pre-Proto-Luwic, as Hieroglyphic Luwian and Lycian also show evidence for fricativisation (see below). If the TA-spellings in Kizzuwatna Luwian represent a stop, fricativisation must have happened in Lycian and Hieroglyphic Luwian individually.

be drawn is that the Kizzuwatna Luwian reflex of the Proto-Anatolian lenis stops was probably *voiceless*.

In Hittite, we seem to be dealing with voiced stop [d] while Lycian and Hieroglyphic Luwian arguably show a voiced fricative [ð]. Now the question is what we should reconstruct for Proto-Anatolian itself. I see two options. On the one hand, we can reconstruct a Proto-Anatolian voiceless short stop *[t], which was retained as such in Cuneiform Luwian. In that case, Hittite, Lycian and Hieroglyphic Luwian must have independently undergone voicing in intervocalic position: [t] > [d] (followed by fricativisation in Lycian and Hieroglyphic Luwian: *[d] > [ð]). Alternatively, we may reconstruct a voiced stop *[d] in Proto-Anatolian and assume that Hittite, Lycian and Hieroglyphic Luwian kept the original voicing while Cuneiform Luwian underwent devoicing from *[d] to [t] in intervocalic position.

I would argue that the first scenario is preferable, given the trivial character of intervocalic voicing and the awkwardness of devoicing in this position. As a consequence, I believe that the Proto-Anatolian (and, therefore, also the Proto-Luwic) lenis stop must be reconstructed as short and voiceless */t/ *[t], and that it only developed into a voiced stop in Hittite and a voiced fricative in Lycian and (presumably) Hieroglyphic Luwian. The resulting picture is that the Proto-Anatolian fortis stops were phonologically distinct only in length from their lenis counterparts: fortis /tː/ [tː] vs. lenis /t/ [t]. Thus, the Cuneiform Luwian consistent TA-spellings support a Proto-Anatolian phonological distinction in consonantal length (treated most recently in Kloekhorst 2016a: 223–226), and argue against models which take voicing as the phonologically distinguishing feature between fortis and lenis stops (such as Kimball 1999: 46 and Melchert 1994a: 53).

To conclude, the Cuneiform Luwian spelling of intervocalic lenis dental stops differs strongly from those found in Hittite. In Hittite, they are spelled with both TA/DA from Old Hittite onward, suggesting a voiced stop [d]. Cuneiform Luwian, on the other hand, shows near-consistent TA spelling, which strongly suggests the presence of a voiceless stop [t].

4.6 Post-consonantal position (°*C-ta-*/°*C-da-*)

In Cuneiform Luwian, there is only data for dental stops after *n* (see Section 4.4), *š*, *ḫ*, *r* and *l*. I have not been able to find examples of dental stops after *k*, *p* or *m* in the Kizzuwatna corpus. The forms we have are distributed according to the consonants preceding them in the following way (Table 4.5).

	š	*ḫ*	*r*	*l*
TA	40x	1x	18x	7x
DA	2x	0x	5x	3x
TA%	95%	100%	78%	70%

Table 4.5: CLuw. TA/DA distributed across preceding consonants

4.6.1 Comparison with Hittite and phonetic interpretation

The paucity of good attestations necessarily renders any conclusion about spelling *patterns* rather uncertain. Nevertheless, we can clearly see that after voiceless *š* (and *ḫ*), TA is much more common than DA.[19]. Also, DA occurs more frequently after the voiced consonants *r* and *l*, although not to the same degree as in post-nasal position.

For both the Old Hittite and Middle/New Hittite corpora, Kloekhorst (fthc. 8) notes that "we virtually only find the sign TA following *ḫ*, *k*, *p* and *š*." He concludes that this spelling indicates that in this position, dental stops were phonetically voiceless and non-ejective. In position after *r* and probably also after *l*, Hittite Middle and New Script texts show an alternation of TA and DA, indicating, according to Kloekhorst, that the dental stop following it was voiced, regardless of its original quality as fortis or lenis. In this respect, Hittite dental obstruents after *r* and *l* behave similarly to those following *n*.

[19] The only CLuw. DA-spellings after *š* are the verbal form *da-aš-da-a-u-i* '?' (1sg.pres.act.) and *az-za-aš-da* 'you/he ate'.

Despite the poor attestation of the CLuw. material, it nevertheless shows spelling patterns that are nearly similar to those observed in Hittite: we find a similar predominance of TA after voiceless consonants, suggesting a phonetic interpretation of [t], and an alternation of TA and DA after *r* and *l*, which may indicate a voiced reflex in this position: [rd] and [ld].

4.7 Word-initial position (*#ta/da-*)

Cuneiform Luwian data involving word-initial stops are difficult to analyse, as the morphemes and lexemes in question lack convincing etymologies in most cases. There seem to be two main groups: words that are spelled consistently with TA, and words that are spelled with alternating TA and DA. The relevant data (3+ attestations) are listed below, cf. Table 4.6. There are no morphemes or lexemes spelled consistently with DA that are attested more than twice.

The few etymologisable items in the TA/DA-spelled group, even though they are poorly attested, suggest that all PIE dental stops, whatever their source, merged into one phoneme that could be spelled with TA and DA: CLuw. *t/dāru(š)-* (3/4) 'statue; wood' < PIE **dóru-*; CLuw. *t/dā-* (2/2) 'to step' < PIE **(s)teh₂-*. CLuw. *t/dāu̯i-* (7/10) 'eye' and CLuw. *t/dāin-* (8/5) 'oil' are also spelled with both word-initial TA and DA. Although their connection to their Hittite cognates *šākuu̯a-* 'eye' and *šākan-/šakn-* 'oil' is difficult in its formal details, it seems that these two stems synchronically had the same phonetic anlaut as words starting with inherited dental stops.[20]

It is unclear what the origin of the words spelled with consistent TA might have been, as they lack good etymologies.[21] Whatever the origin of

[20] Also CLuw. *t/dāti-* 'father' and its derivatives are spelled with both TA and DA, following the same pattern as the inherited words. Their HLuw. counterpart *tá-ti-* 'father' (+ derivatives) stands out for being practically the only word that is spelled with word-initial <tá> (72x), while words from all other sources are almost universally spelled with initial <ta>, cf. Section 3.3.3. It thus seems that HLuw. *tá-ti-*'s unique position is not reflected in the CLuw. data, which rather suggests that the first consonant of CLuw. *tāti-* was homophonous to those of the inherited stock of words with a word-initial dental stop.

[21] CLuw. *tappaš-* (2/0) 'heaven' (< PIE **neb^{h}o/es-*) is attested too poorly to conclude anything about the consistency of its spelling. CLuw. *talupp(i)-* 'clod (of earth)' has, to my mind

Spelling	Lemma	TA	DA
TA only	*taparu-* '?' (something evil)	21	-
	talupp(i)- 'clod (of earth)'	9	-
	tapar- 'to rule, govern'	9	-
	tapāl- '?'	6	-
	tāpa(n)- '?'	5	-
	talku- '?'	3	-
TA/DA	*tātariia̯mman-* 'curse'	18	6
	tāt(i(a/i))- 'father(ly)'	14	2
	tāu(i)- 'eye'	7	10
	tāin(i(a/i))- 'oil(y)'	8	5
	tāru(š)- 'statue; wood'	3	4
	tā- 'to step'	2	2
	tāu̯an(i)- 'stalk, stem'(?)	3	1
	tarāu̯i(i̯a)- 'hand over'	1	2

Table 4.6: Spelling of Cuneiform Luwian word-initial dental stops

this class of words, there are no indications that consistent TA-spelling was employed to spell inherited word-initial dental stops.

There are no well-attested words which are consistently spelled with DA, apart from a few dis and hapax legomena. The absence of concurrent TA-spellings might therefore well be due to chance.[22]

unconvincingly, been connected to Hitt. *tarupp-*/*talupp-*^{zi} 'to gather, unite' and Gr. τολύπη 'ball of wool' (see Melchert 1998 for a discussion).

[22] Even if the word *dakkui-* (1x DA) truly means 'dark' and is cognate to Hittite *dankui-* 'id.', it is found in a text containing many other unexpected DA-spellings (KUB 25.39, cf. Section 4.3) and it is therefore best left out of consideration.

4.7.1 Comparison with Hittite and phonetic interpretation

The Hittite spelling of word-initial stops is treated in detail in Kloekhorst 2010: 202–209 and the Middle/New Script spelling specifically in Kloekhorst fthc. 13. In Old Hittite text compositions, we find two distinct spelling patterns for words with an IE etymology. Nearly all words continuing PIE word-initial dental stops are spelled consistently with TA. Kloekhorst (2010: 204) has argued that this spelling pattern represents a word-initial voiceless stop [t-]. There are two words with IE etymologies that do not follow this pattern, however: the verbal stems *dai-^{i}/ti-* 'to put' and *dā-^{i}/d-* 'to take', which are consistently spelled with DA in forms where their initial dental stop is followed by the vowel *a*. On etymological grounds—both stems starting with a combination of a dental stop and a PIE laryngeal—Kloekhorst (fthc. 4) argues that this spelling indicates the presence of a postglottalised stop [t^{ʔ}].

In MS/NS texts, this situation has changed: nearly all words (including those continuing PIE dental stops) are spelled with alternating TA and DA, such as Hittite *ta*/*da-ma-a-iš* 'other' (nom.sg.c.) and *ta*/*da-lu-ga-uš* 'long' (acc.pl.c.). Kloekhorst (l.c.) argues that the alternation of TA/DA spellings represents a voiced stop [d], and that word-initial voicing must have occurred somewhere in between Old Hittite and Middle and New Hittite. The consistent DA-spellings in Hitt. *dai-^{i}/ti-* 'to put' and *dā-^{i}/d-* 'to take' seem to persist in Middle and New Hittite text compositions. From this, Kloekhorst (fthc. 13) concludes that the Old Hittite postglottalised stop [t^{ʔ}] was maintained in Middle/New Hittite.

The Cuneiform Luwian situation corresponds well to the Hittite data (MS/NS): in both languages, inherited word-initial dental stops seem to have merged and are spelled with both TA and DA (cf. Table 4.6). If we apply Kloekhorst's phonetic interpretation of Hittite to Luwian, this seems to indicate the presence of a voiced stop [d-]. This conclusion, however, is at odds with the Old Hittite (see above), Lycian (Van den Hout 1995: 133) and Hieroglyphic Luwian (Rieken 2010b: 303, Section 3.4.2) material, which all suggest that inherited PIE word-initial dental stops in these languages ended up as voiceless [t-]. It thus appears that Cuneiform Luwian underwent word-initial voicing from *[t-] to [d-], possibly as part of a joint development with Hittite.

Unlike Middle/New Hittite, Cuneiform Luwian does not seem to have a special group of words spelled consistently with DA in word-initial position. As mentioned above, consistent word-initial DA-spelling in Hittite is found in only two verbal stems: Hitt. *dai-^{i}/ti-* 'to put' and Hitt. *dā-^{i}/d-* 'to take'. It is noteworthy that the CLuw. cognate of the latter is the verb CLuw. *lā-* 'id.', which is surprisingly spelled with *l-*. It is tempting to assume with Norbruis (in prep.[b]) that PIE **TH-* developed into CLuw. *l-* through regular sound change. If this is true, the absence of a class of well-attested, consistently DA-spelled words in Cuneiform Luwian vis-à-vis Hittite would be perfectly regular and expected.

Another divergence from Hittite is the existence of a group of words that are consistently spelled with TA. This spelling pattern seems to imply a voiceless [t-], suggesting that Luwian, as opposed to Hittite, acquired a phonetic contrast in word-initial position between stops which are written with consistent TA (presumably [t-]) and those written with alternating TA and DA (presumably [d-]). The origin of this new group of words spelled consistently with TA is unfortunately quite uncertain.

4.8 Conclusion

In Table 4.7 below, I have summarised all major Cuneiform Luwian spelling patterns we have seen in the sections above, together with those observed in Hittite. In word-initial and post-nasal position, inherited stops are usually spelled with both TA and DA, while in intervocalic position, inherited long and short stops are written with TA. In addition, post-consonantal dental stops appear to be spelled with TA after voiceless consonants, and with an alternation of TA/DA seems to be used after voiced consonants, although there is only very little data.

Environment	Spelling	Hittite (MS/NS)	Cuneiform Luwian	Phonetic interpret.
Word-initial	TA only	-	✓[1]	[t]
	TA/DA	✓(PIE **T*)	✓(PIE **T*)	[d]
	DA only	✓(PIE **TH*-)	-	[t^{ʔ}]
Intervocalic geminates	TA only	✓(PIE **t*)	✓(PIE **t*)	[tː]
	TA/DA	-	-	n.a.
	DA only	✓(PIE **TH*)	-	[tː^{ʔ}]
Intervocalic singletons	TA only	-	✓(PIE **d*$^{(h)}$)	[t]
	TA/DA	✓(PIE **d*$^{(h)}$)	-	[d]
	DA only	-	-	n.a.
After *n*	TA only	✓[2]	-	[t]
	TA/DA	✓(PIE **nT*)	✓(PIE **nT*)	[d]
	DA only	✓(PIE **nTH*)	-	[t^{ʔ}]
After *p, š, ḫ*	TA only	✓	✓	[t]
	TA/DA	-	-	n.a.
	DA only	-	-	n.a.
After *l, r*	TA only	-	-	n.a.
	TA/DA	✓	✓?	[d]
	DA only	-	-	n.a.

[1] Possibly secondary.
[2] Analogical.

Table 4.7: Summary

Comparing Cuneiform Luwian with Hittite, we can identify three main differences:

- Middle and New Hittite shows consistent DA-spelling for combinations of an inherited dental stop followed by a laryngeal (**TH*). In Cuneiform Luwian, by contrast, post-consonantal laryngeals do not seem to have left any traces on preceding dental stops. This can be seen in word-initial, post-nasal and intervocalic (geminate) position, e.g. CLuw. *ānta*/*ānda* vs. Hittite *anda*.[23] As far as we can tell, inherited combinations of dental stops and a following laryngeal all seem to have merged into one group.
- Cuneiform Luwian has acquired a group of words which are spelled with consistent word-initial TA. None of these has a good etymology, making it hard to see how they entered the language. In Middle/New Hittite, all word-initial dental stops are generally spelled with alternating TA/DA (< PIE **T*-) or consistent DA (< PIE **TH*-).
- Proto-Anatolian intervocalic lenis (short) stops show up as voiced obstruents not only in Hittite, but also in Lycian and Hieroglyphic Luwian. In Cuneiform Luwian, however, they are spelled consistently with TA. I have argued that the Cuneiform Luwian spelling reflects a voiceless stop /t/ [t], which is an archaism with regard to [d] found in Hittite and [ð] found in Lycian and (presumably also) Hieroglyphic Luwian. The main implication of this find is that we should also reconstruct the Proto-Anatolian lenis stop as a voiceless short stop */t/ *[t]. Thereby, the main difference between Proto-Anatolian fortis and lenis stops appears to be one in consonantal length, not voice, providing support for Kloekhorst 2016a: 223–226.

In all other respects, Cuneiform Luwian dental stops preceding *a* seem to be spelled in a similar way to Hittite, and Kloekhorst's interpretation of

[23] As mentioned in Section 4.7, PIE word-initial **TH*- may well have yielded CLuw. *l*- through regular phonetic development. This explains why we do not find any etymologisable items which are spelled with consistent DA, which we would expect to continue PIE **TH*-.

phonetic values behind the Hittite spelling patterns of TA and DA seems applicable to the Cuneiform Luwian data as well. Moreover, neither of the three points of divergence listed here call for improbable assumptions that render the phonetic analysis unlikely. We can account for at least two of them using typologically trivial phonetic developments (voicing of intervocalic stops; $^{*}H > ø \,/T\_V$).

We can thus conclude that the cuneiform signs TA and DA were used to spell Hittite and Luwian dental stops in a similar, non-random way. The close orthographical similarity between Cuneiform Luwian and Hittite for the same etymological and/or phonetic sequences should not surprise us much. The Cuneiform Luwian material transmitted to us was found among the Hittite material in the Ḫattuša archives, often even in the form of extended passages within otherwise Hittite texts. Therefore, most, if not all, of the CLuw. corpus was written by the same scribes who wrote Hittite texts.

The most important consequence of the current analysis for our reconstruction of Proto-Anatolian phonology concerns the main point on which Hittite and CLuw. spelling seem to differ. The spelling of the intervocalic lenis stops in CLuw. with consistent TA clearly suggests the presence of a voiceless element, presumably [t], which is more likely to be an archaism than an innovation (Section 4.5.1). Thus, the Cuneiform Luwian evidence encourages us to reconstruct a Proto-Anatolian length opposition for fortis and lenis stops: fortis /t:/ [t:] vs. lenis /t/ [t]. The effects of voicing we find in the intervocalic stops in Hittite, Lycian and Hieroglyphic Luwian, may well have come about independently.

More research is needed on the spelling of dental stops preceding vowels other than *a* and on other consonant series in general. It remains to be seen whether the spelling patterns and phonetic interpretations analysed here are also found with other stop + vowel combinations.

As a closing note, I would like to return to the Empire Luwian material (362 attestations of TA and DA), which I have left out of consideration for now, since we cannot exclude the influence of Hittite spelling practices for these words (cf. Section 4.2).

I have compared the use of TA and DA in the Empire Luwian material with that in the Kizzuwatna Luwian material (again using a chi-square

test of independence, see Section 4.2), in order to evaluate if there is any difference between the two.[24] The result of this analysis is that the use of TA and DA in Kizzuwatna Luwian words does not differ significantly from that of Empire Luwian words. Ḫattuša scribes apparently used TA and DA to write words from both dialects in a similar way.[25] As we have seen in the preceding discussion, most phonetic environments show the same spelling of TA/DA in Hittite and Luwian, so that any Hittite influence on the Empire Luwian material would remain unnoticed anyway. However, even in spelling the lenis stops—the point where Hittite and Luwian diverge most clearly—Empire Luwian shows the same spelling pattern as Kizzuwatna Luwian: an overwhelming preference for TA spellings (as opposed to the TA/DA alternation commonly found in Hittite). The distributional data for TA and DA in Empire Luwian are presented below, cf. Table 4.8.

	TA-/ DA-	**-VTTA-/ -VDDA-**	**-VTA-/ -VDA-**	**-nTA-/ -nDA-**	**-CTA-/ -CDA-**	**Total**
TA	42	68	103	36	49	298
DA	20	8	9	23	4	64
Total	62	76	112	59	53	362
TA%	68%	89%	92%	61%	92%	82%

Table 4.8: Cuneiform ('Empire') Luwian TA/DA

These data can be interpreted in multiple ways. The fact that the Em-

[24] In all 5 phonetic environments distinguished in this chapter (word-initial stops (p = .17), intervocalic geminates (p = .46), intervocalic singletons (p = .20), post-nasal stops (p = .42) and post-consonantal stops (p = .59)) the p-values are higher than the significance threshold of 0.05. This means that we should maintain our null-hypothesis, which says that TA/DA-spelling and dialectal variation are independent from one another. Scribes writing Empire Luwian did not use TA/DA in a significantly different way, compared to Kizzuwatna scribes.

[25] Note that this does not mean that I reject the dialectal split proposed in Yakubovich 2010. I am merely arguing that the split is not manifested in the spelling of the dental stops using TA and DA.

pire Luwian intervocalic lenis stops seem to follow the Kizzuwatna Luwian spelling pattern rather than the Hittite one may suggest that the 'hittitisation' of Luwian words (even in Hittite contexts) may not have been very far-reaching. This complicated discussion, however, deserves a more extensive treatment elsewhere, including careful investigation of more spelling features of Hittite and Luwian cuneiform.

Appendix: DA-spellings in the 3sg.pret. verbal endings

In the preceding sections, we have seen that both the fortis and lenis variant of the 3sg.pret.act. ending -(*t*)*ta* are mostly spelled with the sign TA. Nevertheless, we find several unusual spellings with the sign DA for these endings as well. Given the small amount of attestations, it is distinctly possible that these DA-spellings represent 'noise' (scribal errors *vel sim.*) and do not represent a special phonetic feature. However, it is remarkable that these DA-spelled variants of these endings are limited to verbal stems of a specific shape. This opens up the possibility that the occurrence of these DA-spellings is structural rather than coincidental, and that there is a more principled explanation behind their use. This appendix will explore this idea.

Geminate DA-spellings in *-dda* (3sg.pret.act.)

In Section 4.3, we have seen that the fortis 3sg.pret.act. verbal ending *-tta* is spelled overwhelmingly with the sign TA: 55x. Nevertheless, there are seven attestations of the same ending spelled with DA. As discussed above, three of these can be considered peculiarities of a certain scribe or text, given that they are found concentrated in one tablet (KUB 25.39) that contains several other unusual DA-spellings. The four remaining attestations of DA in the 3sg.pret.act. ending *-tta* belong to only three lemmata, each having at least one attested variant with TA co-occurring alongside it. First, CLuw. *lā-* 'to take' has 2x *la-a-ad-da* 'he took' (KUB 32.8+5 iii 15, 16), next to 3x *la-at-ta* and 5x *la-a-at-ta*. Secondly, the reduplicated variant of this stem, *lāla-* 'id.',

has one attestation of *la-a-la-ad-da* 'he took' (KUB 35.43 iii 2), next to the TA-spellings [*l*]*a-la-a-at-t*[*a*] (1x, KUB 35.13, 19) and *la-la-at-ta* (1x, KUB 35.43 iii 23). Lastly, the 3sg.pret.act. of the stem *tā-* 'to stand' is spelled once as *da-a-ad-da* 'he stepped' (KUB 35.88 ii 2), occurring next to the morphologically identical form *ta-at-ta* (1x, KUB 35.133 ii 27). It is very well possible that these DA-spellings are simply mistakes and do not mark anything linguistic. Nevertheless, it is noteworthy that these DA-spelled endings are attached to verbal stems which are commonly reconstructed with a final PIE laryngeal on independent grounds: PIE **deh$_3$-* 'to take' and **(s)teh$_2$-* 'to stand', respectively. Therefore, as an alternative to interpreting these DA-spellings as scribal anomalies, I tentatively put forward the possibility that these four instances of *-dda* rather write the result of a specific phonetic development. The PIE laryngeal may have left a trace in the form of a glottalic element on the following dental stop before it disappeared: PIE **VHT* > **VʔT* > **Vˀ T*. In the case of the 3sg.pret.act. ending in particular, the result would then have been a long preglottalised stop [-ˀtː-], which was spelled with DA.

The scribes' choice for the sign DA to represent this long preglottalised stop should not come as a surprise. We may recall (Section 4.3.1) that Hittite has a group words spelled (near-)exclusively with DA, which all continue PIE dental stops in contact with a following laryngeal, e.g. Hitt. *padda-^{i}*/*padd-* 'to dig' < PIE **b^{h}od^{h}h$_2$-*. Kloekhorst (fthc. 1f.) has argued that the spellings with DA mark the presence of an ejective stop [-tːˀ-]. If this analysis is accepted, it provides clear precedence for the use of DA to write glottalic or glottalised consonants.[26]

One obstacle to this scenario is that **VHC* is generally thought to have yielded **V̄C* in Proto-Anatolian already, with compensatory lengthening of the preceding vowel, cf. Melchert 1994a: 67, 69, 73. This is borne out by forms such as PIE **d^{h}eh$_1$-ti* 'he puts' > Lyc. *tadi*. The <d> marks a lenis fricative [ð] which can only be the result of pre-Proto-Anatolian lenition, meaning that a long accented vowel must have preceded it: pre-PAnat. **d^{h}eH-ti* > **dē-ti* > **dē-di* (lenition). We cannot have our cake and eat it too: a PIE laryngeal

[26] The use of DA to represent a glottalic/glottalised dental stop was taken over from Old Babylonian Akkadian, where the sign was used to write the emphatic stop /ṭ/, cf. Kloekhorst 2010: 231–238.

cannot be lost with compensatory lengthening of the preceding vowel *and* simultaneously survive as preglottalisation on the following consonant.

However, we should remember at this point that even though the stem-final laryngeal was lost in preconsonantal position, it may well have been retained longer in intervocalic position, for instance in the 3sg.act. forms of the present (pre-PAnat. **dóʔ-ei*) or preterite (pre-PAnat. **dóʔ-e*); for the endings cf. Melchert 2013: 137 and Kloekhorst 2008: 137). In fact, Kloekhorst (e.g. 2014: 374–376) has argued on independent grounds that traces of old PIE laryngeals can be found in the OS spellings of Hitt. *ḫé-e-a-u-e-eš* 'rains' (nom.pl.) < PIE **$h_2$éih_3-eu-*, Hitt. *ne-(e-)a* 'makes a turn' (3sg.pres.med.-pass.) < PIE **néh$_1$-o* and Hitt. *zé-(e-)a-ri* 'cooks' (3sg.pres.med.-pass.) < **tieh$_1$-o*.

Since traces of intervocalic laryngeals seem to have been preserved in Hittite—and, by extension, also in Proto-Anatolian—it is possible that they were retained in Luwian as well, so that for instance pre-PAnat. **dóʔ-ei* > Luw. [laːʔi].[27] If this is true, Proto-Anatolian must have inherited two allomorphs of the strong (full-grade) stem of PIE laryngeal-final verbal stems. In the case of PIE **deh$_3$-* 'to take', these would be preconsonantal PAnat. **dōʔ-C* next to prevocalic PAnat. **dōʔ-V*. Secondly, Proto-Anatolian may well have seen the anlaut of the weak stem (< PIE **dh$_3$-*) being generalised throughout the paradigm.[28]

Lastly, we know that the inherited 3sg.pret.act. ending **-t*, (preserved in Hitt. *te-e-et* 'he said') would have been lost in Luwian. For this reason, it is commonly assumed that the endings *-tta* en *-ta* we find in Luwian must have been taken from the medio-passive ending, going back to PIE **-to* (Melchert 1994a: 278).[29]

The result, pre-Luwian **lāʔtːa*, shows the combination of a glottal stop followed by a dental stop. I hesitatingly propose here that the glottal stop

[27] This may well be the phonetic realisation behind HLuw. *la-i* (KÖRKÜN obv. § 11) 'he takes', even though this cannot be proven based on the spelling.

[28] This is because both Luwian (*l-*, cf. Section 4.7.1 above) and Hittite (consistent DA-spellings, cf. Section 4.7.1) show the same anlaut throughout the active paradigm, without any differences between the strong stem and the weak stem.

[29] In the case of CLuw. *lātta*, we know that this replacement took place *after* Proto-Anatolian, because the fortis ending is not subjected to Proto-Anatolian lenition (cf. footnote 14).

would eventually be lost in this position as well, but not without leaving its trace as preglottalisation on the dental stop. This may have resulted in a preglottalised voiceless long stop [-ˀtː-], comparable to that found in some pronuncations of Modern English intervocalic voiceless stops (e.g. *letter* as ['lɛʔtɐ], cf. Lodge 2009: 177). The entire process can be summarised as follows, cf. Table 4.9 below.

PIE		**PAnat.**		**Pre-Luwian**		**Luwian**
**dóh$_3$-e*	>>[1]	**d^{ʔ}óʔ-e*	>>[2]	**āʔ-tːa*	>[3]	[laːˀtːa]

[1] The weak stem (< PIE **dh$_3$-*) is generalised to the strong stem.
[2] The ending *-tta* is taken over from the medio-passive, replacing **e*.
[3] Glottalisation of dental stop.

Table 4.9: Development of the *ḫi*-conjugation 3sg.pret.act. form of Pre-PAnat. **doh$_3$-/dh$_3$-* 'to take'

As a result, CLuw. would have had two fortis 3sg.pret.act. endings: [-tːa] and [-ˀtːa]. Since the laryngeal conditioning the use of TA or DA had disappeared, speakers presumably had no means of synchronically motivating or predicting the use of either. This means that the two endings would not only have been phonetically distinct, but also phonemically. It thus appears that Cuneiform Luwian synchronically may have had a marginal phonological opposition between /tː/ and /ˀtː/.

One final question is how we should interpret the TA/DA-alternating spellings for preglottalised [-ˀtːa]. One interpretation is that the scribes used both TA and DA to refer to this ending, feeling that neither of them was perfectly suited to represent the underlying phonetics. Alternatively, we may speculate that the four spellings with DA (*la-a-ad-da*) represent the original preglottalised variant [-ˀtːa], and that it was gradually being replaced by its much more common variant [-tːa] (spelled with consistent TA), yielding *la-a-at-ta*. Unfortunately, we cannot test this hypothesis, as none of the texts containing these four DA-spelled geminates are demonstrably older than those containing TA-spelled ones.[30]

[30] All DA-spelled geminates belong to the New Hittite corpus, according to *HetKonk*

Singleton DA-spellings in *-da* (3sg.pret.act.)

We now enter even more speculative territory by taking a look at the very few DA-spellings used for the *lenis* 3sg.pret.act./med.-pass. ending *-ta*. As we have seen (Section 4.5), this ending is spelled 33x with TA, and 7x with DA. Two of these seven DA-spellings are found in KUB 25.39, a text containing other peculiar DA-spellings which I have argued (Section 4.3) are not representative for the whole corpus. The five remaining DA-spellings, however, belonging to one verbal root only: CLuw. *ā-/āi̯a-* 'to do', which is commonly connected to PIE **Hieh$_1$-* 'to throw' (Rix et al. 2001: s.v., Melchert 1994a: 75). Four of them occur within the same text (*a-da*: KBo 13.260 ii 16, 18, 20, 22); the fifth one (*a-a-da*: KBo 29.27 i 4) is found in a text which otherwise does not contain any unusual uses of TA/DA. Note that we also find spellings with TA for the same grammatical form: *a-ta* and *a-a-ta*. (Melchert 1993: s.v. '*ā-/āya-*'). If these DA-spellings do not represent general noise or the peculiarities of a certain scribe, one could explain the presence of these rare DA-spellings for 3sg.pret. *-da* in a similar way to the fortis/geminate *-dda* above. At some point, the original 3sg.pret.act. form must have undergone the change from PIE **VHC* to PAnat. **V̄C* described above: PIE **Hieh$_1$-t* > PAnat. **ʔiē-t*.[31] The 3rd person *plural* on the other hand, could have possibly preserved the laryngeal, since it was there in intervocalic position: **Hih$_1$-énti* > pre-PAnat. **ʔiʔ-énti*. In order to regularise the paradigm, the resulting stem-final laryngeal reflex was introduced into the strong stem, yielding pre-Luwian **ʔiāʔ-*. After the introduction of the ending *-ta* (< PIE **-to*, see preceding Section), the laryngeal might have been lost in this position, except for a trace of preglottalisation on the following dental stop. Thus, one could presuppose the following scenario, cf. Table 4.10.

This process would have led to the creation of a new, short preglottalised stop [ˀt]. Again, since the laryngeal conditioning the allomorph [-ˀta] <-da> had disappeared, speakers must have been unable to synchronically determine its use on the basis of its phonetic surroundings. Thus, Cuneiform Luwian would seem to have acquired a marginal phonemic distinction

(Košak 2002ff.).

[31] For the word-initial glottal stop (< PIE **H-*), cf. Simon 2010. The argument made here is not affected by its presence.

PIE		**PAnat.**		**pre-Luw.**		**CLuw.**
**Hieh$_1$-t*	>[1]	**ʔiē-t*	>>[2]	**ʔiāʔ-ta*	>[3]	[ʔ(a)jaːˀta]

[1] PIE **VHC* > **V̄C*.

[2] Analogical reintroduction of **ʔ* (< PIE **H*) from verbal forms where it was retained intervocalically, e.g. 3pl.pres.act. PIE **Hih$_1$-énti* > pre-PAnat. **ʔiʔ-énti*. In addition, the 3sg.pret.act. ending **-t* is replaced by the lenis ending **-da* < PIE **-to* (3sg.pret.med.).

[3] Glottalisation of dental stop.

Table 4.10: Development of CLuw. *ā-/ā̯i̯a-* 'to do'

between short stops with and without glottalisation: /t/ vs. /ˀt/. The scribes would have used DA in their attempts to express the latter in the 3sg.pret. verbal forms of *a-(a-)t/da*.

It is needless to say that this scenario is highly speculative. While it is true that the shape of the Luwian root (if it is of PIE stock) suggests the presence of a root-final PIE laryngeal, we only have very few examples of this verb, and the etymological connection between CLuw. *ā-/ā̯i̯a-* 'to do' and PIE **Hieh$_1$-* 'to throw' is not immediately obvious from a semantic or formal point of view. The preceding is therefore given here only for consideration, and I will not insist on the presence of a CLuw. phoneme /ˀt/.

Summary

To conclude, I have argued here that there is little but suggestive evidence that Cuneiform Luwian may have distinguished not only between long and short dental stops, but also between stops with and without preglottalisation. An overview is presented in Table 4.11 below.

Phonological value	Phonetic value per environment				
	Word-initial	Intervocalic	After *n*	After *p, š, ḫ*	After *l, r*
/tː/	([t-])[1]	[-tː-]	-	[-Ct-]	-
/t/	[d-]	[-t-]	[-nd-]	-	[-Cd-]
/ˀtː/	-	[-ˀtː-]	-	-	-
(/ˀt/	-	[-ˀt-]	-	-	-)

[1] Not inherited and of unknown origin; see Section 4.7.

Table 4.11: Cuneiform Luwian dental stops

A notable difference between glottalised stops in Hittite and Luwian is the order of the stop and the laryngeal: Hittite DA-spellings are triggered by PIE dental stops *followed* by laryngeals (PIE *-*TH*-) and are most likely to represent an ejective stop [tˀ]. Cuneiform Luwian DA-spellings, on the other hand, seem to appear whenever the dental stops were *preceded* by a laryngeal (PIE *-*HT*-), presumably yielding a preglottalised stop [ˀt].[32]

[32] The CLuw. picture with a opposition between long and short preglottalised stops is not paralleled in Hittite, where all evidence for glottalised (ejective) stops can be subsumed under one fortis phoneme: /tːˀ/. Nevertheless, an opposition between long and short glottalised consonants *per se* is not unheard of. Amharic, for instance, displays a phonemic contrast between long and short ejectives (transcribed with *ṭ, p, ṣ* etc.: *wäṭ* 'stew' vs. *wäṭṭ* 'solid, homogenous'; Leslau 1995: 13).