Voices in stone: Studies in Luwian historical phonology

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CHAPTER 3

The Spelling and Phonology of the Dental Stops in Hieroglyphic Luwian

Published in Kadmos *58 (2019): 1–31.*

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Abstract: This chapter investigates the distribution and use of the Hieroglyphic Luwian signs <ta> and <tá>, expanding on and reacting to Rieken 2010. It appears <ta> and <tá> are used contrastively not only in a select subset of texts from the Karkamiš region, but in large parts of the Hieroglyphic Luwian corpus in general. Word-internally, <tá> appears to be used wherever we expect to find a short stop (either voiced or voiceless), while <ta> is used for long (fortis) stops. This suggests that consonantal length was at least a *phonetic* feature in the phonological system underlying Hieroglyphic Luwian.

3.1 Introduction

The Anatolian hieroglyphic syllabary used to write Luwian is infamous for its wide variety of signs having—as far as we know—the same phonetic value. This is illustrated by the sign inventory in Hawkins 2000: 28–34, which lists up to four sign variants purportedly marking the phonetic value [tu], seven in the case of [ta] and no less than eight for [sa]. Some of these variants, such as <tu$_4$>, <sa$_6$>, <sa$_7$> and <sa$_8$>, show up only in a few texts or time periods, so that their opposition to highly frequent signs such as <tu> and <sa> is relevant only in a small number of HLuw. texts. Other variants, however, such as <ta> and <tá>, or <sa> and <sá>, are encountered throughout the HLuw. corpus and clearly belong to the regular syllabary.

Recent research has shown that there are often significant distributions hiding behind what we consider to be allographic sequences. After eliminating a lot of previously assumed allography, we now know that many sign variants actually write distinct phones. Thus, Kloekhorst 2004 demon-

strated that there is a remarkable distribution in the use of the signs <a> and <á>, and argued that the latter writes the reflex of PIE *h_1.[1] In addition, Rieken 2008 convincingly demonstrated that the sign <tà> does not alternate with other signs in the *ta*-series, and that it marks the HLuw. reflex of the PAnat. lenis stop */d/. Two years later, Rieken and Yakubovich (2010) argued that <ta$_4$> and <ta$_5$> represent lateral sounds rather than dental stops, proposing the transcriptional values <la/i> and <lá/í>, respectively. Lastly, Rieken (2010b) treated the use of the signs <ta> and <tá> in the HLuw. texts from Karkamiš. Since her 2008 article on <tà>, it was believed that <ta> and <tá> were used interchangeably to write the HLuw. fortis dental stop /t/ (< PIE **t*), and indeed, many words can be found spelled with both <ta> and <tá>, e.g. KARKAMIŠ A6 § 18 *á-sa-tá* vs. ibid. § 12 *á-sa-ta*$^{-a}$, both meaning 'he was'. However, Rieken noted that there was a non-random distribution between <ta> and <tá>, indicating a phonetic contrast. It is this last study that the present chapter reacts to and aims to refine.

3.2 Rieken's account of HLuw. <ta> and <tá>

Rieken's (2010b) study on the use of HLuw. <ta> (L 100) and <tá>  (L 29) sets off with the observation that the use of <ta> and <tá> is non-randomly distributed. While it is true that some lexemes are found spelled with both <ta> and <tá>, there appear to be many items which are clearly spelled with <ta> only. More specifically, Rieken has shown that consistent spelling with the sign <ta> is found 1.) in word-initial position, where it represents the result of a merger of all inherited dental stops (< PIE **t*, **d*, **d^h*), and 2.) in intervocalic position, for dental stops which correspond to fortis stops in the other Anatolian languages (< PIE **t*). On the basis of this evidence, Rieken argues that <ta> spells out a voiceless stop [t(:)] in these environments.

Rieken also shows that we find an alternation between <ta> and <tá> in three environments. Most prominently, it is found to spell the second member of consonant clusters (having *n* and *s* as their first members), as found in, for instance, HLuw. *á-sa-ta*/*tá* 'he was' /ʔasta/. Rieken argues that both

[1] The discussion has been continued in Melchert 2010, Simon 2013a and Burgin 2016.

<ta> and <tá> are also found to spell the result of Čop's Law, a pre-Proto-Luwic sound change which fortited original intervocalic lenis stops (< PIE $*d^{(h)}$): see Section 3.5.1. Lastly, we find both <ta> and <tá> to spell the initial dental stops of words which have voiced alveolar consonants elsewhere in the word (< **nt*, **d*, **r*), such as *ta*/*tá-ru-sa* 'statue' (< PIE **doru-*). All in all, Rieken concludes that the sign <tá> was used to spell a voiced stop [d(ː)]. Its use would have been optional, and scribes could also use the sign <ta> to represent this phonetic value.

Thus, Rieken arrives at a system where <ta> writes either a voiceless or voiced stop [t(ː)/d(ː)], while <tá> is reserved for a voiced stop [d(ː)], as summarised in Table 3.1.[2]

Phonetic value	**Spelling**	**Source**
[t(ː)]	<ta>	1.) Intervocalic fortis dental stops.
		2.) Word-initial dental stops.
[d(ː)]	<ta>/<tá>	1.) Second part of a consonant cluster (i.c. after *n* or *s*).
		2.) Result of Čop's Law.
		3.) Assimilation to a voiced alveolar consonant (< **nt*, **d*, **r*) elsewhere in the word.
[ð]	<tà>	Intervocalic lenis dental stops.

Table 3.1: Summary of Rieken's (2010b) analysis of HLuw. <ta> and <tá>

Rieken's 2010b observation that the use of <ta> and <tá> is not completely random is an important step forward in the study of Luwian orthography, and her paper contains several interesting insights. Nevertheless, I believe her data and analysis can be improved on several points.

[2] Rieken attributes the phonetic value [ð] to <tà> based on a comparison with Lycian, cf. Section 3.4.3.

- The corpus used by Rieken for investigating the use of <ta> and <tá> is restricted both geographically and chronologically: it contains only texts from Karkamiš composed in 1100–850 BCE. Texts from other periods and other areas are not subjected to a detailed treatment.[3]
- No definitive judgement is passed on the length of these stops, meaning that it is still undecided whether consonantal length was a phonetic or phonological feature in Hieroglyphic Luwian.[4]
- Rieken's (2010b: 304) conclusion that <tá> marks a voiced stop is hard to reconcile with its occurrence after [s]/[ʃ], where voicing of an originally voiceless stop is unlikely.
- The phonological system of Hieroglyphic Luwian is not compared to that of the other Anatolian languages, and its consequences for our reconstruction of Proto-Anatolian are not considered.

Therefore, a new study of the signs <ta> and <tá> on a larger scale seems in order, and its results are presented here. I will first present the data: an

[3] Rieken's reason for focusing on specifically these "classical" texts is that they purportedly exhibit the highest level of scribal competence ("Phase der höchsten Schreibergelehrsamkeit", 2010a: 308). She argues that this is borne out by 1.) a higher degree of consistency in the use of <sà> to denote [ʃ], a conditioned allophone of /s/ (Rieken 2010b), and 2.) the consistent use of 'initial-a-final', a peculiar spelling phenomenon by which <a> is written at the end of words that are otherwise written with initial <a> or <á>. With regard to this final point, one should point out that 'initial-a-final' is also abundantly attested in texts from Tell Ahmar and Aleppo (Burgin 2016: 31f.), so that it cannot be considered a defining feature of the texts composed in Karkamiš. More importantly, one could just as easily contend that the scribal tradition from 1100–850 is less refined than that after 850 BCE, since texts from the latter period differentiate <a> from <á> in a systematic fashion, while those from 1100–850 hardly use <á> in the first place (Burgin 2016: 8). Finally, one may raise the general objection that a scribal tradition that happens to distinguish one sign pair is not necessarily more refined on all accounts. The fact that the Karkamiš texts seem to distinguish <sa> from <sà> in a systematic way does not automatically mean they also distinguish <ta> from <tá>, or any other sign pair.

[4] Rieken (2010b: 306) merely notes that it is thinkable that the stops were geminated. ("Daß mit der Bewahrung der plosiven Artikulationsart wie möglicherweise auch beim stimmlosen Plosiv eine Gemination einherging, ist denkbar."). Also in the case of Čop's Law, she keeps the option open that the resulting geminate spellings we find in the cuneiform script are merely graphic.

overview of the use of <ta> and <tá> in the entire extant HLuw. corpus (Section 3.3). We will see that our extended dataset confirms Rieken's idea that there were multiple non-random spelling patterns involving <ta> and/or <tá>, suggesting a phonetic distinction. My own phonetic analysis of these spelling patterns will follow (Section 3.4), after which I treat a few counterexamples to this distribution in Section 3.5. Lastly, I will summarise and compare the phonetics and phonology of the Hieroglyphic Luwian dental stops to those in the other Anatolian languages, and trace their development into Proto-Anatolian in Section 3.6.

3.3 Data

As my corpus, I have taken all texts published in Hawkins 2000, supplemented by texts from the Bronze Age (Empire period; dated before approximately 1150 BCE) and those which have been discovered after the publication of Hawkins' (2000) corpus.[5] An automated search yields 1325 instances of <ta> (942x) and <tá> (383x) in 192 texts, thus showing that <ta> is more than twice as common as <tá>. The use of <ta> and <tá> does not seem to be determined geographically (i.e. by the place of attestation): plotting the occurrences of different spellings on a map shows no significant geographical patterns with regard to the availability or use of <tá> as opposed to <ta>. Chronologically, however, Rieken's (2010b: 308) observation that there is a clear transition visible from the oldest to the youngest texts, is confirmed. In the Empire period, <ta> is relatively rare when compared to <tá>. In the youngest HLuw. texts, by contrast, this picture is completely turned around, as can be seen in Table 3.2.[6]

[5] The Empire texts are the following: EMİRGAZİ, FRAKTİN, HATİP, KARABEL, KARAKUYU, KINIK, KÖYLÜTOLU-YAYLA, MALKAYA (graffiti), SÜDBURG, TARKONDEMOS (seal), YALBURT. Iron Age texts included in this study but not present in Hawkins' (2000) corpus are: ADANA 1, ALEPPO 4–7, ANCOZ 11–12, ANKARA 2, ARSUZ 1–2, BABYLON 3, BEYKÖY, ÇALAPVERDİ 3, ÇINEKÖY, DÜLÜK BABA TEPESİ, EREĞLİ, GEMEREK, GÜRÇAY, IMAMKULU, ISTANBUL 2, JISR EL HADID 4, KÂHTA 1, KIRŞEHİR, KUŞÇU-BOYACI, LATMOS, PANCARLI, POTOROO, ŞARAGA, TALL ŠṬĪB, TELL AHMAR 6, TELL TAYINAT (seal), YASSIHÖYÜK, YUNUS. Not all of these contain <ta> or <tá>.

[6] Texts whose dating is unclear (e.g. MARAŞ 11) are not taken into account here.

Time period	**<ta>**	**<tá>**	**<ta> %**
Empire period	8	32	21%
1200–1101	3	12	20%
1100–1001	3	22	12%
1000–951	37	28	57%
950–901	55	27	67%
900–851	151	117	56%
850–801	65	26	71%
800–751	123	44	74%
750–701	358	63	85%
700–651	130	7	95%

Table 3.2: Attestations of <ta> and <tá> in Hieroglyphic Luwian. The horizontal line indicates when <ta> overtakes <tá> in terms of frequency.

On the level of individual texts, we can see that the ratios of <ta> vs. <tá> differ significantly. Several texts do not show any opposition between <ta> and <tá> at all and categorically use one or the other. In texts with just one or two attestations, such as SUVASA (0x <ta>; 1x <tá>), this may well be due to chance. However, some of the later texts and subcorpora show so many instances of <ta> that the absence of <tá> is likely to be structural rather than incidental. A number of these containing 6+ attestations of <ta> (the number is arbitrarily chosen) are listed in Table 3.3.

It seems that at least some scribes did not have <tá> in their active syllabary, meaning that their texts are uninformative for determining whether <tá> represents a phonetically/phonologically different entity than <ta> or not. Initially, we should therefore exclude those texts that do not exhibit a contrast between <ta> and <tá> (114 in total) from our investigation.[7]

[7] This unavoidably leads to the exclusion of texts with only a handful of attestations of <ta> and <tá>, where the absence of both signs may well be due to chance. This is prefer-

Text name	Attestations (<ta>/<tá>)	Subcorpus	Rough dating (Hawkins 2000)
ASSUR letters	44/0	ASSUR	late 8th BCE
SULTANHAN	38/0	TABAL	740–730 BCE
KULULU lead strips	19/0	TABAL	mid-late 8th BCE
KULULU 1	12/0	TABAL	mid-8th BCE
BULGARMADEN	11/0	TABAL	738–710 BCE
KULULU 2	9/0	TABAL	mid-8th BCE
ISTANBUL 2	7/0	TABAL	8th BCE
KÖRKÜN	7/0	KARKAMIŠ	late 9th BCE
KULULU 5	7/0	TABAL	8th BCE
TÜNP 1	7/0	KARKAMIŠ	mid-8th BCE
İSKENDERUN	6/0	MARAŞ	late 9th BCE
ŞARAGA	6/0	KARKAMIŠ	8th BCE

Table 3.3: Texts with 6 or more attestations of <ta> showing no contrast.

The 78 texts which do show an opposition (i.e. contain both <ta> and <tá>) contain 998 instances of <ta> (638x) and <tá> (360x). They are found all throughout the HLuw. corpus, from the Empire period (SÜDBURG) up until the 8th century BCE (KIRŞEHİR).[8] Naturally, however, this does not mean that the distribution remained unchanged throughout this period. It may well be possible that only the earliest texts use different spellings to differentiate between two phonetically/phonologically different sequences, while this is no longer the case in later texts. This is an important avenue for

able, however, over including false spellings of <ta> which do not accurately reflect its original phonetic value.

[8] YALBURT, EMİRGAZİ and SÜDBURG are the only Empire-period texts in which both <ta> and <tá> are represented. See Section 3.5.2, however, for the observation that the single attestation of <ta> in YALBURT is very unsure (next to 13x <tá>), making it uncertain whether its scribe actually used <ta> and <tá> contrastively.

future research. For this chapter, I will restrict myself to general observations.

The distribution of <ta> and <tá> in the full Iron Age corpus is given below. As marked already in Rieken 2010b, the use of <ta> and <tá> is by no means random. We can distinguish three groups of morphemes/lexemes: those that are spelled consistently with <ta>, those that are consistently spelled with <tá> and those which seem to be spelled alternatingly with <ta> and <tá>. I will treat these groups in order in the sections that follow below.[9]

3.3.1 Group 1: consistent <ta> spelling

The most common items (3+ attestations) which are spelled with consistent TA-spelling are given below, in Table 3.4.

Lemma	**<ta>**	**Translation**
tanim(a/i)-	12	'every, all'
^{I}*Hamiyata-*	11	PN
SUPER+*ra/ita*	10	'above'
(TERRA)*taskwa/ir(i)-*	9	'earth'
(*274)*hatali-*	9	'to smash'
(FORTIS)*muwatal(a/i)-*	8	'mighty'
kwa/ita(na)-	7	'where'
(ORIENS)*kisatam(i)-*	6	'east'
(LITUUS/DEUS)AVIS-*tani(a/i)-*	5	'good times'
(AEDIFICARE)*tama-*	5	'build'
taw(i)-	4	'eye'
ta(nu)-	4	'stand; put'

Continued on next page.

[9] Note that the frequent occurrence of alternating spellings is markedly different from that of <tà>: Rieken (2008: 637f.) has shown that <tà> as a rule never alternates with <ta> or <tá> and is strictly kept apart.

Lemma	<ta>	Translation
(VIA)*harwa*/*ita*(*hit*)-	4	'road; travel'
(VITIS/LIBARE)*sarlata*-	4	'offering'
(MALUS$_2$)*haniyata*(*str*(*i*))-	3	'badness'
taminama-	3	'?'

Table 3.4: Consistently <ta> spelled items in Hieroglyphic Luwian.

The few words on this list that are phonetically and/or etymologically analysable suggest that consistent <ta> spelling was used to represent 1.) word-internal fortis stops and 2.) word-initial dental stops.

Examples of intervocalic fortis stops are found in HLuw. *mu-wa*/*i-ta-li*- 'mighty' (cf. CLuw. *mu-u-u̯a-at-ta-al-la-ti* 'might' [abl.-ins.]), (*274)*ha-ta-li*- 'to smash' (cf. Hitt. *ḫatta-*^{ri}, Lyc. *χtta*- < PIE **h*$_2$*et*-, cf. Starke 1990: 309f.) and perhaps (VITIS/LIBARE)*sa*$_5$+*ra*/*i-la-ta*- 'offering', if CLuw. *šar-la-at-ta*- 'exaltation, worship' is comparable (cf. Starke 1990: 539).

In addition, consistent <ta> spelling is the unmarked way to spell word-initial dental stops (63x). As we will see, the only robust group of word-initial <tá> spellings belongs to the stem *tá-ti*- /taθi-/ 'father' (72x). The remaining 18 word-initial <tá> spellings occur either in lexemes without clear etymologies such as *tátu*- (0x <ta>, 4x <tá>; cf. Section 3.3.3) or as occasional variants to words otherwise spelled with <ta>: *tanant*(*a*/*i*)- 'empty', *taru*- 'tree, statue', *tataria*- 'curse' and the names *Tasku*- and *Taita*-. We will see that special explanations are readily available for (nearly) all of them.

3.3.2 Group 2: alternating <ta>/<tá> spelling

The most common morphemes and lexemes spelled with both <ta> and <tá> are given below, in Table 3.5.

Lemma	**<ta>/<tá>**	**Translation**
=ta	165/79	'locatival' particle
-ta	60/24	3sg.pret.act. (fortis)
anta(*li*)-	24/42	'inside'
-ta	43/20	3pl.pret.act.
-ta	45/9	3sg./pl.pret.[10]
zanta (<INFRA-*ta*/*tá*>)	18/5	'down'
(DEUS)*Tarhunt*-	11/5	DN
(REX)*hantawata*(*hi*)-	4/4	'king(ship)'[11]
(LOCUS)*alant*-	6/2	'place'
(SCALPRUM)*kutasar*(*i*)-	6/1	'stele'
-tanz	2/5	pronominal dat.pl.
(DEUS)*Tasku*-	4/2	DN
(VACUUS)*tanant*(*a*/*i*)-	4/1	'empty'
(STATUA/LIGNUM)*taru*-	4/1	'tree, statue'
(VACUUS)*tanant*(*a*/*i*)-	2/2	'empty'
[I]*Taita*-	2/2	PN
(THRONUS)*isatarata*-	3/1	'throne'
(*218)*sakatalisa*-	3/1	'?'
(LOQUI)*mara*/*ita*-	3/1	'words/requests'
aparanta <POST+*ra*/*i-ta*/*tá*>	3/1	'after'
izisata-	3/1	'honour' (verb)

Continued on next page.

[10] This category consists of orthographically ambiguous verbal forms whose number is unclear. Some of them are found in unclear contexts, in which no subject is clearly identifiable. Others have either multiple singular subjects or neuter plural subjects. In those cases, either singular or verbal forms can be found (cf. Melchert 2003: 201f.).

[11] The postnasal dental stop in the root for 'king' is not attested in phonetic spelling, but spellings with both <ta> and <tá> would be most likely.

Lemma	<ta>/<tá>	Translation
(LOQUI)*tataria*-	1/3	'curse'
(FRONS)*hanta*-	2/1	'face'
(*314)*hasatan*(*i*)-	2/1	'support'
tiwatal(*i*)-	1/2	(measure)
Anaita(*wan*(*i*))(REGIO)-	1/1	GN
CAPUT-*t*(*i*)-	1/1	'nobleman'

Table 3.5: Alternating <ta>/<tá> spelled items in Hieroglyphic Luwian.

Spellings with alternating <ta> and <tá> are found most often in consonant clusters. More specifically: they occur in the spelling of fortis/lenis dental stops (historically) preceded by [n] and those preceded by [s]/[ʃ], cf. Rieken (2010a).[12]

Alternating <ta>/<tá> spellings represent postnasal dental obstruents in the verbal ending *-ta* (3pl.pret.act.; < PIE *-*nto*), (LOCUS)*alant*- (cf. Yakubovich 2017b: 7), *anta* (+ derivatives), (VACUUS)*tananta*- (cf. Rieken 2010b: 306), *zanta*, the divine name *Tarhunt*- and (FRONS)*hanta*-.[13]

We also find <tá> in consonant clusters involving *s*: this accounts for six instances of 3sg.pret.act. forms which are spelled with <tá>, cf. Section 3.5.2. Additionally, it may account for the <ta>/<tá> spellings of *izisata*- 'to honour' and (*314)*hasatana*- if we assume that these words contained clusters of the shape *-st*-. Rieken also includes the locatival particle *=ta* (163/81) here, following Josephson (1972: 419) and Melchert (2003: 210) who connect it to Hitt. *=ašta*. This etymology presupposes that *-s*- was lost in this word (according to Rieken 2010b: 305 due to enclision and phonetic erosion), while it remained in other words.

[12] Note that the PN *Hartapu*- is spelled consistently (7x) with <tá> (*há+ra*/*i-tá*°) in KIZILDAĞ 1–4, KARADAĞ 1–2 and BURUNKAYA. Unfortunately, these texts only have attestations with <tá> and should therefore be excluded from our current analysis for now.

[13] For the inclusion of the DN *Santa*-, see the following section.

Exceptions to this pattern are intervocalic cases of the 3sg.pret.act. fortis ending *-ta* which are occasionally spelled with <tá> where we would expect consistent <ta> spelling. Almost all of these forms have other explanations available to them, as we will see in Section 3.5.3.

3.3.3 Group 3: consistent <tá> spelling

Consistent <tá> spelling is attested for very few items only. All items occurring more than once are listed in Table 3.6.

Lemma	**<tá>**	**Translation**
tati(*a*/*i*)-/*ṯatal*(*i*)-	72	'father(ly)'
(DOMUS)*haristani*-	5	'upper floor'(?)
tatu-	4	'?' (all from EMİRGAZİ)
Santa°	2	DN
tamihi-	2	'abundance'

Table 3.6: Consistently <tá> spelled items in Hieroglyphic Luwian

Apart from HLuw. *tá-ti*- (and its derivatives), this spelling category does not have any frequently found members. The absence of <ta> spellings for (DOMUS)*haristani*- 'upper floor(?)' (5x <tá>), which is compared to Hitt. *ḫarištani*- by Starke (in Hawkins 2000: 99), may well be due to chance. The same is true of the DN *Santa*- (0/2), which occurs twice as the first element of a PN in CEKKE: § 17c ^{I}*sà-tá*-FRATER-*la-sa-ha* and § 17i ^{I}*sà-tá*-(*m*)*u*$^{?}$-*sá-ha*. This dataset does not include 8 attestations of *Santa*- written with <ta> in texts which do not show an opposition between <ta> and <tá>.[14] Thus, it may well be coincidental that we do not find any <ta> spellings for (DEUS)*Santa*-. All in all, I do not think that consistent <tá> spelling was used for any other lexical item besides *tá-ti*- in our HLuw. texts.

[14] These are BEIRUT (2x), KULULU 2 (2x), KULULU lead strip 2, NIMRUD, ŞARAGA and TÜNP 1.

In conclusion, therefore, we find the following distribution in Hieroglyphic Luwian texts that have both <ta> and <tá>

- **Consistent <ta>:** word-initial & intervocalic fortis stops
- **Alternating <ta>/<tá>:** postconsonantal stops
- **Consistent <tá>:** only *tá-ti-*(*ia-*) + *tá-tà-li-* 'father(ly)'

Overall, this distribution is very similar to that observed in Rieken 2010b, see Section 3.2. Nevertheless, data from the extended corpus requires us to update Rieken's distribution in three respects. First, Rieken treats *tá-ti-* together with words with initial <tá> that have an additional alveolar consonant in the root (cf. *tataria-*, *taru-*, *tanata-* in Section 3.5.3). This is perfectly reasonable from the perspective of the Karkamiš texts from before 850 BCE. As we have seen, however, the extended corpus reveals that *tá-ti-*'s spelling is unique. Whereas *taru-* and *tataria-* are spelled with both <ta> and <tá>, *tá-ti-* occurs only with <tá> (72x), suggesting a special phonetic value. Secondly, dental stops after *s* are not spelled consistently with <tá> (Rieken 2010b: 302: 0x <ta>, 7x <tá>), but with <ta> and <tá> alternating, cf. HLuw. *asta* 'he was' (3sg.pret.act.; 2x <ta>, 5x <tá>). This puts them into the same category as dental stops after *n*. Lastly, the same is true for *anta* 'inside', which appears to be spelled not only with <ta> (Rieken: 16/0) but with both <ta> and <tá> (24/41). Thus, the spelling of *anta* (and its derivative *antali-*) is no different from that of other words containing **-nT-*: all have co-occurring spellings with <ta>.

The distribution of <ta> and <tá> suggests that morphemes and lexemes written with both <ta> and <tá> were at least phonetically different from those written exclusively with <ta>. It indicates that words which are consistently spelled with <ta> have a specific phonetic feature which is lacking in words spelled with alternating <ta>/<tá>, or vice versa. Thus, we may ask ourselves, as Rieken has done, what this/these feature(s) is/are. To investigate this, we should look in more detail at all phonetic environments in which each of these spelling patterns are found, starting with the postconsonantal <ta>/<tá> spellings.

3.4 Analysis

3.4.1 Alternating <ta>/<tá>: post-consonantal position

As mentioned above, the words in this subgroup contain dental stops after *n* or *s*. Rieken 2010b: 304f. correctly mentions that in these environments, the PAnat. opposition between fortis (< PIE **t*) and lenis (< PIE **d*$^{(h)}$) stops appears to have been neutralised: both are spelled in exactly the same way, cf. 3pl.pret.act. <-ta/tá> < PIE **-nt̲o* vs. <a-ta/tá> < PIE **-nd̲*$^{(h)}$-. An example of an original fortis dental stop preceded by HLuw. *s* is found in HLuw. *á-sa-ta*/*tá* 'he was'. I have not been able to find sure examples of original lenis dental stops after *s*, but there are no signs indicating that fortis and lenis stops did not merge in this position.

The phonetic values of the results of these mergers after *n* and *s* are difficult to pinpoint. In her treatment of HLuw. <tá> spellings of postnasal dental stops, Rieken (2010b: 304) correctly points out that it is very common for post-nasal stops to undergo shortening and/or voicing, referring to Kümmel 2007: 53f.[15] Accordingly, the result of the merger of PAnat. **nt* and **nd* was most probably HLuw. [nd] or [nt]. In her article, Rieken (2010b: 306) opts for [nd] and concludes that <tá> was used to write [d(ː)].

While the idea that <tá> marks a voiced stop [d] works well for cases where the dental stop follows a nasal, this is more difficult for stops preceded by the voiceless fricatives [s] or [ʃ], as voicing is not very likely in this position. Rieken 2010b: 304f. notes that "eine spezifische Sonorisierung bzw. Lenierung in der Position nach **s* durchaus bezeugt [ist]", referring to Kümmel 2007: 52. On closer inspection, Kümmel (l.c.) discusses how consonants lose a contrastive phonetic feature (e.g. aspiration) when in contact with a fricative, and how the resulting phone is reinterpreted as a different phoneme (rephonologisation). As an example, Kümmel gives Eastern Middle Iranian (Sogdian, Chorasmian, Khotanese), where **t* > *d̥* /*f,x_*: in contact with a fricative, voiceless aspirated **t* [t^{h}] lost its aspiration, which was a determining feature of the fortis stops. The resulting voiceless unaspirated stop [t]

[15] Kümmel notes instances of post-nasal voicing in Sindhi, Punjabi, Old Persian, Middle Iranian, Armenian, Middle Greek, and Uralic (Sámi, Hungarian, Selkup), among others.

was thus reanalysed as an allophone of the lenis stop /d/ [d̥]. At a later stage, the fricative was voiced in an unrelated development (Sims-Williams 1989: 167f.), which in turn voiced the following dental stop, thus yielding fully voiced consonant clusters, which are attested in writing.[16] Other cases mentioned by Kümmel (2007: 52) in which stop oppositions are neutralised after voiceless fricatives (West-Iranian dialects, Icelandic etc.) do not involve direct stop voicing either.

In Luwian, however, there is no evidence suggesting that aspiration was a phonologically distinctive feature as it was in Iranian, so that we cannot use the same reanalysis scenario to account for the Luwian stop system. In addition, given that the change from [st] to [sd] is not very plausible, I argue that it is unlikely that HLuw. *á-sa-ta*/*tá* 'he was' shows the result of voicing. Rather, I propose that the neutralisation of the fortis-lenis opposition after *s* took the shape of shortening. It is not difficult to imagine how long stops lost their phonologically defining feature length in contact with /s/ and merged with the short stops: [st:] > [st].

In conclusion, HLuw. postconsonantal dental obstruents (written with <ta> and <tá>) mostly likely had in common that they were phonetically short. It is plausible that the dental stop was voiced after *n* ([nd]) and voiceless after *s* ([st]); as we will see later (Section 3.6), these phonetic interpretations are supported by comparative data from the cuneiform languages and Lycian. I support Rieken's analysis that the use of the sign <tá> was not obligatory (given that we also find <ta> in postconsonantal position). Unlike Rieken, however, I argue that <tá> marks a short stop in this position and does not express consonant voicing.

[16] This development is illustrated by Chorasmian *'βδ* and Khotanese *hauda*, both having the meaning '7' < Proto-Iranian **hafta* [haɸt^{h}a]. After the voiceless fricative [ɸ], the fortis stop [t^{h}] lost its aspiration, leading to reanalysis of the resulting non-aspirated stop as lenis: PIr. *[haɸt^{h}a] > *[haɸd̥a]. Subsequently, the fricative seems to have been voiced in postvocalic position: *[haβd̥a]. In turn, this voiced the following lenis stop, yielding *[haβda] which lead to attested Chor. *'βδ* and Khot. *hauda*. I emphasise here that the voiced consonants we find in these forms (Chor. *δ*, Khot. *d*) did not receive their voicing directly from a preceding voiceless fricative [ɸ].

3.4.2 Consistent <ta>: word-initial/intervocalic position

In word-initial position, HLuw. does not show any distinction between the reflexes of PIE dental stops. I agree with Rieken and Melchert that this signals a general word-initial merger (Rieken 2010b: 303; Melchert 1994a: 252). Examples suggesting this merger are *tama-* 'to build' (5/0; < PIE **demh₂-*) and *ta*(*nu*)- 'to stand' (4/0; < PIE **steh₂-*), which I assume show the regular reflex of both fortis and lenis stops in this position.[17] Synchronically within Hieroglyphic Luwian, words with inherited dental stops are opposed to the word *tá-ti-*, which will be treated below, together with the phonetic interpretation of the opposition in this position of the word, in Section 3.4.4.

Intervocalic <ta> spellings regularly correspond to geminate spellings in Hittite and Cuneiform Luwian and the sign <t> in Lycian, all continuing the PAnat. fortis stop */t/ [tː]. Good examples are the intervocalic fortis stops in the 3sg.pret.act. ending HLuw. *-ta* (< PIE **-to*, e.g. HLuw. *pi-ia-ta* ~ CLuw. *pí-i-i̯a-at-ta* ~ Lyc. *pijete* 'he gave'), and the stem (*274)*hatali-* 'to smash, smite' (9x <ta>) ~ Hitt. *ḫatt-*^{ari} 'to stab' < PIE **h₂et-*.

It is clear that the intervocalic fortis stops (spelled with <ta>) are kept distinct from the postconsonantal stop (spelled with <ta>/<tá>). It is likely, therefore, that there is a phonetic difference between the two. Given that the postconsonantal stop may well have been a short stop [t/d], I propose that the HLuw. intervocalic fortis stop was voiceless and *long* [tː] for the reason that it is the same phonetic value which is assumed for the cuneiform languages (Hittite, Cuneiform Luwian, Palaic, cf. Melchert 1994a: 20).[18] In addition, this is the phonetic value of the intervocalic stops in Proto-Anatolian, as assumed by Melchert 1994a: 62 and Kloekhorst 2016a: 223–226.[19]

[17] I will argue below (Section 3.5.3) that secondary developments are responsible for the occasional <tá> spellings in items such as *taru-* 'tree, statue' (4/1).

[18] I do not see any reason to assume why the geminate spelling in Cuneiform Luwian (e.g. CLuw. *a-pat-ti* < PAnat. **Hob^{h}éd^{h}i*, cf. Goedegebuure 2010: 87) would have been only 'graphic' and not phonetic, as Rieken (2010b: 305) seems to take as a possibility: "Durch Čop's Regel hat sich im Luwischen betones **é* zu *á* entwickelt, während der darauf folgende stimmhafte Laut (ggf. nur graphisch) geminiert wurde."

[19] More recently, Yates (fthc. 35) has taken an agnostic stance on this point.

3.4.3 Intermediate conclusion

We thus arrive at a system with a clear complimentary distribution between a short stop [t/d] (spelled with <ta> and <tá>) in consonant clusters, as opposed to a long stop [t:] (spelled with <ta> only) in intervocalic position. At this point, one may ask why the scribes wrote supposedly shortened post-consonantal stops (e.g. in *a-ta*/*tá* 'inside' and *á-sa-ta*/*tá* 'he was') using the signs <ta> and <tá>. Why did the stonemasons not use the sign <tà>, the sign representing the result of a PAnat. lenis stop, which is commonly assumed to have been short intervocalically (Melchert 1994a: 20)?

A solution to this question is provided by Rieken (2010b: 306): simply put, the scribes did not use <tà> to write a synchronic short stop because the lenis stop represented by <tà> had developed into something else. In other words: at some point, all Proto-Anatolian intervocalic lenis stops */VdV/ presumably developed into consonants which were not identifiable anymore with the short stops which had appeared after *n* and *s*. Accordingly, Hajnal (1995: 32[11]) and Rieken (ibid.) propose that Proto-Anatolian intervocalic lenis stops had developed into fricatives: *[d] > HLuw. [ð] /V_V, as they did in Lycian, cf. Section 3.6. The resulting fricative would have been spelled with the sign <tà>.[20] As in Lycian, this fricativisation would have affected only intervocalic stops, not those in consonant clusters. Phonologically, I assume that the original lenis stops which kept their occlusivity in consonant clusters were thus automatically reanalysed as fortis consonants.

By way of an intermediate conclusion, we can succinctly account for most of the data presented above by positing that the main opposition in the Hieroglyphic Luwian dental obstruents was one of stops versus fricatives: /t/ vs. /θ/. The signs <ta> and <tá> would mark the stop, while <tà> expressed the fricative. The stop phoneme seems to have had several allophones: intervocalically, I have suggested that they were long [t:]. After consonants, however, they were short (and voiced or voiceless, depending on

[20] The phenomenon of HLuw. rhotacism, by which HLuw. /θ/ alternates with /r/ in texts from the late 9th century BCE onward (Goedegebuure 2010: 76–78) fits in perfectly with Hajnal's and Rieken's analysis of the HLuw. lenis obstruent as [ð]: the change from [ð] to [r] is phonetically well understandable and has many parallels among the world's languages, cf. Kümmel 2007: 79.

the preceding consonant). All this is summarised in Table 3.7. Note that the word-initial stop is given here simply as [t], but cf. Section 3.4.4 immediately below for further discussion.

	#T-	**-VTTV-**	**-VTV-**	**-C[+voice]T-**	**-C[-voice]T-**
Spelling	<ta>	<ta>	<tà>	<ta>/<tá>	<ta>/<tá>
Phonetics	[t]	[tː]	[ð]	[d]	[t]
Phonology	/t/	/t/	/θ/	/t/	/t/

Table 3.7: Intermediate summary of the spelling, phonetics and phonology of the Hieroglyphic Luwian dental stops

The story does not end here. There is one frequently attested root which adds a further complication to the system.

3.4.4 Consistent <tá>: *tá-ti-*(*ia-*) + *tá-tà-li-* 'father(ly)'

The spelling of the stem *tá-ti-* (○/72) 'father' is unique in our HLuw. corpus. Not only is it remarkable for its <tá> spellings in word-initial position, but it is also the only well-attested stem that is spelled with <tá> *consistently*.[21] Another sign of HLuw. *tá-ti-*'s special connection to the sign <tá> is the fact that <tá> is used as a logogram meaning 'father(s)' in YALBURT block 4, § 2: *TÁ*.AVUS-*zi*/*a* 'fathers (and) grandfathers' (cf. Hawkins and Neve 1995: 69). As we will see below (Section 3.6), the other Anatolian languages that have inherited this root treat it in the same way as any other inherited word. It is not spelled in a special way in those languages.[22]

[21] The lexemes *tatu-* (○/4) '?' and *tamihi-* (○/2) 'abundance'(?) are also spelled consistently with word-initial <tá>. However, both their rarity and the fact that they are each found in one text only (EMİRGAZİ and KARATEPE 1, respectively) render them less striking than *tá-ti-*, whose use is much more widespread.

[22] Although Hittite *at-ta*(-)/*ad-da*(-) 'father' is unrelated to HLuw. *tá-ti-* and its congeners, it also shows a unique spelling pattern (Kloekhorst fthc. 6[22]) with regard to its dental stop. Depending on their etymology, most Hittite words containing a geminate dental are spelled either with (near-)consistent TA (< PIE **t*, e.g. *kat-ta* 'down') or DA (< PIE **TH*, e.g.

The question now is how we should interpret this spelling. One could argue that the distinction between *tá-ti-* and the rest of the lexicon is simply graphic and does not indicate anything linguistic. However, as long as there is no clear motivation for a non-phonetic spelling in the word for 'father', I think we should take this spelling at face value, indicating a phonetic feature that is present in *tá-ti-* but absent in other words or vice versa. Based on the two phonetic realisations <tá> seems to have in word-internal position, I see two plausible phonetic interpretations: the spelling of *tá-ti-* indicates either [t] (as in [st]) or [d] (as in [nd]). In either case, because the distinction between [t] and [d] was not synchronically conditioned, the opposition must have been phonological: the first dental element in *tá-ti* constitutes a different phoneme than that of other words with initial dental obstruents, such as *tanim*(*a*/*i*)- 'all' or *taskwa*/*ir*(*i*)- 'earth', which are spelled consistently with <ta>.

1. If we assume that *tá-ti-* began with a phonetically voiced stop [d], then our phonological overview of Hieroglyphic Luwian should include a phonological opposition between voiced /d/ (in *tá-ti-*) and voiceless /t/ (all other words) in word-initial position. The scribes' choice for the sign <tá> to spell this word is not difficult to understand. The only other place where a voiced dental stop was found in the language, was in postnasal position: [nd]. The scribes would have taken over the spelling with <tá> from there and generalised it in order to spell word-initial [d-] as well. In word-internal position, there seems to have been no phonological voicing contrast (as voice was determined by the preceding consonant): both [d] and [t] seem to be spelled in the same way. The resulting picture is tabulated below, cf. Table 3.8.

   In this scenario, it remains unclear where this unique pronunciation of 'father' comes from. Rieken (2010b: 305f.) connects *tá-ti-* to words which are only occasionally spelled with word-initial <tá>, such as *tananta*/*i-* '(to) empty' (4/1) and *taru-* 'tree, statue' (4/1) (see Section

uddar/*uddan-* 'word'). Hitt. *atta*(-)/*adda*(-) fits neither category, as it is spelled with TA ca. 70%. According to Kloekhorst (ibid.), this indicates a unique long voiced stop [d:].

	#T-	-VTTV-	-VTV-	-C[+voice]T-	-C[-voice]T-
Spelling	<ta> vs. <tá>	<ta>	<tà>	<ta>/<tá>	<ta>/<tá>
Phonetics	[t] vs. [d]	[t:]	[ð]	[d]	[t]
Phonology	/t/ vs. /d/[1]	/t/	/ð/	/t/	/t/

[1] The phoneme /d/ only occurs word-initially.

Table 3.8: HLuw. dental stops if HLuw. *tá-ti-* starts with [d-].

3.5.3). In these words, she argues, the <tá> spellings could represent sporadic word-initial voicing under influence of a voiced alveolar or dental element (i.c. *r*, *n*) elsewhere in the word.[23] Phonetically, this scenario would explain the voicing of the initial stop, but the difference between *tá-ti-* (always <tá>) on the one hand and *taru-* etc. (mostly <ta>) is still unaccounted for.

2. Alternatively, we could assume that the <tá> in *tá-ti-* 'father' represents a phonetically voiceless stop [t], which fits well with its proposed origin as a babble word (*Lallwort*).[24] As is well known, children start pronouncing word-initial stops with what is known as 'short lag voice onset time', meaning that the release of the initial plosive and the onset of vocal cord vibration take place nearly simultaneously, resulting in [t], cf. Macken and Barton 1980. Only later do children acquire fully voiced stops (with 'lead VOT' or 'prevoicing') and/or aspirated stops (defined by 'long lag VOT'). If we assume that the initial consonant of *tá-ti-* reflects the pronunciation of children at an early stage of L1 acquisition, *tá-ti-* may well have started with a voiceless stop [t]. The anlaut of all other words (spelled with consistent <ta>) must have been different, but was presumably also voiceless, given that consistent

[23] In the case of *tá-ti-*, this would be the second dental obstruent (*tá-t̲i-*), which must be a lenis obstruent ([ð]) because it rhotacises in, e.g., CEKKE § 16 *tá-ra+a-za* (dat.pl.).

[24] Synchronically, the 'father'-root is not a babble word in Hieroglyphic Luwian, but rather the regular word for 'father'. Historically, however, its roots in children's language are—as far as I know—uncontested (Kloekhorst 2008: s.v. '*atta-*').

<ta> spelling is otherwise used to spell word-internal *voiceless* geminates. As it is not unusual for word-initial voiceless stops to become aspirated (Kümmel 2007: 168f.), perhaps the inherited word-initial voiceless stop was slightly aspirated in word-initial position: [t^h]. Alternatively, it may have been a word-initial geminate [tː]. Whatever the precise phonetics, this word-initial dental stop would presumably have been an allophone of the long fortis stop /tː/. In this case, we have to assume a phonological opposition between a long stop, a short stop and a fricative, cf. Table 3.9.

	#T-	**-VTTV-**	**-VTV-**	**-C$^{[+voice]}$T-**	**-C$^{[-voice]}$T-**
Spelling	<ta> vs. <tá>	<ta>	<tà>	<ta>/<tá>	<ta>/<tá>
Phonetics	[t^h/tː] vs. [t]	[tː]	[ð]	[d]	[t]
Phonology	/tː/ vs. /t/	/tː/	/θ/	/t/	/t/

Table 3.9: HLuw. dental stops if HLuw. *tá-ti-* starts with [t].

The 'cost' of this scenario is an additional phonetic development (*t > t^h /#_) or the assumption that word-initial dental stops merged into a word-initial geminate [tː-].[25] It also requires that the pronunciation of Hieroglyphic Luwian 'father' was at some point readjusted to that of infants.[26] The benefits are that the spelling distributions are well explained (<tá> marks a short stop in all positions of the word; consistent <ta> marks a geminate or aspirate), and allows us to explain why consonantal length was preserved in the language (and written!) in intervocalic position. Lycian seems to have lost consonantal length differences (as far as we can tell) when it transformed its fortis-lenis

[25] Word-initial geminate stops are relatively rare, but certainly not unattested. See Muller 2001: 204ff. who lists a few dozen languages that have them.

[26] It is impossible to say when this happened. The fact that only Hieroglyphic Luwian seems to preserve the distinction suggests a dialectal innovation. It is also possible that the marked pronunciation of the 'father'-word was Proto-Luwic, and that the difference with other inherited words was lost in the individual prehistories of Cuneiform Luwian and Lycian.

> opposition from one based on length into one based on frication. We can understand why the same did not happen in HLuw. if long stops were kept distinct from short ones in word-initial position.

The choice for one of the scenarios proposed here depends on the personal preference of the reader; I will not insist on either of them here. The main phonological opposition between the Hieroglyphic Luwian fortis and lenis dental obstruents was presumably one in frication. In addition, there may have been a marginal voicing opposition in word-initial position or a distinction between long and short stops.

3.5 Exceptional cases

Several more cases need our attention. These are all instances of <tá> outside of consonant clusters or the stem *tá-ti-* and occur in word-initial or intervocalic position, and will be treated below.

3.5.1 Pronominal dat.-loc.pl. forms

This category contains dat.-loc. plural forms of the demonstrative pronouns *za*/*i-* 'this' and *apa-* 'that', as well as the relative/interrogative pronoun *kwa*/*i-* 'who, which'. The data from the extended corpus confirm Rieken's (2010b) observation (based on the Karkamiš corpus) that these forms are not exclusively spelled with <tá>. Next to five attestations with <tá> we find two spellings with <ta>.[27] The dental stop in this word is therefore spelled as if it were part of a consonant cluster.

Rieken (2010b: 305) has argued that these forms show the result of Čop's Law. This sound law describes a lengthening of short intervocalic consonants that are immediately preceded by a short accented vowel (Čop 1970;

[27] These are: KARKAMIŠ A25*a* § 2 *pa-tá-za-pa-wa*/*i-ta-***a*, KARKAMIŠ A11*b* § 8 *pa-tá-za-pa-wa*/*i-ta-***a*, AKSARAY § 4a *á-*[*pa*]*-tá-za*$_x$, all representing *apatanz*, the dat.pl. of *apa-* 'that'; EMİRGAZİ § 19 *kwa*/*i-tá-zi*/*a*, from *kwa*/*i-* 'who/which'; YALBURT § 2 *zi*/*a-tá-zi*/*a-pa-wa*/*i*, from the proximal deictic pronoun *za*/*i-* 'this'. The two spellings with <ta> are KARATEPE 1 § XXIII, 119–124 Hu. *á-pa-ta-za* and KARATEPE 1 § XXXIII, 171–176 Hu. *á-pa-ta-za-pa-wa*/*i-ta*.

Section 5.2): pre-PLuw. **VCV* > PLuw. **VCCV*. Indeed, we would expect its reconstructed PAnat. form, which contains **-éd^h-*, to undergo Čop's Law (cf. Goedegebuure 2010: 87; Kloekhorst 2012a: 261f.). If this scenario is correct, then this would mean that the result of Čop's Law (spelled with both <ta> and <tá>) did not merge with the inherited fortis (long) stops, which are spelled with consistent <ta>. Thus, Čop's Law would have created a new phonological opposition between inherited fortis stops [t:] on the one hand and secondarily fortited stops [d:] on the other hand (Rieken 2010b: 305, following Melchert 1994a: 252).

This analysis is not very attractive for two reasons. First, the Lycian data suggest that lenis stops which were fortited by Čop's Law *did* merge with inherited fortis stops: the Lycian form *ebette* 'these' (dat.-loc.pl., parallel to HLuw. *á-pa-ta*/*tá-za*) is spelled with <t>, not with <Ṽt>, the spelling normally used to mark a voiced stop in intervocalic position.[28] Secondly, it is difficult to understand how the result of a long/geminated voiced short stop (*[d] > [d:] according to Rieken and Melchert) would have been written in exactly the same way as the presumably short and voiceless dental stops [t] we find in *á-sa-ta*/*tá*.

For these reasons, I am more inclined to follow the suggestion made by Kloekhorst (2012a: 262), who views *á-pa-ta*/*tá-za* as the result of analogy from other cases of the paradigm of PAnat. **Hob^{h}o-* 'that', cf. Table 3.10.

Kloekhorst argues that HLuw. *á-pa-ta*/*tá-za* reflects pre-Luwic **ʔobé-nʔ-d-oms*, with an element **-nʔ-* taken over from the gen.pl., where it is found in the forms Hitt. *apĕnzan* and Lyc. *ebẽhẽ*. While this is possible by itself, I believe that not only the gen.pl. may have exerted analogical pressure to introduce *n* in the HLuw. dat.-loc.pl. form. Also the nom.pl.c. and the acc.pl.c. show *n* directly after their respective stems *za-* and *apa-*. Adding *n* to the stem of the dat.-loc.pl. form would therefore constitute a trivial regularisa-

[28] The Cuneiform Luwian material cannot help us here: the cognate of HLuw. *á-pa-ta*/*tá-za* is not attested in CLuw., nor do we find cases of Čop's Law which are spelled with the signs TA or DA. For Lycian *ebette*, note that the effects of Čop's Law are only shown by the use of <t> /t/ (instead of <d> /d/), not by its geminate spelling <tt>. It is generally assumed (Kloekhorst 2012a: 261f.; Hajnal 1995: 116[125]) that the geminate in *ebette* is secondarily introduced from a syncopated stem *eptte-*/*ebtte-* 'their', where the geminate is regular in postconsonantal position.

	Hitt.	CLuw.	HLuw.	Lyc.	PLuw.[1]
nom.pl.c.	*apē*	–	*á-pa-zi*	–	**ʔəbənsi*
gen.pl.	*apĕnzan*	–	–	*ebẽhẽ*	**ʔəbənsom*
dat.-loc.pl.	*apĕdaš*	–	*á-pa-ta-za* *á-pa-tá-za*	*ebette*	**ʔəbətos*
acc.pl.c.	*apūš*	*apinz*	*á-pa-zi*	*ebeis*	**ʔəbəns*
nom.-acc.pl.n.	*apē*	–	*á-pa-ia*[2]	*ebeija*	**ʔəbə-ia*(?)

[1] For PLuw. **ə*, cf. Section 2.3.1, Table 2.2.

[2] Attested as KARKAMIŠ A11*b* § 12 *pa-ia-*a* (with initial-a-final) and ASSUR *f*+*g* § 38 *á-pa*$^{-i}$*-ia-pa-wa*/*i*, where the sign *i* is used as a word-internal space-filler, cf. Section 1.5.3.

Table 3.10: Attested and reconstructed forms of PAnat. **Hob*^{h}*o-* 'that'

tion of the paradigm. Unlike Kloekhorst, however, I argue that the dental stop in the resulting /ʔaɸantants/ was not written <tá> for its postnasal character, but rather on account of its shortness.

To sum up, I contend that the dental stops in the HLuw. pronominal forms *á-pa-ta*/*tá-za* 'those', *kwa*/*i-tá-zi*/*a* 'who/which' and *zi*/*a-tá-zi*/*a* 'this' do not necessarily present a counterexample to the distribution presented here, according to which intervocalic fortis/long stops are spelled consistently with <ta>.

3.5.2 <tá> spelling in the 3sg.pret.act. ending

The fortis variant of the 3sg.pret.act. ending (< PAnat./PIE **-to*) is spelled with <ta> in most cases (60x). In addition, there are 24 counts of 3sg.pret.act. endings spelled with <tá>. These are given below in Table 3.11.

In 11 of these verbal forms, the 3sg.pret.act. ending *-ta* may be part of a consonant cluster. This is assuredly the case for the roots *as-* 'to be' and quite possibly also for *sakatalis-* '?' and *up-* 'to bring about', if we are allowed to interpret the verbal stems as ending in a consonant. In addition, the three <tá> spellings of (MORI)*wa*/*i-la-tá* 'he died' may continue a root form-

Text	Attestation
AKSARAY § 10	*á-sa-tá* ‘to be’
BOYBEYPINARI 1-2 IIID § 7	*sà-ka-ta-li-sà-tá* ‘?’
KARKAMIŠ A11*b* § 2	*sa-tá-*a* ‘to be’
KARKAMIŠ A6 § 18	*á-sa-tá* ‘to be’
TELL AHMAR 1 § 8	*sa-tá-*a* ‘to be’
TELL AHMAR 6 § 4	*sa-tá-*a* ‘to be’
ALEPPO 2 § 12	DARE-*tá* ‘to give’
ARSUZ 2 § 11	PONERE-*wa*/*i-tá* ‘to put’
BOYBEYPINARI 1-2 IC § 4	(PES)*u-pa-tá-*° ‘to bring (about)’
BOYBEYPINARI 1-2 IIIC1 § 5	(PES)*u-pa-tá* ‘to bring (about)’
CEKKE § 2	PONERE-*tá* ‘to set up’
CEKKE § 3	*pu-pa-li-tá* ‘to compose’(?)
KARAHÖYÜK § 4	SOLIUM-*tá* ‘to set/to sit’
KARKAMIŠ A21 § 4	SOLIUM-*nú-tá* ‘to set’
KARKAMIŠ A24*a*2+3 § 6	“PES_2”(-)*wa*/*i-za-tá* ‘to carry off’
TELL AHMAR 6 § 8	(MORI)*wa*/*i-la-tá* ‘to die’
TELL AHMAR 1 § 10	(“MORI”)*wa*/*i-la-tá* ‘to die’
TELL AHMAR 1 § 18	(“MORI”)*wa*/*i-la-tá* ‘to die’
TELL AHMAR 1 § 25	“AUDIRE+MI”-*ti-i-tá* ‘to hear’
TELL AHMAR 5 § 4	*hwa*/*i-nu-wa*/*i-tá* ‘to make run’
YALBURT 8	*hwi*/*a-i*(*a*)*-tá* ‘to run’
YALBURT 12 § 4	*hwi*/*a-i*(*a*)*-tá* ‘to run’
YALBURT 16+10 § 4	*hwi*/*a-i*(*a*)*-tá* ‘to run’
YALBURT 4 § 3	*á-zi*/*a-tá* ‘to love’

Table 3.11: 3sg.pret.act. forms spelled with <tá>

ation, *walta*, consisting of a stem *wal-* (< PAnat. **uel-* or **g^{w}el-*, with Melchert 1994a: 238) to which the ending *-ta* was added. If this is true, we may assume that the long (fortis) stop of the ending was shortened (and voiced) in contact with the stem-final *l*, like *n*. The resulting form was then spelled with <tá>. A similar interpretation is possible for SOLIUM-*tá* 'he sat/set' (KARAHÖYÜK § 4) and "PES$_2$"(-)*wa*/*i-za-tá* 'he carried away' (KARKAMIŠ A24*a*2+3 § 6). In these two verbal forms, the ending may well have directly followed the stem: /(ʔ)asta/ and /uatsta/.

The remaining 13 instances of a 3sg.pret. ending with ending with <tá> are not obviously found in post-consonantal position. For most of these, however, special explanations can be found.

– The subject of ARSUZ 2 § 11 PONERE-*wa*/*i-tá* 'to put' is (*A*)*T*[*ANA*]-*sa*-[*pa*]-*wa*/*i-mu*(REGIO) 'the city/land Adana'. Perhaps we are allowed to interpret the verbal form here *ad sententiam* as a plural form ("the inhabitants of Adana"). We may then interpret PONERE-*wa*/*i-tá* as /tuanta/ 'they put', and the spelling with <tá> would be regular as part of a cluster.

– The context of KARKAMIŠ A21 § 4 SOLIUM-*nú-tá* is quite damaged:

KARKAMIŠ A21 §§ 3–4:

3. § 3 ...] (DEUS)*ku*+AVIS MANUS-*tara*/*i ARHA*$^{?}$(-)*i*+*a-t*[*á*

4. § 4 ... || ...]*190.THRONUS *tá-ti mi-i za*$_4$*-la* SOLIUM-*nú-tá*]

"(...) Kubaba ...-ed [me?] the hand, (...) [and me(?) she] caused to sit on my paternal throne(?)" (Transl. after Hawkins 2000: 160.)

A different reading involving a 3pl. subject is still possible, although no obvious candidate presents itself.

– The context of TELL AHMAR 5 § 4 *hwa*/*i-nu-wa*/*i-tá* 'he made run' is very unclear. Instead of taking 'my father' from § 2 as the subject (thus Hawkins 2000: 232), perhaps § 2 *za-a-zi* |(*256)*ka-lu*/*i*/*a-na-zi* 'the granaries' is applicable here, although it does not improve our understanding of the context.

– The four attestations of <tá> in the YALBURT inscription (*hwi*/*a-i*(*a*)-*tá* and *á-zi*/*a-tá*) are striking, but closer inspection reveals that the only attestation of <ta> in this text is very uncertain: YALBURT block 11 § 2 *a-ta*$^{?}$-*pa*-x(URBS$^{?}$/REGIO$^{?}$), cf. Figure 3.1. YALBURT may therefore belong to the group of texts which do not have an opposition between <ta> and <tá>, and should be left out of consideration.[29]

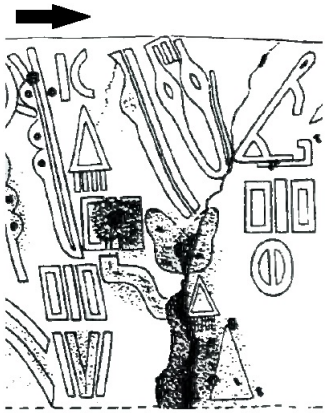

Figure 3.1: YALBURT block 11 § 2: *a-wa*/*i-mi* |*416-*wa*/*i-ní*-[*sa*$^{?}$] *a-ta*$^{?}$-*pa*-x (URBS$^{?}$/REGIO$^{?}$) *mu-wa*/*i-ha*. (Transliteration taken from Hawkins and Neve 1995: 68, drawing taken from Poetto 1993: 145. The arrow indicates the direction of reading.)

I have no special explanation for "AUDIRE+*MI*"-*ti-i-tá* 'he heard', occurring in TELL AHMAR 1 § 25, which does not show any other remarkable uses of <tá>. The same goes for CEKKE § 2 PONERE-*tá* and § 3 *pu-pa-li-tá*. However, these 3 spellings are clearly exceptional in light of the 70 3sg.pret.act. forms which do follow the main pattern observed in this chapter or which can be explained in alternative ways: as a rule, <ta>/<tá> alternations are found in consonant clusters. Therefore, I do not think these examples necessarily invalidate the distribution defended here.

[29] If these doubts are justified, then also the significance of the <tá> spelling in the pronominal form YALBURT § 2 *zi*/*a-tá-zi*/*a*-(*pa-wa*/*i*) has to be reconsidered.

3.5.3 Words containing apical consonants

The final group of <tá> spellings that are found outside of consonant clusters are mainly found in word-initial position, cf. Table 3.12.

Lemma	**<ta/tá>**		**Texts + §§**
[I]*Taita-* (PN)	1/1	**<ta>:**	SHEIZAR § 1
		<tá>:	ALEPPO 6 § 1
tananta- 'empty'	4/1	**<ta>:**	KARAHÖYÜK § 3 KARKAMIŠ A11*b* § 12 MARAŞ 1 § 4 MARAŞ 8 § 3
		<tá>:	KARKAMIŠ A12 § 6
(STATUA/LIGNUM)*taru-* 'tree, statue'	4/1	**<ta>:**	ALEPPO 2 § 8 KARKAMIŠ A18*e* § 4 MARAŞ 14 § 7 MALPINAR § 1
		<tá>:	KARKAMIŠ A25*a* § 7
(DEUS)*Tasku-* (DN)	4/2	**<ta>:**	ANCOZ 1 § 3 ANCOZ 7 §§ 4 & 9 ANCOZ 10 § 4
		<tá>:	ANCOZ 5 § 1 ANCOZ 10 § 1
(LOQUI)*tataria-* 'curse'	1/3	**<ta>:**	KARKAMIŠ A3 § 24
		<tá>:	KARKAMIŠ A3 § 21 ALEPPO 2 § 14 TELL AHMAR 2 § 19

Table 3.12: Rare attestations of <tá> next to <ta>

The names (DEUS)*Tasku-* and [I]*Taita-* are of unknown origin and not analysable from an Indo-European perspective. Their unusual spelling may

thus reflect the scribes' attempt to write a foreign phonetic sequence with no perfect correlate in Luwian itself.

For the other word-initial <tá> spellings in this list, I think the easiest solution is the one proposed by Rieken (2010b: 305), who analyses them as the result of occasional voice assimilation. Each of these forms has a voiced alveolo-dental element elsewhere in the word (**r*, **n*), which may have occasionally affected the dental stop by voicing it. If this analysis is correct, it may provide another argument in favour of word-initial <tá> marking a voiced stop [d], rather than an unvoiced stop [t] in word-initial position.

3.6 Comparison and reconstruction

We may now compare the results of our analysis of the Hieroglyphic Luwian dental stops with what we know about the spelling and phonetics of dental stops in the other Anatolian languages, and so consider how they may have developed from Proto-Anatolian.

3.6.1 Word-initial dental stops

We have seen that most HLuw. lexemes with word-initial dental stops before *a* are spelled with <ta>, indicating a general merger of word-initial stops. Similar mergers seem to have occurred in Lycian, Hittite and Cuneiform Luwian. In Lycian, both original fortis and lenis stops in word-initial position are written using the sign <t>, marking a voiceless stop [t] (Melchert 1994a: 283–286), cf. Lyc. *Trqqñt* (DN) < PIE **trh₂-u-* and *tadi* 'he puts' < PIE **dʰeh₁-ti*. A general merger of word-initial dental stops is also attested for Old Hittite (consistent TA-spelling; Kloekhorst 2010) and Cuneiform Luwian (alternating TA/DA spelling, cf. Section 4.7), although the phonetic outcome does not appear to be the same. We cannot reconstruct a general merger of all word-initial stops for Proto-Anatolian: Hittite evidence shows that word-initial **ti-* must have been distinct from **di-* until pre-Hittite times, as both seem to yield different reflexes: PIE **ti-* > Hitt. *z-*, as in Hitt. *zi-i-ik* 'you' < PIE **tiH-* (Kloekhorst 2008: 26; Melchert 1994a: 117), while PIE **di-* > Hitt. *š-*, as in Hitt. *šīu-* 'god' < PIE **diēu-* (Kloekhorst 2008: 26[41]; Melchert 1994a: 104).

This requires us to assume at least two Proto-Anatolian word-initial dental stop phonemes, with independent mergers in Hittite, Luwian and Lycian.

The remarkable spelling of HLuw. *tá-ti-* is not paralleled in the other languages which have inherited this root. Orthographically, the anlaut of Cuneiform Luwian *t*/*da-a-ti-*, Lycian *ted*(*i*)-, Carian *tedi-* and Lydian *taada-* 'father' is identical to that of words with inherited fortis or lenis dental stops (cf. Section 4.7). This means that the unique pronunciation of HLuw. *tá-ti-* is either an archaism (if the other Anatolian languages have simply lost the distinction) or an innovation (if Hieroglyphic Luwian somehow introduced the Lallwort phonetics secondarily). In any case, the remarkable pronunciation of the anlaut of HLuw. *tá-ti-* and its phonological opposition to inherited PIE word-initial dental stops need not continue anything old.

3.6.2 Word-internal dental stops

Intervocalically, Hieroglyphic Luwian consistent <ta> spellings correspond to fortis dental stops in Cuneiform Luwian ([tː], Melchert 1994a: 229) and Hittite ([tː], Melchert 1994a: 92), which are commonly written with geminate spelling <-Vt-tV->. In the alphabetic script of Lycian, the intervocalic fortis dental stop is rendered with the sign <t>, representing a voiceless stop [t] (Melchert 1994a: 282). I follow Melchert 1994a: 62 and Kloekhorst 2016a: 223–226 in assuming that the Proto-Anatolian precursor to the intervocalic fortis stops was a phonetically long and voiceless stop, e.g. *[tː].

In postconsonantal position, I have argued that Hieroglyphic Luwian shows the result of general shortening and voice assimilation to the preceding consonant. Both developments are well attested in the other Anatolian languages:

1. After voiced consonants, PIE **t* and **d^h* appear to have merged into Old Hittite [d] (spelled alternatingly with both voiced and voiceless signs: TA/DA, TI/DI etc. alternating), cf. Kloekhorst fthc. 6–11, thus showing a similar merger (loss of length + voicing) as Hieroglyphic Luwian.[30] Cuneiform Luwian does not seem to distinguish reflexes

[30] PIE **d* does not seem to have undergone voicing by a preceding voiced consonant,

of PIE **nt* from those of **nd* or **nd^{h}*: all three are spelled with the signs TA and DA alternating, cf. Section 4.4. Also in Lycian, postnasal stops were voiced, the resulting [d] being marked with a sign that normally writes a fortis stop, <t>, preceded by a nasal: Lyc. <ñt> (word-initial or post-consonantal) or <Ṽt> (post-vocalic), cf. Lyc. *ñte* 'inside' (< PIE **d$^{(h)}$*) and 3pl.pret.act. *-Cñte*/*-Ṽte* (< PIE **-nto*). We know that Lyc. <ñt> represents a voiced stop [d] because it is used to represent Gr. δ in borrowed personal names (e.g. Lyc. *Ñtemuχlida-* ← Gr. Δημοκλείδης).[31]

2. After voiceless consonants, both Hittite (Kloekhorst 2013) and Cuneiform Luwian (Section 4.6) display an overwhelming preference for TA spellings, which marks the presence of a voiceless stop [t]. In Lycian, dental stops are regularly lost after *s*, cf. *esu* 'he must be' < **h$_1$es-tu*. There is no way of determining whether this loss was preceded by a general merger of fortis and lenis stops or not, but it seems likely that the change from fortis PAnat. *[t:] > ø /s_ went through an intermediary stage *[t]. Thus: pre-PAnat. *[st:] > *[st] > Lyc. [s].[32]

Thus, our interpretation of the Hieroglyphic Luwian stops as short and voiceless/voiced depending on the preceding consonants finds many correspondences in the other Anatolian languages.

Hieroglyphic Luwian <tà> spelling represents the reflex of the Proto-Anatolian intervocalic lenis stop **d*, continuing a PIE **d$^{(h)}$* or PIE **t* that has

since it was blocked by an intervening glottalic element, cf. Kloekhorst 2013: 137f. This prevents us from reconstructing a complete merger of PIE **nT* into a Proto-Anatolian postnasal voiced stop. However, I see no objections to a merger of PIE **nt* and **nd^{h}* in pre-Proto-Anatolian, by way of a neutralisation of length and voicing.

[31] A similar use is attested in Lydian, where the sign <t> appears to spell [d] after nasals in Lyd. *αlikšantru-* ← Gr. Ἀλέξανδρος. Again, this suggests that fortis stops were voiced after nasals (Melchert 1997b: 45). In Carian, the sign <δ> corresponds to Greek δ and Egyptian *d*, indicating a voiced stop. The fact that we find this sign in Car. *trqδ*, the cognate of CLuw. *Tarḫunt-*, Lyc. *trqqñt-* etc. (< PIE **-nt-*), indicates that also in Carian, original fortis (voiceless) stops have undergone voicing after nasals.

[32] As far as I know, there are only cases of **s* + fortis stop in Lycian. Presumably, also lenis stops were lost in this position. Attested cases of Lycian word-internal *-st-* go back to secondary formations (such as *qasttu* 'he must destroy' [iter.] < syncopated **g^{wh}en-ske-tu*).

been lenited in Proto-Anatolian. In Hittite, this stop is spelled with the signs TA and DA alternating, cf. Hitt. *a-ta-an-zi* ~ *a-da-an-zi* 'they eat'. Kloekhorst (2013: 139f.) has argued that this alternation represents a voiced stop [d]. Cuneiform Luwian shows consistent TA-spelling in this position, suggesting the presence of a short voiceless stop [t] (Section 4.5). Finally, Lycian, uses the sign <d> to write intervocalic lenis stops. As mentioned in Section 3.4.3, it is commonly believed that this sign does not write a voiced *stop*, but rather something else, perhaps a voiced fricative [ð]. I agree with Hajnal (1995: 32[11]) and Rieken (2010b: 306) that a similar phonetic interpretation is applicable to Hieroglyphic Luwian, so that HLuw. <tà> may well represent a voiced fricative [ð]. I will argue in Section 4.5.1 that we must reconstruct a short voiceless stop *[t] for Proto-Anatolian, for the reason that the alternative, PAnat. *[d] (as reconstructed in Melchert 1994a: 54) would require intervocalic devoicing to arrive at the Cuneiform Luwian reflex [t]. If we start from PAnat. *[t], we only have to assume voicing of the intervocalic lenis stop in Hittite, Lycian and Hieroglyphic Luwian. Additionally, Lycian and Hieroglyphic Luwian may show the effects of subsequent fricativisation ([d] > [ð]).

3.7 Summary and conclusion

The established correlations between spelling, phonetics and phonology in Hittite, Luwian and Lycian can be summarised as follows, cf. Table 3.13.

In this chapter, my analysis of the use of <ta> and <tá> in Hieroglyphic Luwian departs from that of Rieken 2010b with the observation that (dental) stops in contact with [s]/[ʃ] are more likely to be voiceless than voiced, as voicing in this position is typologically unlikely. Consequently, I have interpreted the alternating <ta>/<tá> spelling pattern in postconsonantal position as primarily *short* stops, which could be voiced or voiceless according to the consonant preceding them. This means that the intervocalic fortis stops (written consistently with <ta>) cannot have been distinct from the postconsonantal ones in terms of voice. I have proposed that they are rather distinctive in length, which fits well with both the phonetic value of etymologically comparable sequences in the cuneiform languages and the Proto-

	#T-	-VTTV-	-VTV-	-C[+voice]T-	-C[-voice]T-
OHitt.					
Spelling	<TA>	<TA>	<T/DA>	<T/DA>	<TA>
Phonetics	[t]	[tː]	[d]	[d]	[t]
Phonology	/tː/	/tː/	/t/	/t/	/t/
CLuw.					
Spelling	<T/DA>	<TA>	<TA>	<T/DA>	<TA>
Phonetics	[d]	[tː]	[t]	[d]	[t]
Phonology	/t/	/tː/	/t/	/t/	/t/
HLuw.					
Spelling	<ta> vs. <tá>	<ta>	<tà>	<ta/tá>	<ta/tá>
Phonetics	[t] vs. [d]	[tː]	[ð]	[d]	[t]
Phonology	/t/ vs. /d/	/t/	/θ/	/t/	/t/
or:					
Phonetics	[tː] vs. [t]	[tː]	[ð]	[d]	[t]
Phonology	/tː/ vs. /t/	/tː/	/θ/	/t/	/t/
Lyc.					
Spelling	<t>	<t>	<d>	<t>	<t>
Phonetics	[t]	[t]	[ð]	[d]	[t]
Phonology	/t/	/t/	/θ/	/t/	/t/
PAnat.					
Phonetics	*[tː] vs. *[t]	*[tː]	*[t]	*[d]?	*[t]?
Phonology	*/tː/ vs. */t/	*/tː/	*/t/	*/t/?	*/t/?

Table 3.13: Spelling, phonetics and phonology of dental stops in Hittite, Luwian, Lycian and Proto-Anatolian.

Anatolian intervocalic fortis stop as reconstructed in, e.g., Kloekhorst 2008: 21–25 and Melchert 1994a: 62. A second major difference between my analysis and that of Rieken revolves around HLuw. *tá-ti-* 'father'. I have argued that this lexeme contrasts with other words in the language that have word-initial dental stops. I have presented two ways to interpret the opposition phonetically: in terms of voicing or length/aspiration.

With respect to its marking of phonetic and phonological features of the dental stop, Hieroglyphic Luwian takes a middle position between the cuneiform languages on the one hand and Lycian on the other. Like the cuneiform languages and unlike Lycian, it distinguishes long stops (only <ta>) and short stops (both <ta> and <tá>). Like Lycian, on the other hand, it consistently marks a contrast between stops (<ta> and <tá>) and another type of consonant, presumably a fricative (<tà>). Hieroglyphic Luwian thus shows both the signs of a new stop vs. fricative system, while still showing the vestiges of a long vs. short stop opposition in its orthography, and perhaps even in its phonology.[33]

[33] As an avenue for future research, I suggest a detailed focus on different chronological periods, so as to combine the distribution found in this chapter with the diachronic replacement of <tá> by <ta> we observed in Section 3.1. As we have seen, this replacement was gradual from the Empire texts to our latest texts onwards. It is to be expected that some items drop their <tá> spellings relatively quickly, while others retain theirs for longer. The rate of replacement in some lexemes or time periods may reveal extra details about the use of <ta> and <tá> in Hieroglyphic Luwian.