Mora Insertion in Tetsǫ́t'ıné: Apparent cases of under- and overapplication

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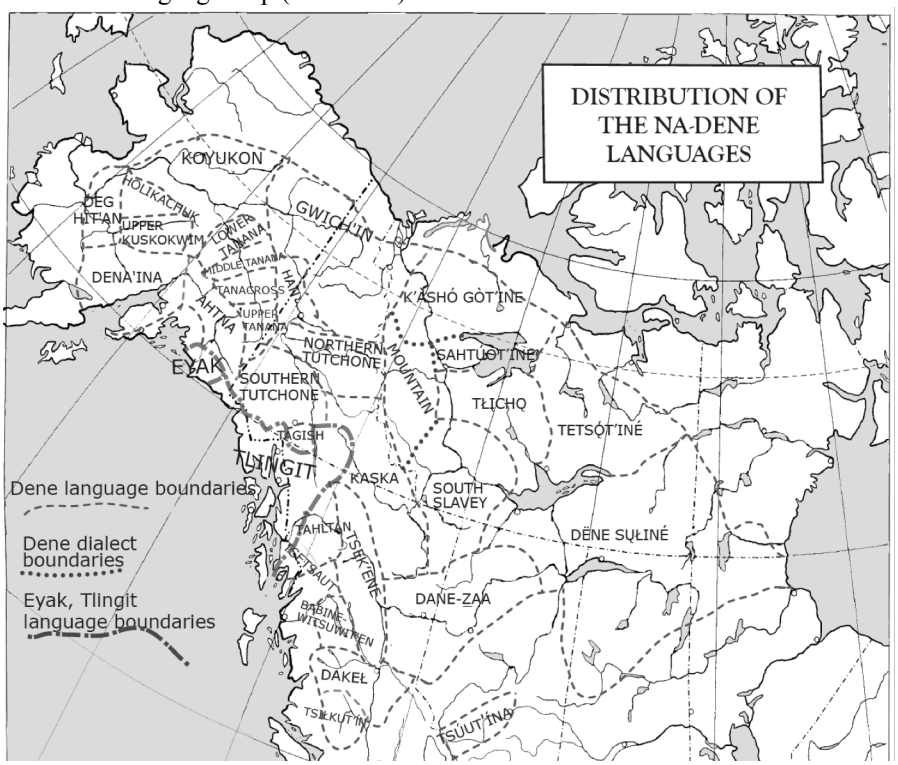
1 Background on Tetsǫ́t'ıné

Tetsǫ́t'ıné (Yellowknife) is a dialect of Dëne Sųłıné (ISO: CHP) spoken in Canada's Northwest Territories. Tetsǫ́t'ıné was first documented in a wordlist published by Haas (1968). The Tetsǫ́t'ıné dialect, along with the Yellowknives Dene themselves, was declared extinct by Gillespie (1981). In spite of this, recently a dictionary (Cardinal, Jaker & Cardinal 2021) and a verb grammar (Jaker & Cardinal 2020) of this dialect have been published. A map of northern Dene languages is given in (1). Note that Tetsǫ́t'ıné is separated from Dëne Sųłıné by a dialect boundary.

(1) Northern Dene language map (Kari 2020)



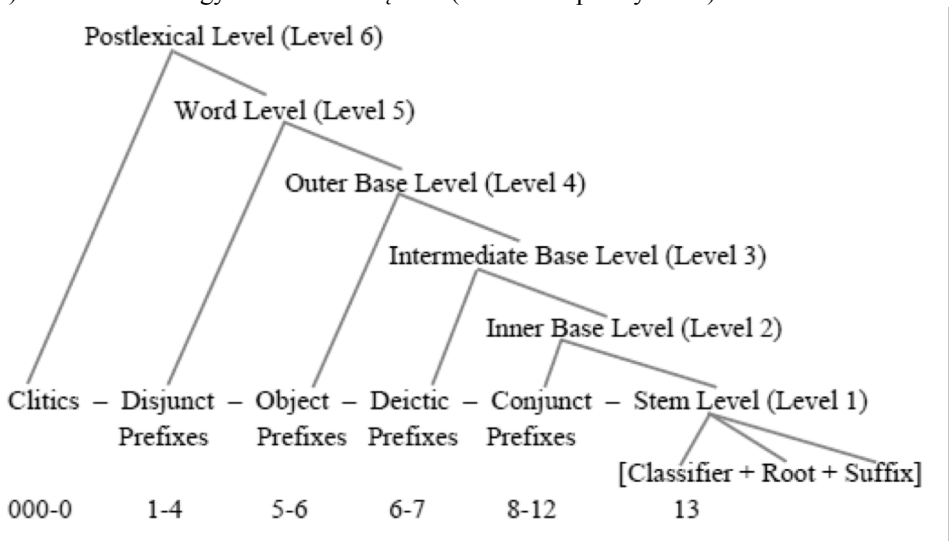
Tetsǫ́t'ıné, like all Dene languages, is a templatic, prefixing language. Its morphology could be characterized as underlyingly agglutinating, but surface-fusional: underlying forms consist of discrete prefixal elements with clearly identifiable meanings, but these prefixes often fuse on the surface due to processes of intervocalic consonant deletion and vowel coalescence. Tetsǫ́t'ıné has four contrastive tones (High, Low, Rising, Falling), contrastive vowel length, and quantity-sensitive iambic stress (Jaker & Howson 2022).

* I wish to thank Keren Rice, Elan Dresher, Paul Kiparsky, and participants at AMP 2022 for comments on this paper. I especially wish to thank the late Emerence Cardinal for working with me and teaching me her language.

2 Lexical Phonology of Tetsǫ̨t'ıné

The Tetsǫ̨t'ıné verb is templatic and prefixing (Jaker & Cardinal 2020). However, these template positions seem to form a layered structure. Applying level ordering to the Dene verb was first proposed by Hargus (1988), for the northern Dene language Sekani. Previous Lexical Phonology work on Tetsǫ̨t'ıné has argued for a total of 6 levels (5 lexical levels + the postlexical level) (Jaker & Kiparsky 2020, Jaker & Cardinal 2020, Jaker 2022), as shown in (2). The numbers at the bottom of (2) are template positions.

(2) Lexical Phonology model of Tetsǫ̨t'ıné (Jaker & Kiparsky 2020)



Under this model, different prefixes are assigned to different levels. A list of which prefixes are assigned to which levels is given in (3).

(3) Examples of prefixes assigned to different levels

Level	Level 6	Level 5	Level 4	Level 3	Level 2	Level 1
Template positions	000 – 0	1 – 4	5 – 6	6 – 7	8 – 12	13
Examples	ɣá$_0$ – for łaH$_0$ – THM se$_{00}$ -1sgIO ne$_{00}$ – 2sgIO je$_{00}$ – 3sgIO	ná$_1$ – CONT já$_1$ – into.air xá$_1$ - out dá$_2$ – DISTR na$_3$ –ITER ja$_4$ – speech	ho$_5$ – AREALO se$_6$ – 1sgO ne$_6$ – 2sgO je$_6$ -3sgO nuhe$_6$ -1/2plO hube$_6$ – 3plO heje$_6$ – 3plO	ʔe$_6$ –IMPERSO he$_7$ – 3plS ts'e$_7$ – IMPERSS	ne$_8$ - QUAL te$_9$ –INCEP Hθe$_{10}$ – CON Hɲe$_{10}$ – MOM hí$_{10}$ – SEM ɣe$_{10}$ – DUR ɲe$_{11}$ – PERF ɣu$_{11}$ – OPT s$_{12}$ – 1sgS ɲe$_{12}$ – 2sgS híd$_{12}$ -1plS ah$_{12}$ – 2plS	l$_{13}$ – CAUS.MID ɬ$_{13}$ - CAUS d$_{13}$ – MID

The level to which a prefix belongs determines the phonological processes in which it will participate. A morpheme belonging to Level 1 will participate in the phonological processes of all levels, 1-6. A Level 2 prefix will participate in the processes of Levels 2-6, but not Level 1. A Level 3 prefix will participate in the processes of Levels 3-6, but not 1 and 2, etc.

In Tetsǫ̨t'ıné, as in most other Dene languages, most of the morphophonemics involve intervocalic consonant deletion, and the vowel coalescence that results from that. Different consonants delete (or lenite) at different levels. A table summarizing which consonants delete (or lenite) at which levels is given in (4).

(4) Summary of which consonants delete at which levels

Consonants	h	ɣ	x	ɲ	n	t	θ
Level 2	h	ɣ	-----	ɲ	-----	t, (t → x)	θ
Level 3	-----	(ɣ → w)	(x → w)	-----	-----	-----	-----
Level 4	h	-----	-----	ɲ	-----	-----	θ
Level 5	-----	-----	-----	-----	-----	-----	-----
Level 6	h	ɣ	x, (x → h)	ɲ	-----	t	-----

3 Systematic Underspecification

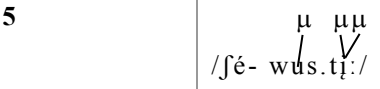
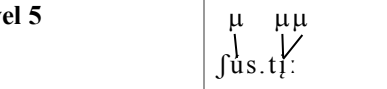
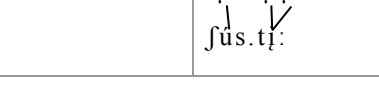
The essential puzzle concerning Tetsǫ́t'ıné prefix vowel length is this: All long vowels in prefixes are the result of intervocalic consonant deletion; however, not all cases of intervocalic consonant deletion result in a long vowel. Whether intervocalic consonant deletion results in a long or a short vowel depends on a combination of two factors: the consonant which was deleted, and the level to which the preceding prefix belongs. In my recent *NLLT* article (Jaker 2022), I argued that the key generalization is *when* consonant deletion occurs, relative to affixation. This is stated in (5).

(5) Relationship between intervocalic consonant deletion and vowel length (Jaker, to appear)

a) When an intervocalic consonant C_2 is deleted at the same level that a preceding prefix is added, a short vowel results: /V_1-C_2V_3/ → [$V_{1,3}$].
b) When V_1 is added first, and C_2 is deleted at a later level, a long vowel results: /V_1-C_2V_3/ → $V_1C_2V_3$ → [V_1V_3].

An illustration of this generalization is given in (6).

(6) The Level 5 prefix *ʃé* followed by both *w* and *ɣ*

Level	**(a) Consonant deletes at same level, short vowel results**	**(b) Consonant deletes at later level, long vowel results**
Input to Level 5	 /ʃé- wʉs.tı̨:/	 /ʃé- ɣɛs.tı̨:/
Output of Level 5 (deletion of *w*)	 ʃʉs.tı̨:	 ʃé.ɣɛs.tı̨:
Output of Level 6 (deletion of *ɣ*)	 ʃʉs.tı̨:	 ʃɛɛs.tı̨:

In (6), the prefix *ʃé* is a Level 5 prefix. *w* deletes at Level 5, while *ɣ* deletes at Level 6. Therefore, when *w* deletes at Level 5, a short vowel results. When *ɣ* deletes at Level 6, the preceding vowel has already acquired a mora, and so a long vowel results.

4.0 Underapplication: Optative paradigms

The optative prefix /ɣu/ is a Level 2 prefix. Our analysis so far predicts that if /ɣu/ is preceded by a Level 4 or 5 prefix, a long vowel should result. Instead, we observe short vowels in the singular forms, and long vowels in the plural forms, as shown in (7)-(8), with the Level 5 prefixes *ʃé* and *ná*.

4.1 *Data*

(7) *ɣu* preceded by Level 5 prefix results in short vowels in singular forms

Underlying form	Surface form	English gloss
a. /ʃé-**ɣ**u-s=d-tį:/	ʃ**ú**stĩ:	'I will eat'
b. /ʃé-**ɣ**u-ɲe=d-tį:/	ʃ**ų́**tĩ:	'you (sg) will eat'
c. /ʃé-**ɣ**u=d-tį:/	ʃ**ú**tĩ:	'he/she will eat'
d. /ná-**ɣ**u-s=l-zé:/	n**ó**szé:	'I will hunt'
e. /ná-**ɣ**u-ɲe=l-zé:/	n**ǫ́**lzé:	'you (sg) will hunt'
f. /ná-**ɣ**u=l-zé:/	n**ó**lzé:	'he/she will hunt'

(8) *ɣu* preceded by Level 5 prefix results in long vowels in plural forms

Underlying form	Surface form	English gloss
a. /ʃé-**ɣ**u-híd=d-tĩ:/	ʃ**úú**tį:	'we (2) will eat'
b. /ʃé-**ɣ**u-uh=d-tĩ:/	ʃ**úu**htį:	'you (2) will eat'
c. /ʃé-xe-**ɣ**u=d-tĩ:/	ʃéh**uu**tį:	'they (2) will eat'
d. /ná-**ɣ**u-híd=l-zé:/	n**áú**lzé:	'we will hunt'
e. /ná-**ɣ**u-uh=l-zé:/	n**áu**łzé:	'you (pl) will hunt'
f. /ná-xe-**ɣ**u=l-zé:/	náh**uu**lzé:	'they will hunt'

ref: TVG: 129, 141

This same pattern—of short vowels in the singular forms, and long vowels in the plural forms—is also found following a Level 4 prefix, as shown in (9) and (10).

(9) *ɣu* preceded by Level 4 prefix results in short vowels in singular forms

Underlying form	Surface form	English gloss
a. /ne-**ɣ**u-s=l-ts'ʊ́n/	n**u**sts'ʊ́n	'I will kiss you'
b. /se-**ɣ**u-ɲe=l-ts'ʊ́n/	s**ų**lts'ʊ́n	'you (sg) will kiss me'
c. /je-**ɣ**u=l-ts'ʊ́n/	j**u**lts'ʊ́n	'he/she will kiss him'

(10) *ɣu* preceded by Level 4 prefix results in long vowels in plural forms

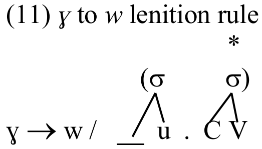
Underlying form	Surface form	English gloss
a. /ne-**ɣ**u-híd=l-ts'ʊ́n/	n**uú**lts'ʊ́n	'we will kiss you'
b. /se-**ɣ**u-uh=l-ts'ʊ́n/	s**uu**łts'ʊ́n	'you (pl) will kiss me'
c. /se-xe-**ɣ**u=l-ts'ʊ́n/	seh**uu**lts'ʊ́n	'they will kiss me'

ref: TVG: 131

4.2 *Lexical Phonology analysis*

To account for these data, I propose two rules: a *ɣ* to *w* lenition rule, and a *w* deletion rule. The *ɣ* to *w* lenition rule is shown in (11). This rule is motivated by the need to have high-sonority onsets in prosodically weak positions (González 2003). Subsequently, *w* is deleted at Levels 4 and 5, as shown in (12).

(11) *ɣ* to *w* lenition rule (Level 3)



"*ɣ* lenites to *w* before *u,* in the onset of the weak position of an iambic foot."

(12) Intervocalic *w* deletion (Levels 4 and 5)

w → Ø / V __ V

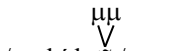
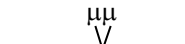
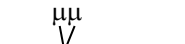
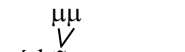
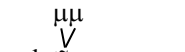
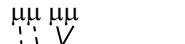
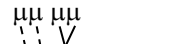
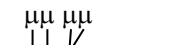
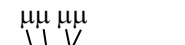
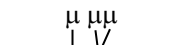
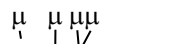
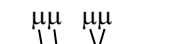
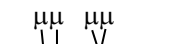
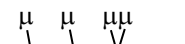
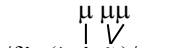
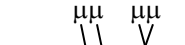
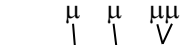
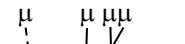
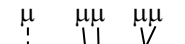
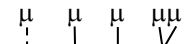
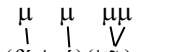
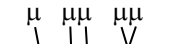
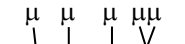
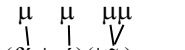
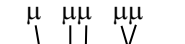
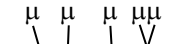
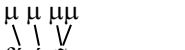
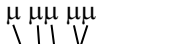
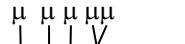
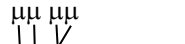
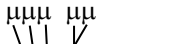
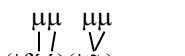
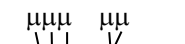
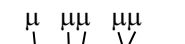
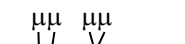
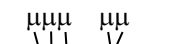
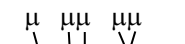
"*w* is deleted in between two vowels."

The application of these two rules is illustrated in (13) and (14).

(13) Derivation of the optative singular forms of *ʃétĩ:* 'eat'

Underlying form	μμ /ʃé-ɣu-s=d-tĩ:/	μμ /ʃé-ɣu-ɲe=d-tĩ:/	μμ /ʃé-ɣu=d-tĩ:/
----------Level 2----------			
Input	μμ /ɣu-s=tĩ:/	μμ /ɣu-ɲe=tĩ:/	μμ /ɣu=tĩ:/
Intervocalic *ɣ* deletion	-----	-----	-----
Segmental rules	-----	ɣũtĩ:	-----
Mora insertion	μ μμ ɣus.tĩ:	μ μμ ɣũ.tĩ:	μ μμ ɣu.tĩ:
----------Level 3----------			
Input	μ μμ ɣus.tĩ:	μ μμ ɣũ.tĩ:	μ μμ ɣu.tĩ:
Mora insertion	-----	-----	-----
Foot construction	μ μμ (ɣus.ˈtĩ:)	μ μμ (ɣũ.ˈtĩ:)	μ μμ (ɣu.ˈtĩ:)
ɣ → w lenition	μ μμ (wus.ˈtĩ:)	μ μμ (wũ.ˈtĩ:)	μ μμ (wu.ˈtĩ:)
----------Level 4----------			
(no prefixes added)			
----------Level 5----------			
Input	μ μμ /ʃé- (wus.ˈtĩ:)/	μ μμ /ʃé- (wũ.ˈtĩ:)/	μ μμ /ʃé- (wu.ˈtĩ:)/
Intervocalic *w* deletion	μ μμ ʃé.us.tĩ:	μ μμ ʃé.ũ.tĩ:	μ μμ ʃé.u.tĩ:
Segmental rules	μ μμ ʃús.tĩ:	μ μμ ʃũ.tĩ:	μ μμ ʃú.tĩ:
Mora insertion	-----	-----	-----
Foot construction	μ μμ (ˈʃús.tĩ:)	μ μμ (ˈʃũ.tĩ:)	μ μμ (ˈʃú.tĩ:)
----------Level 6----------			
Input	μ μμ (ˈʃús.tĩ:)	μ μμ (ˈʃũ.tĩ:)	μ μμ (ˈʃú.tĩ:)
Debuccalization	-----	-----	-----
Segmental rules	-----	-----	-----
Mora insertion	-----	-----	-----
Surface form	μ μμ (ˈʃús.tĩ:)	μ μμ (ˈʃũ.tĩ:)	μ μμ (ˈʃú.tĩ:)
English gloss	*'I will eat'*	*'you (sg) will eat'*	*'he/she will eat'*

(14) Derivation of the optative plural forms of */ɛ̌ɛ̨ı:* 'eat'

Underlying form	 /ʃé-ɣu-híd=d-tĩ:/	 /ʃé-ɣu-uh=d-tĩ:/	 /ʃé-xe-ɣu=d-tĩ:/
----------Level 2----------			
Input	 /ɣu-híd=tĩ:/	 /ɣu-uh=tĩ:/	 /ɣu=tĩ:/
Intervocalic *ɣ* deletion	-----	-----	-----
Segmental rules	 ɣúd.tĩ:	 ɣuh.tĩ:	 ɣu.tĩ:
Mora insertion	 ɣúd.tĩ:	 ɣuh.tĩ:	 ɣu.tĩ:
----------Level 3----------			
Input	 /ɣúd.tĩ:/	 /ɣuh.tĩ:/	 /xe- ɣu.tĩ:/
Mora insertion	-----	-----	 xe.ɣu.tĩ:
Foot construction	 (ˈɣúd)(ˈtĩ:)	 (ˈɣuh)(ˈtĩ:)	 (xe.ˈɣu)(ˈtĩ:)
ɣ → w lenition	-----	-----	-----
----------Level 4----------			
(no prefixes added)			
----------Level 5----------			
Input	 /ʃé- (ˈɣú.tĩ:)/	 /ʃé- (ˈɣuh)(ˈtĩ:)/	 /ʃé- (xe.ˈɣu)(ˈtĩ:)/
Intervocalic *w* deletion	-----	-----	-----
Segmental rules	-----	-----	-----
Mora insertion	 ʃé- (ˈɣú.tĩ:)	 ʃé- (ˈɣuh)(ˈtĩ:)	 ʃé- (xe.ˈɣu)(ˈtĩ:)
Foot construction	 (ʃé.ˈɣú)(ˈtĩ:)	 (ˈʃé.ɣuh)(ˈtĩ:)	 (ˈʃé.xe)(ɣu.ˈtĩ:)
----------Level 6----------			
Input	 (ʃé.ˈɣú)(ˈtĩ:)	 (ˈʃé.ɣuh)(ˈtĩ:)	 (ˈʃé.xe)(ɣu.ˈtĩ:)
Debuccalization	 ʃé.ú.tĩ:	 ʃé.uh.tĩ:	 ʃé.he.u.tĩ:
Segmental rules	 ʃúú.tĩ:	 ʃúuh.tĩ:	 ʃé.huu.tĩ:
Mora insertion	-----	-----	-----
Foot construction	 (ˈʃúú)(ˈtĩ:)	 (ˈʃúuh)(ˈtĩ:)	 (ˈʃé.huu)(ˈtĩ:)
Surface form	 (ˈʃúú)(ˈtĩ:)	 (ˈʃúuh)(ˈtĩ:)	 (ˈʃé.huu)(ˈtĩ:)
English gloss	'we (2) will eat'	'you (2) will eat'	'they (2) will eat'

5.0 Overapplication: Pre-accenting prefixes

With the pre-accenting prefixes *θe* and *ɲe*, the opposite issue occurs: *θ* and *ɲ* delete at Level 4; however, when *θe* and *ɲe* are preceded by a Level 4 prefix, a *long* vowel results. Thus, with respect to the basic generalization in (5), there seems to be *overapplication* of mora insertion. To explain this pattern, I propose that *θe* and *ɲe* are preceded by a NULL VOWEL which is lexically pre-associated to a High tone: /Ǿ/. This null vowel acquires a mora at Level 2, which accounts for the extra vowel length.

5.1 *Data*

(15) Examples of *θe* preceded by a Level 4 prefix

Underlying form	**Input to Level 4**	**Surface form**	**English gloss**
a. /ne-Ǿ**θ**e-i=ʔéːθ/	ne- Ǿ**θ**iʔéːθ	n**íi**ʔéːθ	'I kicked you'
b. /se-Ǿ**θ**e-ɲe=ʔéːθ/	se- Ǿ**θ**ĩʔéːθ	s**ĩ́ĩ**ʔéːθ	'you (sg) kicked me'
c. /se-Ǿ**θ**e-uh=ʔéːθ/	se- Ǿ**θ**uhʔéːθ	s**úu**hʔéːθ	'you (pl) kicked me'
d. /ne-Ǿ**θ**e-i=tθ'íː/	ne- Ǿ**θ**itθ'íː	n**íi**tθ'íː	'I pinched you'
e. /se-Ǿ**θ**e-ɲe=tθ'íː/	se- Ǿ**θ**ĩtθ'íː	s**ĩ́ĩ**tθ'íː	'you (sg) pinched me'
f. /se-Ǿ**θ**e-uh=tθ'íː/	se- Ǿ**θ**uhtθ'íː	s**úu**htθ'íː	'you (pl) pinched me'

ref: Jaker & Cardinal (2020: 95, 119)

(16) Examples of *ɲe* preceded by a Level 4 prefix

Underlying form	**Input to Level 4**	**Surface form**	**English gloss**
a. /ła-ne-Ǿ**ɲ**e-i=ɬ-ðər/	ne- Ǿ**ɲ**iɬθər	łan**íi**ɬθər	'I killed you'
b. /ła-se- Ǿ**ɲ**e-ɲe-ɲe=ɬ-ðər/	se- Ǿ**ɲ**ĩɬθər	łas**ĩ́ĩ**ɬθər	'you (sg) killed me'
c. /ła-je-Ǿ**ɲ**e-ɲe=ɬ-ðər/	je- Ǿ**ɲ**ĩɬθər	łaj**ĩ́ĩ**ɬθər	'he/she killed it'
d. /ní-je-Ǿ**ɲ**e-ɲe=laː/	je- Ǿ**ɲ**ĩlaː	níj**ĩ́ĩ**laː	'he/she put them down (pl. objects)'
e. /ní-je-Ǿ**ɲ**e-ɲe=tąː/	je- Ǿ**ɲ**ĩtãː	níj**ĩ́ĩ**tãː	'he/she put it down (sticklike obj.)'
f. /ní-je-Ǿ**ɲ**e-ɲe=ʔąː/	je-Ǿ**ɲ**ĩʔãː	níj**ĩ́ĩ**ʔãː	'he/she put it down (heavy object)'

ref: Jaker & Cardinal (2020: 149, 152)

5.2 *Lexical Phonology analysis*

By NULL VOWEL, I mean a vowel whose root node is defective—that is, phonetically uninterpretable. As a result, all features which are dependent on the root node (including tone) are phonetically uninterpretable as well, unless the root node coalesces with another root node which is not defective before the end of the derivation. If the defective root node has not coalesced with another root node by the end of the derivation, all features dependent on the defective root node are deleted. The effect of this null vowel on the insertion of moras is illustrated in (17). Crucially, note that the null vowel acquires a mora by the Mora Insertion rule at Level 2, which accounts for the extra vowel length at Level 4.

(17) Derivation of the perfective forms *níiʔé:θ* 'I kicked you' and *súuhʔé:θ* 'you (pl) kicked me'

Underlying form	μμμ /ne-Ǿθe-i=ʔé:θ/	μμμ /se-Ǿθe-uh=ʔé:θ/
----------Level 2----------		
Input	μμμ /Ǿθe-i=ʔé:θ/	μμμ /Ǿθe-uh=ʔé:θ/
Coalescence	μμμ Ǿθi.ʔé:θ	μμμ Ǿθuh.ʔé:θ
Mora insertion	μ μ μμμ Ǿθi.ʔé:θ	μ μμ μμμ Ǿθuh.ʔé:θ
Foot construction	μ μ μμμ Ǿ(θi.ˈʔé:θ)	μ μμ μμμ Ǿ(ˈθuh)(ˈʔé:θ)
----------Level 3----------		
(no affixes added at this level)		
----------Level 4----------		
Input	μ μ μμμ /ne- Ǿ(θi.ˈʔé:θ)/	μ μμ μμμ /se- Ǿ(ˈθuh)(ˈʔé:θ)/
Coalescence	μ μ μμμ né.θi.ʔé:θ	μ μμ μμμ sé.θuh.ʔé:θ
Intervocalic *θ* deletion	μ μ μμμ né.i.ʔé:θ	μ μμ μμμ sé.uh.ʔé:θ
Coalescence	μμ μμμ níiʔé:θ	μμμ μμμ súuhʔé:θ
Mora insertion	-----	-----
Foot construction	μμ μμμ (ˈníi)(ˈʔé:θ)	μμμ μμμ (ˈsúuh)(ˈʔé:θ)
Surface form	μμ μμμ (ˈníi)(ˈʔé:θ)	μμμ μμμ (ˈsúuh)(ˈʔé:θ)
English gloss	'I kicked you'	'you (pl) kicked me'

6 Conclusion

We have examined cases of overapplication and underapplication of mora insertion in Tetsǫ́t'ıné. In optative paradigms, a rule which lenites *ɣ* to *w* applies in prosodically weak position at Level 3, leading to exceptionally short vowels in the singular forms. In the case of the *θe* and *ɲe* conjugation markers, a null vowel acquires a mora at Level 2, leading to exceptionally long vowels at Level 4. In both cases, the explanation of surface vowel length involves careful attention to representations, as well as a form's derivational history. This type of explanation is facilitated by the Lexical Phonology framework, where a form's derivational history reflects its morphological structure.

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