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Abstract This paper deals with vowel length in Friulian, and shows that this is sometimes phonologically predictable and sometimes an instance of mora affixation in conjugation 1 verbs. Building on newly collected data on verbal morphology, we make the hypothesis that the Theme morpheme in conjugation 1 verbs in the dialect of Negrons has distinct allomorphs, among which a mora. This analysis of morphological length in Negrons Friulian shows that there is no need for a morphome-based analysis of the data. In our analysis, each morph, including length, spells out a morphosyntactic property.

Keywords Vowel length · Mora affixation · Friulian · Verbal paradigms

1 Introduction

From a typological perspective, Romance consists of fusional languages in which suffixation, and secondarily prefixation, play a central role in both inflectional and derivational morphology. Friulian, the easternmost of the Rhaeto-Romance languages (the other two being Ladin and Romansh) spoken in Friuli − a historical region in North-eastern Italy − displays an intriguing case of morphologically-conditioned vowel length occurring in one conservative dialect. This dialect, which we refer to as Negrons (henceforth NE), is spoken in the village from which our informants come. It is characterized by vowel lengthening in open, non-final syllables in some forms of present indicative (henceforth PI) and present subjunctive (henceforth PS). This

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Table 1: NE: PI and PS, conjugation 1 'swim'

	PI	PS
1SG	ˈ**na:di**	ˈ**na:di**
2SG	ˈnadas	ˈ**na:dis**
3SG	ˈnada	ˈ**na:di**
1PL	naˈdiŋ	naˈdiŋ
2PL	naˈdai̯s	naˈdai̯s
3PL	ˈnad-iŋ∼aŋ	ˈ**na:diŋ**

Table 2: ÇU: PI and PS, conjugation 1 'swim'

	PI	PS
1SG	ˈnodi	ˈnodi
2SG	ˈnodis	ˈnodis
3SG	ˈnode	ˈnodi
1PL	noˈdiŋ	noˈdiŋ
2PL	noˈdai̯s	noˈdai̯s
3PL	ˈnodiŋ̂	ˈnodiŋ̂

happens exclusively in conjugation 1 verbs. Table 1 shows the entire paradigms of PI and PS, respectively, of a conjugation 1 verb.

Vowel lengthening occurs in the 1SG of PI, and in the 1-3SG and 3PL of the PS, as first reported in Roseano (2015) (forms appear in boldface). In contrast, in another dialect, Central Friulian as spoken in Çupicje (henceforth ÇU), no vowel length ever occurs in conjugation 1 verbs. This is shown in table 2.

It is generally wellknown that Friulian displays vowel length mostly in stressed, word-final positions. Before an underlying voiced obstruent, which undergoes final obstruent devoicing, vowels always surface as long, as shown in (1a). When the final obstruent is underliyngly voiceless, however, the vowel is short (1b). According to Loporcaro (2015), all vowel length distinctions, including those before obstruents, are underlying. Iosad (2016), however, claims that vowel length before obstruents is derived by a productive, synchronic process of vowel lengthening, and that the presence of such a process is not incompatible with instances of underlying, contrastive vowel length in the same language. In this paper we adhere to Iosad's (2016) view of vowel length in Friulian as derived length before word-final obstruents (see also Iosad and Wetzels ress for a comprehensive overview of vowel length in Romance).

(1) a. [ˈkɾuːt] 'raw.M.SG' vs. [ˈkɾude] 'raw.F.SG'
b. [ˈbɾut] 'ugly.M.SG' vs. [ˈbɾute] 'ugly.F.SG'

The source of vowel length in table 1 does not seem contextually conditioned, since it appears in some stressed, non-final open syllables.

This paper deals with this particular case of vowel length in verbs, and hypothesizes that it is a case of morphologically conditioned mora affixation. In other words, we claim that the conjugation 1 Theme morpheme in NE has various allomorphs among which there is a segmentally empty mora. All the allomorphs are lexically listed, and are inserted when specific morphophonological conditions are met: as we will show, the mora is subcategorized for a subset of cells belonging to either PI or PS. We build our analysis on new data that we collected in December 2018. 4 speakers (3 men and 1 woman aged between 38 and 81) were interviewed and recorded in NE by the second author, and 5 speakers in ÇU by the first author (3 men and 2 women aged between

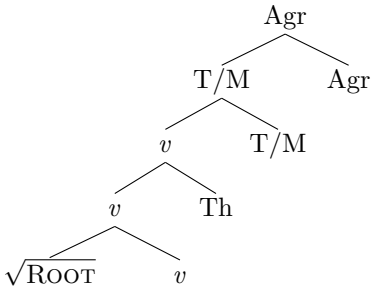
33 and 80). The participants were chosen among the members of the local communities that are considered conservative speakers. All of them reported Friulian to be their L1 and declared that they are dominant in Friulian, Italian being their second language both in terms of age of acquisition and of use in their daily lives. Each speaker was asked to produce the paradigms of PI (6 persons), PS (6 persons), II (6 persons), imperative (2 persons) and infinitive of 7 verbs of conjugation 1 (*judâ* 'to help', *nadâ* 'to swim', *saludâ* 'to say hello', *clamâ* 'to call', *pestâ* 'to beat/tread', *mangjâ* 'to eat', *telefonâ* 'to phone'), 2 verbs of conjugation 2 (*tasê* 'to shut up' and *valê* 'to be worth' in NE, *tasê* 'to shut up' and *temê* 'to fear' in ÇU), 3 verbs of conjugation 3 (*bevi* 'to drink', *bati* 'to beat, to heat', *tindi* 'to hang, to tense'), 2 verbs of non-incohative conjugation 4 (*cusî* 'to sew' and *sintî* 'to hear') and 2 verbs of inchoative conjugation 4 (*agredî* 'to harass' and *capî* 'to understand'). On the whole, 2,016 verbal forms were collected (21 forms * 16 verbs * 9 speakers). Data were recorded by means of a Zoom H4n Pro digital recorder in both ÇU and NE. Recordings were then annotated by means of Praat by the second author (a native speaker of Friulian), who provided a broad phonetic transcription of each form.

Our analysis follows a decompositional approach to inflectional morphology, consisting of identifying the form of the exponents of each morphosyntactic category. This approach is couched within a post-Bloomfieldian framework, such as that initiated by Halle (1973) and related work, which aims at reducing the role of the lexicon in the derivation of inflected forms, and defends the idea that surface forms result from regular phonological computation.

Among current theories, such a model is represented by Distributed Morphology (Halle and Marantz 1993, Embick 2010, Embick 2015, Embick and Halle 2005 i.a.) (henceforth DM). The basic idea of DM, like many other syntactic approaches to morphology, is that words are built in syntax. After syntactic operations, the terminal nodes are associated with morphs, called Vocabulary Items (henceforth VI), according to subcategorization requirements; this process occurs throughout the operation called spell-out. In other words, spell-out is responsible for giving morphemes a phonological exponent. This assumes an uncontroversial view in most rule-based or constraint-based models of phonology: the input to the phonology for some word W consists of the phonological underlying representations of the various morphemes making up W, arranged in the linear order dictated by W's constituent structure.

Consistently with the DM literature on verbal inflection (Calabrese 1998, Calabrese 2015, Embick 2000, Embick 2012, Embick and Halle 2005, Embick and Noyer 2007, Oltra-Massuet 2000, Oltra-Massuet and Arregi 2005, and others), we adopt (2) as the basic complex head of the inflected form of a Friulian verb. This structure is formed by successive head-to-head movement: the root moves upwards through the functional head *v*, the head T/M and finally Agr. We assume that the terminal node Th is adjoined to *v*.[1]

(2) Complex head of Friulian verb



[1] Oltra-Massuet and Arregi (2005) assume that Th is adjoined to all functional heads in the verbal domain; in Embick (2010) and related works, Th is adjoined only to *v*. A third possibility is explored by Calabrese (2015), for whom Th is adjoined only in the structure of what he calls 'thematic verbs' (= regular verbs), whereas athematic, irregular verbs lack Th. We do not explore this issue any further in the paper.

Basic, non-derived verbs in Romance are generally assumed to display an empty functional head v; Th in turn is related to the inflectional class of the verb, that is, the conjugation. We adopt this view: a given root selects for a lexically-associated Th. The node T/M hosts the exponents of PI, PS, and II. Finally, Agr is the site of realization of ϕ-features, namely person and number features. The structure (2) underlies all of the inflected forms of Friulian verbs. To model the phonological derivation of the inflected forms, we adopt an Optimality Theoretic framework. Assuming Optimality Theory as the theory of computation of the phonological module of grammar is not incompatible with positing a post-syntactic module like the one put forward in DM. We assume that the input to the phonology is an arranged sequence of morphs after morphological spell-out has taken place. We further assume that only alignment constraints can refer to a specific subset of the morphosyntactic structure present in the input, according to the Indirect Reference Hypothesis put forward by Bermúdez-Otero (2012): the root, the stem, the word, and, in our analysis, Th. However, syntactic features like [past], [feminine] or [accusative] cannot be accessed by the phonological computation as this would violate modularity at the morphology-phonology interface.

We will conclude that the length displayed by the forms illustrated in Table 1 are the result of a process of mora affixation, and that this prosodic affix is the phonological exponent of the Theme morpheme in conjugation 1 verbs in the Friulian variety as spoken in Negrons.

The paper is structured as follows. In 2, we provide a brief description of phonological lengthening in Friulian. This is needed to understand the morphological difference between conjugation 1 and conjugations 2 and 3. Section 3.1 focuses on vowel length in verbs in both NE and ÇU, and presents our newly collected data. In section 3.2 we offer an analysis in which we show that vowel length in NE cannot be an instantiation of the same phonological process that is responsible for vowel length before word-final obstruents in stressed position. We pursue the idea that each morph, including length, spells out a morphosyntactic property, namely the Theme morpheme in conjugation 1 verbs. We then discuss (3.3) a possible formalization of this analysis, and show why lengthening never appears in proparoxytonic verbal forms. Section 4 concludes.

2 Phonologically conditioned vowel length

Friulian exhibits a phonological system comprising seven contrastive vowels in stressed position: two high vowels, /i, u/, one low vowel, /a/, and a contrast between close and open mid vowels, /e, o, ɛ, ɔ/. In unstressed position, the contrast between close and open mid vowels is neutralized in favor of the close mid vowels [e, o], as in many other Romance languages.[2] In stressed position before a word-final obstruent, vowels can surface as either long or short.[3] The vowel length

[2] For a more complete and recent overview of the phonetics and phonology of Friulian, see Finco (2009) and Roseano and Finco (ress), as well as other references cited therein.

[3] Before word-final sonorants, the distribution of vowel length is more intricate. Stressed vowels before word-final nasals or before word-final clusters of a nasal followed by a stop are always short (e. g. [ˈmaŋ] 'hand', [ˈcamp] 'field'). Before word-final laterals, there is a lexical contrast between long and short stressed vowels, which is only predictable diachronically from the distribution of geminate and singleton intervocalic laterals in Latin (e. g. [caˈvel] 'hair of the head' < Lat. CAPĬLLUM vs. [ˈpeːl] 'hair' < Lat. PĬLUM). The same situation can be observed in PI 1SG, 2SG, and 3SG verbal forms whose stem-final consonant is a liquid. For example, the inflected form of the verb /ˈtol-i/ 'to take' are 1SG [ˈtol], 2SG [ˈtols], and 3SG [ˈtol], but in the case of the verb /val-ˈeː/ 'to cost', they are 1SG [ˈvaːl], 2SG [ˈvaːls], and 3SG [ˈvaːl]. Before word-final rhotics, there is also a contrast between stressed long and short vowels in conservative dialects (e. g. [ˈcaɾ] 'chariot', [ˈcaːɾ] 'dear') which is lost in Central Friulian, in which all stressed vowels surface as long before word-final rhotics. Before word-final affricates, stressed vowels are always short. This is true for all dialects except for Central Friulian, in which stressed vowels are long before underlying voiced affricates in PI 1SG and 3SG forms (e. g. [disˈtruːtʃ] 's/he destroys' cf. [disˈtrudʒi] 'to destroy'). In this section we will only focus on the surface contrast between long and short vowels before word-final obstruents. For

contrast observed in stressed position before word-final obstruents could at first glance seem lexical, that is, phonologically contrastive, as the minimal pairs in (3) appear to suggest.[4]

(3) Minimal pairs

[ˈlaːt]	‘gone.M.SG’	[ˈlat]	‘milk’
[ˈbɾuːt]	‘broth’	[ˈbɾut]	‘ugly.M.SG’
[ˈluːs]	‘light’	[ˈlus]	‘luxury’
[ˈfiːs]	‘son.M.PL’	[ˈfis]	‘fixed, dense’
[ˈpaːs]	‘peace’	[ˈpas]	‘step’
[ˈpeːs]	‘weight’	[ˈpɛs]	‘fish’

However, the distribution of vowel length in the examples in (3) correlates with the underlying laryngeal specification of the word-final obstruent that follows the stressed vowel. Before underlying voiced obstruents, the stressed vowel surfaces as long (as illustrated in 4a),[5] whereas before underlying voiceless obstruents, it surfaces as short (as illustrated in 4b).[6]

(4) Predictable vowel length

a. Vowel length alternations before underlying voiced obstruents

[ˈkɾuːt]	‘raw.M.SG’	[ˈkɾude]	‘raw.F.SG’
[fiˈniːt]	‘finished.M.SG’	[fiˈnide]	‘finished.F.SG’
[ˈfuːk]	‘fire’	[fuˈgut]	‘fire.DIM’
[ˈloːf]	‘wolf.M.SG’	[ˈlove]	‘wolf.F.SG’
[ɾisˈtiːf]	‘obstinate.M.SG’	[ɾisˈtive]	‘obstinate.F.SG’
[ˈnaːs]	‘nose’	[naˈzut]	‘nose.DIM’

b. No vowel length before underlying voiceless obstruents

[ˈskɾit]	‘written.M.SG’	[ˈskɾite]	‘written.F.SG’
[ˈfat]	‘made.M.SG’	[ˈfate]	‘made.F.SG’
[ˈbɾut]	‘ugly.M.SG’	[ˈbɾute]	‘ugly.F.SG’
[ˈmat]	‘crazy.M.SG’	[ˈmate]	‘crazy.F.SG’
[ˈɾɔs]	‘red.M.SG’	[ˈɾɔse]	‘red.F.SG’

From these data, we can conclude that vowel length in Friulian is not phonologically contrastive, but phonologically conditioned. By phonologically conditioned we mean that vowel length is derived by the grammar.[7] This type of vowel length in Friulian is thus the result of a

discussions on whether vowel length before word-final osbruents is predictable or not, see Loporcaro (2015) and Iosad (2016). We follow Iosad (2016) in assuming that vowel length is derived in those contexts.

[4] Central and Northern Friulian have a few words with stressed long vowels in penultimate position, sometimes due to a diachronic process of compensatory lengthening caused by consonant deletion in original muta cum liquida clusters, but not always (e. g. [ˈmaːɾi] ‘mother’, [ˈvoːli] ‘eye’, [ˈleːgɾi] ‘cheerful’, [ˈmaːgɾi] ‘thin’). In these cases, long vowels indisputably need to be encoded in underlying representations (see Iosad 2016 for more details).

[5] The presence of the plural morpheme in nominal forms or the 2SG morpheme in verbal forms, which is /-s/, does not block vowel lengthening (e. g. [ˈbeːfs] ‘you drink’ vs. [ˈbeviŋ] ‘they drink’).

[6] There are two exceptions to this generalization: [ˈoːk] ‘gander’ and [ˈpoːk] ‘few’ contain an underlying voiceless obstruent (see Iosad 2016), as probably does also the word [ˈdoːs] ‘two’. These long vowels derive diachronically from the Latin diphthong AU and, for these cases, vowel length must be encoded in underlying representations. Underlying length in Friulian is also needed to account for stressed long vowels in vowel-final oxytones (e.g. [ˈeː] ‘letter E’ vs. [ˈe] ‘(s)he is’).

[7] Vowel lengthening in Friulian is also synchronically productive, as demonstrated by loanword adaptation. When exposed to Standard Italian forms like *impiegato* ‘employed.M.SG’ and *impiegata* ‘employed.F.SG’, which contain a stressed long vowel, Friulian speakers have reinterpreted the underlying obstruent as being voiced: [impjeˈgaːt], [impjeˈgade]. When the form in Standard Italian contains a short vowel followed by a geminate consonant, no underlying voiced obstruent is posited: [aˈfit] ‘rent’, [afiˈtut] ‘rent.DIM’, from Standard Italian *affitto*

phonological process of vowel lengthening. This process is not morphologically conditioned (with the exception of the behavior of /dʒ/-final stems, which do not undergo lengthening in nouns but do so in verbs; see Iosad 2016), as it applies in nouns, adjectives and verbs if the conditioning environment is met, and should therefore not be confused with the specific case of vowel length found in verbal forms in NE, which will be discussed in the next section. Although it is clear that vowel length in stressed position in Friulian is triggered by the presence of an underlying voiced obstruent in word-final position, an independent phonological process of final obstruent devoicing erases the conditioning environment for vowel lengthening at the surface level of representation. The data in the left column in (3) and (4a) thus exemplify a classic case of phonological opacity by overapplication, in which vowel lengthening seems to overapply because the structural context that triggers vowel lengthening, the presence of a word-final voiced obstruent, is not surface-true. Final obstruent devoicing is exemplified in (5) with forms ending in a consonantal cluster to show that this phonological process is independent from vowel lengthening.

(5) Final obstruent devoicing

[ˈgɾant]	‘big.M.SG’	[ˈgɾande]	‘big.F.SG’
[ˈwaɾp]	‘blind.CM.SG’	[ˈwaɾbe]	‘blind.F.SG’
[ˈmjɛtʃ]	‘half.M.SG’	[ˈmjɛdʒe]	‘half.F.SG’

The generative literature on phonologically conditioned vowel length in Friulian dates back to Vanelli (1979), and has interested formal phonologists from both the rule-based and OT traditions (Hualde 1990, Prieto 1992, Repetti 1994, Baroni and Vanelli 2000, Iosad 2012, Torres-Tamarit 2015). Both Iosad (2012) and Torres-Tamarit (2015), framed within Optimality Theory, give an account of derived vowel length in Friulian that overcomes the problem of phonological opacity. Iosad (2012) proposes an analysis combining the principles of substance-free phonology and feature geometry with a parallel computation, whereas Torres-Tamarit (2015) develops an analysis within Harmonic Serialism. For more details, we refer the interested reader to these works.

As we shall see, vowel lengthening in Friulian verbs is of a different kind and, therefore, cannot be analyzed in the same way. In the next section we deal with morphological length and treat it as a case of mora affixation.

3 Vowel length in verbs in the dialect of Negrons

3.1 The data

Like other Romance languages, Friulian inflects verbs for several grammatical categories, such as person, number, tense, aspect, mood and voice. Nevertheless, in this section we focus only on six persons (1SG, 2SG, 3SG, 1PL, 2PL, 3PL) of one tense (present) in two moods (indicative and subjunctive). Friulian has three main verb conjugations: in this section, we show five verbs, two belonging to conjugation 1, two to conjugation 2 and only one to conjugation 3.[8] The reasons for this choice will become clearer in the course of the section. It should also be pointed

‘rental’. An anonymous reviewer brought our attention to the fact that the homophony of the final sequence of *impiegato* with the past participle suffix (*-at-o/a* M/F in Italian, *-ât/-ade* M/F in Friulian) may be the reason why Friulian speakers reinterpreted the final consonant of the loanword as voiced in the underlying representation. We leave this question open for further research.

[8] Conjugation 2 includes verbs whose infinitive forms end in either stressed [e], or unstressed [i] (della Porta, 1922, 22ff). Some authors, though, split this conjugation into two distinct subclasses: the former group (e.g. *tasê* [taˈzeː] ‘to shut up’) belongs to conjugation 2, the latter (see *meti* [ˈmet-i] ‘to put’ in tables 3 and 4) to conjugation 3. See for instance Marchetti (1955).

Table 3: NE: PI and PS, conjugations 1, 2, and 3

	conj. 1 net-ˈaː ‘to clean’	conj. 1 nad-ˈaː ‘to swim’	conj. 2 ˈmet-i ‘to put’	conj. 2 ˈʃkwed-i ‘to cash in’	conj. 3 kuʒ-ˈiː ‘to sew’
	PI	PI	PI	PI	PI
1SG	ˈneːti	ˈnaːdi	ˈmet	ˈʃkweːt	ˈkuːʃ
2SG	ˈnetas	ˈnadas	ˈmets	ˈʃkweːts	ˈkuːs
3SG	ˈneta	ˈnada	ˈmet	ˈʃkweːt	ˈkuːʃ
1PL	neˈtiŋ	naˈdiŋ	meˈtiŋ	ʃkweˈdiŋ	kuˈʒiŋ
2PL	neˈtaɨ̯s	naˈdaɨ̯s	meˈteɨ̯s	ʃkweˈdeɨ̯s	kuˈʒiːs
3PL	ˈnet-iŋ̯∼aŋ	ˈnad-iŋ̯∼aŋ	ˈmetiŋ̯	ˈʃkwediŋ̯	ˈkuʒiŋ
	PS	PS	PS	PS	PS
1SG	ˈneːti	ˈnaːdi	ˈmeti	ˈʃkwedi	ˈkuʒi
2SG	ˈneːtis	ˈnaːdis	ˈmetis	ˈʃkwedis	ˈkuʒis
3SG	ˈneːti	ˈnaːdi	ˈmeti	ˈʃkwedi	ˈkuʒi
1PL	neˈtiŋ	naˈdiŋ	meˈtiŋ	ʃkweˈdiŋ	kuˈʒiŋ
2PL	neˈtaɨ̯s	naˈdaɨ̯s	meˈteɨ̯s	ʃkweˈdeɨ̯s	kuˈʒiːs
3PL	ˈneːtiŋ̯	ˈnaːdiŋ̯	ˈmetiŋ̯	ˈʃkwediŋ̯	ˈkuʒiŋ

Table 4: ÇU: PI and PS, conjugations 1, 2, and 3

	conj. 1 net-ˈa ‘to clean’	conj. 1 nod-ˈa ‘to swim’	conj. 2 ˈmet-i ‘to put’	conj. 2 ˈskwed-i ‘to cash in’	conj. 3 kuz-ˈi ‘to sew’
	PI	PI	PI	PI	PI
1SG	ˈneti	ˈnodi	ˈmet	ˈskweːt	ˈkuːs
2SG	ˈnetis	ˈnodis	ˈmetis	ˈskwedis	ˈkuzis
3SG	ˈnete	ˈnode	ˈmet	ˈskweːt	ˈkuːs
1PL	neˈtiŋ	noˈdiŋ	meˈtiŋ	skweˈdiŋ	kuˈziŋ
2PL	neˈtaɨ̯s	noˈdaɨ̯s	meˈteɨ̯s	skweˈdeɨ̯s	kuˈziːs
3PL	ˈnetiŋ̯	ˈnodiŋ̯	ˈmetiŋ̯	ˈskwediŋ̯	ˈkuziŋ
	PS	PS	PS	PS	PS
1SG	ˈneti	ˈnodi	ˈmeti	ˈskwedi	ˈkuzi
2SG	ˈnetis	ˈnodis	ˈmetis	ˈskwedis	ˈkuzis
3SG	ˈneti	ˈnodi	ˈmeti	ˈskwedi	ˈkuzi
1PL	neˈtini	noˈdini	meˈtini	skweˈdini	kuˈzini
2PL	neˈtadis	noˈdadis	meˈtedis	skweˈdedis	kuˈzidis
3PL	ˈnetiŋ	ˈnodiŋ	ˈmetiŋ	ˈskwediŋ	ˈkuziŋ

out that we abstract away from subject pronouns. Friulian, like many Northern Italo-Romance languages, possesses two series of subject pronouns: while one set of pronouns is stressed, the other is unstressed and, as a result, these pronouns behave like clitics. Clitic subject pronouns are generally obligatory (see Vanelli 1984 for details). Table 3 shows the inflected forms of NE in PI and PS, whereas table 4 shows the corresponding verbs of ÇU: these data will prove useful to follow the comparisons among the dialects that we draw throughout the remainder of the paper.

Long vowels in the stem of verbs belonging to conjugations 2 and 3 are phonologically predictable and appear in the same conditions described for nouns (see section 2): if the stem of a verb belonging to class 2 ends with an underlying voiced obstruent (like in /ˈʃkwed-i/ ‘to cash in’), the stressed vowel of the stem surfaces as long when the stem-final consonant is devoiced (i.e. in PI 1SG, 2SG, and 3SG). On the other hand, if the last consonant of the stem is not a voiced

obstruent (like in /ˈmet-i/ ‘to put’), the vowel surfaces as short. These observations concern both NE and ÇU data.

As for NE data only, long vowels in the stem of verbs belonging to conjugation 1 are not phonologically predictable, because they appear also in contexts that do not meet the conditions required for vowel lengthening described in section 2 above. They appear, for example, in some of the cases − though not all − where the stem-final voiced obstruent is not devoiced (like in PI 1SG and PS 1SG, 2SG, 3SG, 3PL of /nad-ˈaː/ ‘to swim’), but also if the stem-final consonant is a voiceless obstruent (like in PI 1SG and PS 1SG, 2SG, 3SG, 3PL of /net-ˈaː/ ‘to clean’). Figure 1 shows the spectrograms of the minimal pair [ˈnad-iŋ] 3PL PI vs. [ˈnaːd-iŋ] 3PL PS, where the contrasting vowel lengths are evident.[9]

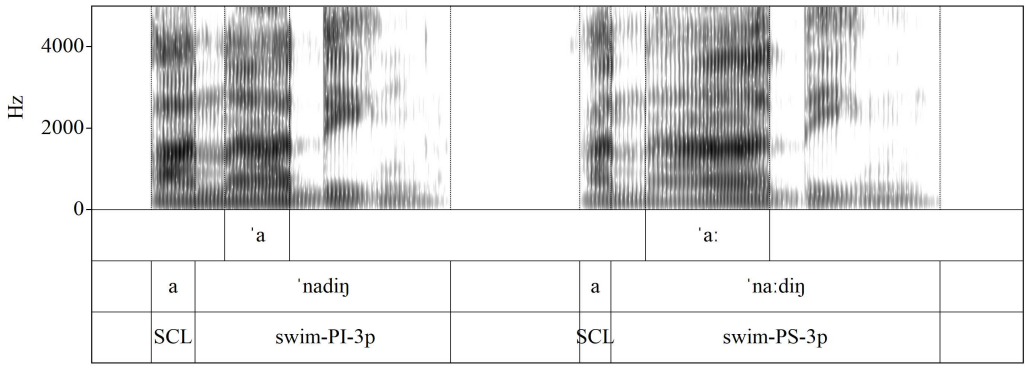


Fig. 1: Minimal pair [ˈnad-iŋ] 3PL PI vs. [ˈnaːd-iŋ] 3PL PS

In section 3.2 we will offer our analysis of this data; in section 3.3, in turn, we provide additional evidence and formalization of the analysis.

3.2 The analysis: a case of mora affixation

In section 2, we saw that lengthening is synchronically predictable in both NE and ÇU, but only in specific environments. In section 3.1, though, we described the opaque distribution of lengthening confined to a subset of cells in the paradigm of NE conjugation 1 verbs. Therefore, the question to be addressed in this section is that posed in (6):

(6) What triggers vowel lengthening in NE verbs?

Question (6) may be answered following three distinct analytical paths, listed in (7) below.

[9] Although the presence of long vowels in the stem of the verbs belonging to conjugation 1 cannot be predicted phonologically in synchrony, from a diachronic point of view there seems to be a clear relationship between vowel length and the phonological vowel lengthening that appears in the other conjugations, namely conjugation 2. Roseano (2015) proposes a reconstruction of the changes that took place in NE Friulian over the last seven centuries stemming from the parallelism with ÇU data as documented by Benincà and Vanelli (1975) and Maschi (2000).

(7) Plausible analytical paths:

a. Root allomorphy

b. Vowel length as Tense/Mood morpheme (subjunctive)

c. Vowel length as Theme (conjugation 1)

Before exploring the third path, which we think is the correct one, let us explore the first two to show why we disfavor them as answers to (6).

The root allomorphy analysis consists in associating each conjugation 1 verb with (at least) two distinct allomorphs. For instance, for the verb /naˈdaː/ 'to swim', one would then posit the allomorphs /naːd/ and /nad/. Crucially, the former is selected only in the following two specific contexts: (i) Conjugation 1, PI, 1SG, and (ii) Conjugation 1, PS, 1SG to 3SG (sg forms), 3PL. The other allomorph, in turn, is selected in all the contexts in which /naːd/ cannot be used. In other words, /nad/ is not specified and, according to the Elsewhere Condition (Anderson 1969, Kiparsky 1973), is the default allomorph. Within DM, this configuration may be formalized as shown in (8). The label [Root, 1] stands for any root belonging to conjugation 1.

(8) Selection of allomorphs /naːd/ and /nad/:

$$[\text{Root, 1}] \Leftrightarrow \begin{cases} \text{/naːd/ / PI, 1SG } \textit{and} \text{ PS, 1SG to 3SG, 3PL.} \\ \text{/nad/ / elsewhere} \end{cases}$$

The contexts found in the selection of allomorph /naːd/ do not form a natural class, since there is no phonological or morphosyntactic explanation for the distribution of lengthening. Rather, this alternation recalls specific patterns of root allomorphy found in Romance verbs, referred to as morphomes by Maiden (2005), Maiden (2011a), and Maiden (2016). A morphome, a notion first introduced by Aronoff (1994), is a function linking one or more forms to a morphological set of properties. The specific definition of morphome as used by Maiden is that this is an entity that encapsulates the distribution of each allomorph of the root within a given paradigm. In Romance verbs, three main morphomes have been postulated, the N-shaped, the L-shaped, and the U-shaped morphomes. These labels come from the visual resemblance of the distribution of the cells containing the same allomorph within the paradigm of the present indicative and the present subjunctive, respectively. The L-shaped morphome, for example, recalls the shape of the letter L, as shown in table (5). Similarly, the N-shaped morphome recalls the shape of the letter N, as in table (6). (X and Y stand for two distinct allomorphs.)

Table 5: The L-shaped morphome

	1SG	2SG	3SG	1PL	2PL	3PL
PI	X	Y	Y	Y	Y	Y
PS	X	X	X	X	X	X

Table 6: The N-shaped morphome

	1SG	2SG	3SG	1PL	2PL	3PL
PI	X	X	X	Y	Y	X
PS	X	X	X	Y	Y	X

Mixed patterns may also arise as the result of morphome interactions (see Herce 2019, 136ff): the NE paradigm is such a mixed pattern since the lengthening, characteristic of the L-morphome (= X in table 5), does not appear in the 1PL and 2PL of the PS as expected. This is shown in table (7).

Table 7: The mixed morphome pattern

	1SG	2SG	3SG	1PL	2PL	3PL
PI	X	Y	Y	Y	Y	Y
PS	X	X	X	Y	Y	X

An identical mixed morphome pattern is observed in Bolognese (Maiden 2012, 30-33) and discussed later by Herce (2019, 137), who argues that "[i]t is relatively common for L-morphome roots to be expelled from these cells [1PL and 2PL], thus becoming confined to the set of cells that belong to L and N simultaneously." This mixed pattern, as well as many other similar ones discussed by Herce (2019) in different Romance languages, points to the great variety of morphomic patterns, a variety that does not allow for a unified analysis of the morphome as a uniform entity in the morphological component. Rather, the morphome seems to be a lexicalized property of (some) languages that affects how their paradigms are organized. A morphome-based analysis of NE, though, would specify the morphological contexts in which each one of the allomorphs has to be chosen, but would fail to predict a crucial fact of the NE data, namely that vowel length stands in complementary distribution with segmental material. As we show below, allomorphy at the affix level naturally captures this fact, and draws the line dividing the labor between morphology and phonology lower in the derivation. In addition, an analysis based on root allomorphy takes us to the question in (9), which we cannot answer.

(9) Why would only conjugation 1 verbs be specified as root-alternating verbs?

The general architecture of Latin morphology is remarkably well preserved in Romance: among other features, the distinction between conjugation 1 vs. non-conjugation 1 verbs is maintained in all of the Romance languages (Maiden 2011b, 207). This fact is connected to the observation that "(f)irst conjugation roots tend distinctively to resist allomorphy and favour invariance" (Maiden 2011b, 210). In other words, as Maiden acknowledges, Romanists usually agree in stating that conjugation 1 is the regular − hence not allomorphic − conjugation in Romance. Alternations occurring in conjugation 1, if present, are phonologically-conditioned, that is, something phonology explains and predicts synchronically (see Maiden (2011b) for a detailed survey of what remains of Latin verbs in the Romance conjugations). It is therefore unexpected to find conjugation 1 displaying root alternations.[10]

[10] Two anonymous reviewers pointed out that Romance does display irregular roots in conjugation 1 mentioning verbs such as French *aller* 'to go', or Italian *andare* 'to go'. These verbs are associated with suppletive roots: for instance, French *(je) vais* [vɛ] vs. *(vous) allez* [ale]. In these verbs, allomorph selection correlates with stress: rhizotonic forms select for *v-*, whereas arhizotonic forms select for *al-* (see Anderson 2011 for a similar analyis of Surmiran verbs, a Rhaeto-Romance language like Friulian). This is a case of phonologically-conditioned allomorphy (see Carstairs-McCarthy 2001 for the typology of allomorphy), and is the sole type of allomorphy generally found in conjugation 1. The alternations displayed by a subset of verbs in conjugation 1 in French, such as *c*[e]*der* 'to give away' vs *(je) c*[ɛ]*de* 'I give away' and *p*[ə]*ser* 'to weigh' vs *(je) p*[ɛ]*se* 'I weigh' are also phonologically-conditioned. (See Scheer 2004, 2015 in which these alternations are shown to be completely phonological.) Thus, lengthening in conjugation 1 in NE verbs is unexpected since it does not correlate with a phonological generalization across both PI and PS.

Hypothesis (7b), in turn, consists in analyzing vowel length as the Tense/Mood morpheme of PS. This would prevent the system from labeling conjugation 1 as lexically specified for root allomorphy. In addition, since 1PL and 2PL do not show length in the subjunctive, the context of insertion of length as the marker of subjunctive would be restricted to rhizotonic forms, those stressed on the root (see data in table 3). Associating length with the Tense/Mood morpheme, however, would encouter another problem, related to the fact that length surfaces not only in PS, but also − although only in one case − in 1SG PI. Why would the Tense/Mood morpheme appear in 1SG PI, too?

Formalizing the selection of Tense/Mood morpheme within a realizational theory like DM would give the output in (10) (length is represented by the symbol μ, a mora). In both PS and PI, the default exponent is determined on the basis of the Elsewhere Condition.

(10) Selection of Tense/Mood in NE (conjugation 1):

a. PS $\Leftrightarrow \begin{cases} \text{null} & / \text{ 1PL, 2PL} \\ \mu & / \text{ elsewhere (i.e. rhizotonic forms)} \end{cases}$

b. PI $\Leftrightarrow \begin{cases} \mu & / \text{ 1SG} \\ \text{null} & / \text{ elsewhere} \end{cases}$

From the list above, it appears that, in PS, the default allomorph corresponds to length, whereas this same allomorph is the most specified one in PI. (10) also shows that length does not overlap the subjunctive paradigm, since it does not appear in 1PL and 2PL, and it appears in one of the forms of PI. Note, in addition to this observation, that question (9) remains unanswered: conjugations 2 and 3 do not display lengthening in the subjunctive paradigm. This means that the items in (10) should also be specified for conjugation, namely conjugation 1.

A third possibility is the only logical possibility to render question (9) vacuous, which is to claim that vowel length *is* conjugation 1. In other words, we argue that vowel length expresses Theme (henceforth Th). Th is a lexical property − that Romance inherited from Latin, and more generally from Proto-Indoeuropean − which is generally spelled out by a vowel, the so-called theme vowel, and devoid of semantic content. Following Oltra-Massuet and Arregi (2005), we assume that the insertion of the Th morph is the result of satisfying a morphological well-formedness condition requiring Th to be adjoined to *v*. As opposed to these authors, however, we restrict Th to be adjoined to *v*, instead of assuming that all syntactic functional heads require this position, including T. The phonological realization of Th depends on its local morphological environment, which includes the conjugation class of the root, a lexical property, and *v*. We further assume that Th is, together with the root, part of the stem. The stem is thus defined as the maximal projection of *v*, which includes Th. We claim that conjugation 1 Th in NE can spell out as a segmentally empty mora, a prosodic morph that is realized as length on the stressed root vowel (vowel length is not licensed in unstressed positions in Friulian, see sections 2 and 3.3). This is a case of mora affixation in Romance.[11] Note that the pattern is productive: loans like [ʃkaneˈɾiːdzi] 'I scan' (1SG PI of [ʃkaneɾiˈdzaː] 'to scan') or [aˈluːni] 'I land to the moon' (1SG PI of [aluˈnaː] 'to land to the moon') have the same pattern as /naˈdaː/.[12]

[11] Carvalho (2004) argues for templatic activity in Portuguese verbs: this is another interesting case of morphological activity within the root in Romance that we are aware of.

[12] Both are probably loans from Italian: [skanneridzˈdzaːre] 'to scan' and [alluˈnaːre] 'to land to the moon', respectively. In Friulian, [ʃkaneɾiˈdzaː] is derived from the English loan *scan* suffixed with the denominal -/iˈdzaː/: such verbs all belong to conjugation 1. [aluˈnaː] in turn, is derived from the noun [ˈluna] 'moon.F.SG' to which prefix /a/- and suffix -/aː/ are added. Lengthening appears, as expected in NE, in 1SG PI/PS, 3SG PS [aˈluːni], 2SG PS [aˈluːnis], and 3PL PS [aˈluːniŋ]. In response to an anonymous reviewer's comment, note that this verb represents an argument against hypothesis (7a). We assume that the noun [ˈluna] is built on the root /lun/, thus the denominal verb cannot be associated with two distinct allomorphs /lun/ and /luːn/. We take this fact as an argument against root allomorphy.

Having established that length is related to Th, the analysis needs to focus on the allomorphs of Th when length does not appear, and the other inflectional exponents, namely Tense/Mood, person and number. Table (8) shows, in the first and third columns, data for the NE verb /naˈdaː/ 'to swim' in PI and PS, respectively; in the second and fourth columns, only Th and inflectional endings are displayed.

Table 8: NE: PI and PS, conjugation 1 'swim' inflectional endings

	PI	PI	PS	PS
1SG	ˈnaːdi	μ-i	ˈnaːdi	μ-i
2SG	ˈnadas	-as	ˈnaːdis	μ-is
3SG	ˈnada	-a	ˈnaːdi	μ-i
1PL	naˈdiŋ	-iŋ	naˈdiŋ	-iŋ
2PL	naˈdaiˆs	-aiˆs	naˈdaiˆs	-aiˆs
3PL	ˈnad-iŋ∼aŋ	-i∼a+ŋ	ˈnaːdiŋ	μ-iŋ

As for PI, we observe that vowel /a/, generally the Th vowel of conjugation 1 in Romance, appears in 2SG, 3SG and 2PL, three forms in which length does not occur. Vowel /a/ may also appear in 3PL, in free variation with /i/. Thus, only 1PL shows neither length, nor /a/. Interestingly, 1PL -/iŋ/[13] is identical across conjugations and across Tense/Mood in NE (see table 3 and Benincà and Haiman 1992, 64ff for an overview of the verbal system in Friulian). We submit that this form is made up of two items: /i/, which is an allomorph of Th, and /ŋ/, which expresses 1PL.[14] So far, we have established the phonological form of three allomorphs of Th in PI, namely length, /i/ and /a/.

The PS paradigm, in turn, is simpler to analyze, since length appears in 1SG, 2SG, 3SG, and 3PL. As just mentioned, 1PL is identical to 1PL in PI. As for 2PL, this form is also identical to the corresponding form in PI. Note that ÇU (see table 4) displays 1PL -/ini/ instead of 1PL -/iŋ/ in PS, whereas PI is identical to NE. Thus, ÇU has allomorphy of 1PL marker in the context of PS: inter-dialectal variation occurs.

A tentative list of the allomorphs of Th is thus as given in (11).

(11) NE: Lexically listed allomorphs of conj. 1 Th (tentative)

$$[\text{Th, 1}] \Leftrightarrow \begin{cases} \text{a} \ / \ \text{2SG PI, 3SG PI, 2PL PI, 3PL PI, 2PL PS} \\ \text{i} \ / \ \text{1PL} \\ \mu \ / \ \text{elsewhere} \end{cases}$$

The analysis proposed above is consistent with the fact that Th vowels and length stand in complementary distribution. In addition, this analysis entails that -/i/ in PI 1SG is the exponent of 1SG, and must not be seen as a Th morpheme: we will come back to this point in section 3.3 below. Also, this supports the hypothesis that length is in fact one of the possible phonological exponents of the Th morpheme, since they occupy the same morphological slot.

As for T/M markers, we hypothesize that PI is a null morpheme. This is consistent with cross-linguistic evidence in Romance verbs: PI is generally recognized by the quality of the Th vowel, and Friulian is no exception to this pattern. For instance, 2PL surfaces as /aiˆs/ in conjugation 1, as /eiˆs/ in conjugation 2, and as /iːs/ (that is /i+i/) in conjugation 3. Another example in

[13] The phoneme /n/ surfaces as [ŋ] word-finally.

[14] The distribution of 1PL -/iŋ/ is not in contrast with the idea that /i/ is an allomorph of Th: in 1PL forms, the distinction between both conjugations and Tense/Mood is neutralized.

favor of a null morpheme for PI comes from conjugations 2 and 3: 1SG and 3SG do not show any inflectional ending, whereas 2SG is -/s/ in NE and -/is/ in ÇU, the vowel -/i/ being part of the 2SG ending since it appears across all conjugations. Thus, PI is not overtly marked in Friulian. In other words, this morphological segmentation allows for a uniform analysis of the T/M morpheme as a null morpheme across the PI paradigm in all conjugations. Contrarily to PI, PS does show an overt marker, namely /i/. Vowel /i/ appears in PS across all conjugations, except for 1PL and 2PL. Both forms are identical to PI, as already mentioned, and this occurs in all conjugations, too. Inter-dialectal variation does exist, however: in ÇU, PS 1PL and 2PL forms differ slightly from those in NE. 1PL forms differ as mentioned above, namely replacing -/ŋ/ with -/ni/, whereas, in 2PL, we find /adis/, /edis/ and /idis/. With respect to NE, variation consists of adding /d/ between the Th vowel and /i/ (see table 4). As far as NE is concerned, we argue that PS shows allomorphy between two items, one overtly marked as -/i/, the other realized as a null morpheme.

Finally, person/number endings are derived straightforwardly from the segmentation proposed so far. Setting aside 1SG, 2SG is marked by /s/, whereas 3SG is a null morpheme. In the plural, 1PL and 2PL are /ŋ/ and /is/; 3PL is also /ŋ/. Finally, 1SG displays an alternation between PI and PS. In the former, 1SG spells out as /i/, whereas in the latter, it is a null morpheme.

Given the list of allomorphs of Th in both PI and PS, we recast the data as in tables (9) and (10) below. These tables describe the morphological segmentation of NE verbs of conjugation 1, and show the morphological segmentation of PI and PS, respectively.

Table 9: Morphological segmentation of PI in NE - conj. 1

	root	Th	T/M	ϕ-Fs
1SG	ˈnad	μ	∅	i
2SG	ˈnad	a	∅	s
3SG	ˈnad	a	∅	∅
1PL	nad	ˈi	∅	ŋ
2PL	nad	ˈa	∅	i͡s
3PL	ˈnad	i∼a	∅	ŋ̂

Table 10: Morphological segmentation of PS in NE - conj. 1

	root	Th	T/M	ϕ-Fs
1SG	ˈnad	μ	i	∅
2SG	ˈnad	μ	i	s
3SG	ˈnad	μ	i	∅
1PL	nad	ˈi	∅	ŋ
2PL	nad	ˈa	∅	i͡s
3PL	ˈnad	μ	i	ŋ̂

As mentioned, variation within NE as well as across dialects (e.g. ÇU) exists; a complete overview of the distribution of inflectional endings is found in Benincà and Vanelli (1975) and Iliescu (1970). In Roseano and Finco (ress) and references therein, one can find additional information about Friulian dialectology. As already observed, 2SG PI is /is/ in ÇU, instead of the /as/ in NE. Crucially, 2SG PS is identical in the two varieties, namely /is/. In order to facilitate

intra-dialectal comparison, approximate segmentation of both PI and PS as they appear in ÇU conjugation 1 verbs is shown in tables 11 and 12, respectively.[15]

Table 11: Morphological segmentation of PI in ÇU - conj. 1

	root	Th	T/M	ϕ-Fs
1SG	ˈnod	∅	∅	i
2SG	ˈnod	∅	∅	is
3SG	ˈnod	e	∅	∅
1PL	nod	ˈi	∅	ŋ
2PL	nod	ˈa	∅	i̯s
3PL	ˈnod	i	∅	ŋ̂

Table 12: Morphological segmentation of PS in ÇU - conj. 1

	root	Th	T/M	ϕ-Fs
1SG	ˈnod	∅	i	∅
2SG	ˈnod	∅	i	s
3SG	ˈnod	∅	i	∅
1PL	nod	ˈi	∅	ni
2PL	nod	ˈa	∅	dis
3PL	ˈnod	∅	i	ŋ

Observing tables 9 to 12 allows for an additional generalization about the segmentation of the inflectional endings. As common in Romance (as it used to be in Latin), 1PL and 2PL are the only arrhizotonic forms. Instead of the root, thus, stress falls on the inflectional ending. In both cases at hand here, stress falls on Th. Since only stressed vowels may be long in Friulian, the default allomorph of Th, μ, can appear neither in 1PL nor in 2PL forms; both a vowel and a mora would occupy the same morphological slot. The issue of how stress is assigned to an inflected form is dealt with in the next section.

As an interim conclusion, to be modified in the next section, we claim that question (6) is answered: a given verb root is lengthened (i) if it belongs to conjugation 1, and (ii) in the absence of subcategorization (namely one of the contexts of insertion in 11). If both conditions are met, then the default allomorph /μ/, the 'elsewhere' item, is selected.

In the next section we discuss further evidence in favor of our analysis, and propose a formal account of it.

3.3 Additional evidence and formalization of the analysis

Before stepping forward to the formalization of the analysis, two facts are worth mentioning, since they both adduce arguments supporting the analytical path that we have taken so far.

[15] In Central Friulian varieties, Latin A changed into /e/ when in final positions starting in at least 16th century: CASA → ['caze] 'house'. This explains why the 3SG form ends in /e/: ['node] '(s)he, it swims'. In other dialects, in turn, we observe /o/ instead of final /a/. The question is whether ÇU has an additional allomorph of Th, namely /e/, or it is simply an allophone of Th = /a/. We leave this question open for further research focusing on Central Friulian varieties. See Francescato (1966) for diachronic details of the distribution of Latin final vowels in Friulian.

First, our analysis accounts for the distinct behaviour of 3PL PI vs. 3PL PS, see table 13. The /i/ in 3PL PI is different from the /i/ in 3PL PS. Only in PS does /i/ express uniformly the T/M morpheme within the paradigm (e.g. in 1SG, 2SG, 3SG, and 3PL). This is the reason why there is vowel length in 3PL PS, where /i/ is the T/M morph and not the Th morph, but not in 3PL PI, where /i/ (or /a/) is in fact the Th morph.

Table 13: Minimal pair between 3PL PI and 3PL PS explained

	root	Th	T/M PI	ϕ-Fs
3PL	ˈnad	i∼a	∅	ŋ
	root	Th	T/M PS	ϕ-Fs
3PL	ˈnad	μ	i	ŋ

Note, also, that the /i/ in 3PL PI appears to be in free variation with /a/ (but crucially /a/ never appears in 3PL PS): this brings us to the second interesting fact. A comparison of 1SG and 3PL in the PI paradigm (table 14) indeed reveals that the segmentation we propose is on the right track.

Table 14: Morphological segmentation of PI in NE: 1SG vs. 3PL

	root	Th	T/M	ϕ-Fs
1SG	ˈnad	μ	∅	i
3PL	ˈnad	i∼a	∅	ŋ

On the one hand, the terminal element /i/ in 1SG PI is analyzed as a ϕ-feature morph, and crucially cannot express Th. This is independently supported by that fact that /i/ also appears in 1SG Imperfect Indicative (henceforth II, see tables 15 and 16) after the Th vowel (e.g. [nad-ˈa-v-i] 'I was swimming'), so it is reasonable to interpret /i/ in 1SG PI not as Th or T/M, but rather as the ϕ-features for 1SG across some conjugation 1 tenses. On the other, /i/ in 1SG PI is different from the /i/ in 3PL PI in that, as just mentioned, only the latter stands in free variation with /a/ (e.g. [ˈnadiŋ] ∼ [ˈnadaŋ]), the typical Th vowel for conjugation 1. This variation indirectly suggests that /i/ is Th in 3PL PI, but not in 1SG PI.

Table 15: NE: II, conjugations 1, 2, and 3

	conj. 1 net-ˈaː 'to clean'	conj. 1 nad-ˈaː 'to swim'	conj. 2 ˈmet-i 'to put'	conj. 2 ˈʃkwed-i 'to cash in'	conj. 3 kuʒ-ˈiː 'to sew'
1SG	neˈtavi	naˈdavi	meˈtevi	ʃkweˈdevi	kuˈʒivi
2SG	neˈtavas	naˈdavas	meˈtevas	ʃkweˈdevas	kuˈʒivas
3SG	neˈtava	naˈdava	meˈteva	ʃkweˈdeva	kuˈʒiva
1PL	neˈtaviŋ	naˈdaviŋ	meˈteviŋ	ʃkweˈdeviŋ	kuˈʒiviŋ
2PL	neˈtavis	naˈdavis	meˈtevis	ʃkweˈdevis	kuˈʒivis
3PL	neˈtaviŋ	naˈdaviŋ	meˈteviŋ	ʃkweˈdeviŋ	kuˈʒiviŋ

The II paradigms reveal two crucial facts. First, after the regular II affix /-v-/, no allomorphy of the inflectional markers appears, in either NE or ÇU. For instance, 2PL is /-is/ across both conjugations and varieties. Second, Th surfaces as a uniform marker across all conjugations. In

Table 16: ÇU: II, conjugations 1, 2, and 3

	conj. 1 net-ˈa ‘to clean’	conj. 1 nod-ˈa ‘to swim’	conj. 2 ˈmet-i ‘to put’	conj. 2 ˈskwed-i ‘to cash in’	conj. 3 kuz-ˈi ‘to sew’
1SG	neˈtavi	noˈdavi	meˈtevi	skweˈdevi	kuˈzivi
2SG	neˈtavis	noˈdavis	meˈtevis	skweˈdevis	kuˈzivis
3SG	neˈtave	noˈdave	meˈteve	skweˈdeve	kuˈzive
1PL	neˈtaviŋ	noˈdaviŋ	meˈteviŋ	skweˈdeviŋ	kuˈziviŋ
2PL	neˈtavis	noˈdavis	meˈtevis	skweˈdevis	kuˈzivis
3PL	neˈtaviŋ	noˈdaviŋ	meˈteviŋ	skweˈdeviŋ	kuˈziviŋ

NE verbs, therefore, conjugation 1 verbs do not display the lengthening on the root, /naːd/, Th being systematically spelled-out as /a/. Crucially, 1SG *[naˈdaːvi] is ungrammatical because it contains two allomorphs of Th, namely /a/ and /μ/. The morphological segmentation of II, both in NE and in ÇU, is shown in tables (17) and (18), respectively.

Table 17: Morphological segmentation of II in NE - conj. 1

	root	Th	T/M	ϕ-Fs
1SG	nad	ˈa	v	i
2SG	nad	ˈa	v	as
3SG	nad	ˈa	v	a
1PL	nad	ˈa	v	iŋ
2PL	nad	ˈa	v	is
3PL	nad	ˈa	v	iŋ

Table 18: Morphological segmentation of II in ÇU - conj. 1

	root	Th	T/M	ϕ-Fs
1SG	nod	ˈa	v	i
2SG	nod	ˈa	v	is
3SG	nod	ˈa	v	e
1PL	nod	ˈa	v	iŋ
2PL	nod	ˈa	v	is
3PL	nod	ˈa	v	iŋ

In light of the II data, we revise the list of allomorphs in (11): the default exponent of [Th 1] is /a/ − the general theme vowel of conjugation 1 in Romance − whereas /μ/ is subcategorized for a subset of cells belonging to either PI or PS. The definitive list is shown in (12).

(12) Lexically listed allomorphs of conj. 1 Th in NE

$$[\text{Th, 1}] \Leftrightarrow \begin{cases} \text{i} \ / \ 1\text{PL PI/PS} \\ \mu \ / \ 1\text{SG PI, 1SG-3SG PS, 3PL PS} \\ \text{a} \ / \ \text{elsewhere} \end{cases}$$

As laid out in section 1, we implement the list of allomorphs in (12) within DM. Since the main focus of this paper is the morphological lengthening occurring in NE verbs belonging to

conjugation 1, the remainder of this section deals exclusively with the structures and the VIs of this conjugation.

(13) VI of the root of [naˈdaː] 'to swim' in NE:
'to swim' ⇔ /nad/

In order to complete the description of these verbs, we need to establish the full list of the VIs. Those expressing the allomorphs of Th are listed in (12), whereas the VI of the root is shown in (13). The other exponents can be easily extracted from tables (9), (10), and (17). As for T/M exponents, they are shown in (14) to (16).

(14) VI of II in NE:
II ⇔ /v/

(15) VI of PI in NE:
PI ⇔ ∅

(16) VIs of PS in NE:

a. PS ⇔ null / 1PL, 2PL

b. PS ⇔/i/ / elsewhere

The last set of VIs to be shown is that representing the ϕ-features. Some of the exponents display variation: in most cases, the allomorph depends on the selection of the T/M exponent. For instance, 3SG spells-out as /a/ in the context of II /v/, whereas it spells-out as a null morpheme in both PI and PS. Since these allomorphic alternations do not have a major impact on our analysis, we will not discuss them in detail here. Therefore, we propose the following approximate list of VIs given in (17).[16]

(17) VIs of ϕ-features in NE:[17]

a. 1SG ⇔ /i/ (but ∅ in PS)

b. 2SG ⇔ /s/ (but /as/ in II)

c. 3SG ⇔ null (but /a/ in II)

d. 1PL ⇔ /ŋ/ (but /iŋ/ in II)

e. 2PL ⇔ /is/

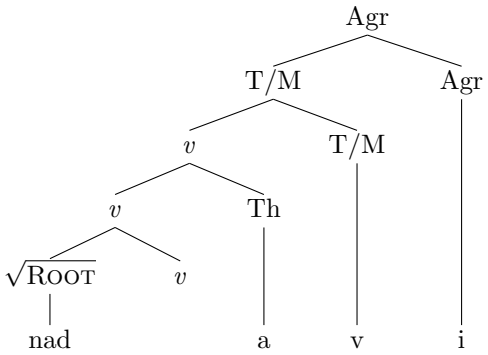
f. 3PL ⇔ /ŋ/ (but /iŋ/ in II)

The VIs presented so far are inserted at the terminal nodes of the complex head shown above in (2) throughout spell-out. For the sake of clarity, we show the structure of four inflected forms, so that the linearization process occurring after syntax is clear. The first form, 1SG II [naˈdavi] 'I was swimming' is derived straightforwardly, as shown in (18).

[16] As we mentioned in the previous section, inter-dialectal variation also occurs.

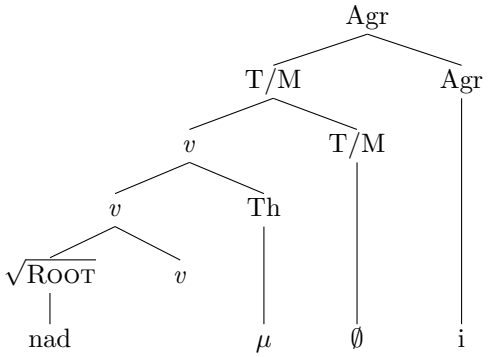
[17] An anonymous reviewer asks why not analyze /a/ in 2SG and 2SG exponents of II as a theme vowel, or as part of the T/M exponent. The answer is that /a/ is not Th because of the intervening /v/ ([nad-ˈa-v-as]) which, in turn, is the exponent of II. If /a/ in /as/ were the exponent of T/M, this would result in having two allomorphs of II: /va/ and /v/.

(18) 1SG II [naˈdavi] 'I was swimming'



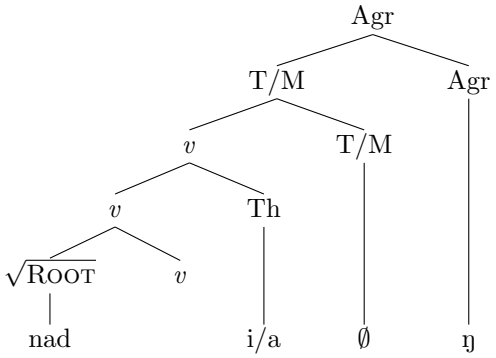
The II paradigm displays overt exponents for each terminal nodes, and no allomorphy occurs at either the root level or the T/M level. It is therefore unnecessary to show the other inflected forms. The PI paradigm, in turn, is of greater interest for our analysis. Allomorphy of Th occurs: 1SG form selects for Th = μ (19), whereas 3PL selects for one of the other possible allomorphs: Th = i, or Th = a (20). Lengthening is a property of Th, and not of the stem: it seems stem allomorphy because Th is a segmentally empy mora, but Th is just realized on the stem for phonological reasons. In other words, in conjugation 1, stem allomorphy is epiphenomenal.

(19) 1SG PI ['naːdi] 'I swim'

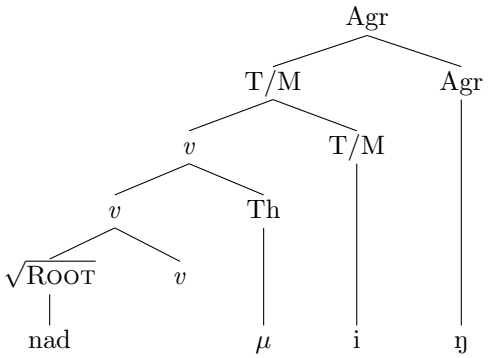


Although 1SG PI and 1SG PS are identical at the surface level, their respective sets of VIs differ: in the latter, /i/ is the exponent of the T/M node (which is empty in 19), whereas the node Agr is empty (/i/ spells-out this node in 19). Similarly, 3PL PI (20) and 3PL PS (21) differ because distinct VIs are selected for. Contrarily to 3PL PI, 3PL PS has Th = μ.

(20) 3PL PI ['nadiŋ]~['nadaŋ] 'they swim'



(21) 3PL PS ['na:diŋ] '(that) they swim'



As mentioned above, in Romance verbs, 1PL and 2PL are arrhizotonic forms, whereas 1SG–3SG and 3PL are rhizotonic forms. NE and ÇU are no exception to this pattern.[18] As argued by Meinschaefer (2011), both phonological and idiosyncratic principles are involved in stress assignment in Romance verbs. More precisely, Meinschaefer shows, based on observations from Spanish and Italian verbal paradigms, that some inflected forms display phonologically predictable stress assignment, whereas other forms, namely 1PL and 2PL, show idiosyncratic patterns.

Meinschaefer (2011) claims that the idiosyncrasy of 1PL and 2PL with respect to stress placement can be accounted for by an interface alignment constraint, ALIGN-TV-H/F, formulated as "the left edge of every theme vowel is aligned with the left edge of the head of a foot". This constraint encapsulates the observation that Th is stressed in both 1PL and 2PL forms in Italian: this is the case in Friulian verbs, too.[19] Crucially, Meinschaefer (2011) argues for an analysis enforcing morphology-prosody alignment, in which inflected forms are built in relation with morpho-syntactic boundaries. In other words, in Meinschaefer's analysis, as in our own proposal, the phonology has direct access to the morpho-syntactic structure underlying the inflected forms.[20]

[18] A few very conservative dialects have rhizotonic 2PL for conjugations 2 and 3, see Francescato (1966).

[19] Besides ALIGN-TV-H/F, Meinschaefer also makes use of an optimal paradigm constraint according to which the stressed syllable in every member of the verbal paradigm must remain the same. 3PL forms in Italian (e.g. 'indicano, from indi'care 'to point at') have stress on the same syllable that also receives stress in all singular forms (e.g. 'indico, 'indichi, 'indica, as opposed to 1PL and 2PL indi'chiamo, indi'cate). It is this optimal paradigm constraint on the location of stress that drags 3PL towards the stress pattern of singular forms. This analysis works as long as the [a] (e.g. 'indicano) in 3PL is not analyzed as a theme vowel. For NE Friulian, in which we analyze [i], which can alternate with [a], in 3PL as the theme vowel, the optimal paradigm constraint alone could not explain why it is 1PL and 2PL which have final stress but not 3PL ([na'diŋ], [na'daịs]). For 2SG and 3SG, stress on the theme vowel (e.g. *[na('das)], *[na('da)]) could simply be ruled out by FOOT-BINARITY, as long as we assume that final -s in 2SG, like the plural morph, does not contribute a mora. An analysis of stress in Friulian verbs and a solution to the problem for stress assignment posed by 3PL forms go beyond the main goal of this paper but are certainly topics that merit careful investigation.

[20] This is Oltra-Massuet and Arregi's (2005) main point, too. In observing the structure that we adopt for the inflected forms of Friulian verbs, stress falls either on the root, or on the Th node. This complies with the generalization proposed by Oltra-Massuet and Arregi, according to which "stress in verbs falls on the vowel preceding the node T, regardless of the specific phonological realization of this node". The generalization accounts for the overwhelming majority of cases, except three of them, belonging to PS: 2SG, 3SG, and 3PL. In these forms, the generalization predicts final stress: for instance, PI 3PL ['nadiŋ]~['nadaŋ] 'they swim' (see structure 20 above), should be stressed on the second vowel: *[na'd-i/-ŋ] 'they swim'. Oltra-Massuet and Arregi encounter the same problem in describing Spanish verbs, and propose a 'stress-deletion' rule, which applies to those forms that would surface as arrhizotonic, but do not. This rule does the job, but seems like an ad-hoc solution.
Another possible path, instead of postulating a 'stress-deletion' rule, is to take those forms that deviate from the general stress pattern as being constituted in an additional phonological domain, à la Kaye (1995). For instance, PI 2SG ['nadas] is derived in two distinct phonological domains, as shown in (1):

Now, since Align-TV-H/F enforces stress on Th, where does stress go when the structure selects for the Th allomorph /μ/? First, Align-TV-H/F would be better referred to as Align-Th-H/F, as Th is not necessarily a vowel in NE. One way of realizing /μ/ is through gemination of the root's consonant, as shown in candidate (c) in (22). This candidate satisfies Align-Th-H/F, because the mora is realized on the stressed syllable, but fatally violates the markedness constraint No-Geminate. In candidate (b), lengthening occurs in the final unstressed vowel, the one expressing φ-features. This candidate is ruled out because it fatally violates Align-Th-H/F, since the mora surfaces in an unstressed vowel. Long vowels in unstressed syllables are prohibited in Friulian, so this candidate also violates a positional markedness constraint against long vowels in metrically dependent syllables. The winning candidate satisfies both No-Geminate and Align-Th-H/F, but violates a low-ranked markedness constraint against long vowels. A candidate with final stress and a stressed long vowel, [naˈdiː], not included in the tableau, would satisfy both No-Geminate and Align-Th-H/F, but would violate a constraint against stress being realized on the morph expressing φ-features, which are always unstressed.[21]

(22) /nad-μ-i/ → [ˈnaːdi]

/nad-μ-i/	No-Geminate	Align-Th-H/F	*Vː
a. ☞ ˈna$_{\mu\mu}$di			*
b. ˈna$_{\mu}$di$_{\mu\mu}$		*W	L
c. ˈna$_{\mu}$d$_{\mu}$di	*W		L

In the remainder of this section, we will show how the phonology prevents the formation of ungrammatical verbal forms, such as *[ˈcaːnti] 1sg 'I sing' and *[ˈliːbɐi] 1sg 'I free' instead of attested [ˈcanti] and [ˈlibɐi], respectively.

The input mora is never realized on the surface in proparoxytonic forms. In our analysis we follow Krämer (2018) and assume that proparoxytones, at least in Romance, can be better analyzed as containing an internally layered foot aligned with the right edge of the prosodic word. Internally layered feet with dactylic (strong-weak-weak) rhythm arise via adjunction of an unstressed syllable to the right of a minimal trochaic (= head-initial) foot to create a maximal foot, that is, a foot that directly dominates another foot, its head, and a final unstressed syllable, its dependent, as illustrated in (23). Head-dependent relations are illustrated with straight and slanted lines, respectively.

(1) PI 3pl [ˈnadiŋ]∼[ˈnadaŋ] 'they swim':

a. Root: [nad]

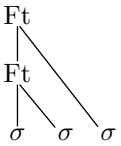
b. Stress is assigned: [ˈnad]

c. Inflectional exponents are added: [[ˈnad]i/a+ŋ].

Such an analysis would equally encounter a problem, since it is not clear why three forms must be composed of two phonological domains, whereas the overwhelming majority of the inflected forms only contain one phonological domain. There does not seem to be any morphophonological reason to defend such an approach. Be that as it may, this discussion cannot be pursued any further here because it is tangential to the central topic of this paper. The debate on the phonology-syntax mapping has been recently reignited by Bonet et al. (2019) and D'Alessandro and Scheer (2015). The interested reader may refer to these papers and the references therein.

[21] Vowel lengthening in final position is a marked option (see, for instance, Myers and Hansen 2007). Similarly, Iosad (2012) assumes that final stressed long vowels are typologically marked, and proposes the constraint *FinalLongV. Loporcaro (2015, 215) also refers to the marked status of final stressed heavy syllables, which include vowel-final oxytones.

(23) Internally layered foot (Martínez-Paricio and Kager 2015)



One of the advantages of assuming internally layered feet is that their right-alignment automatically derives the final three-syllable window for stress assignment, that is, the fact that stress falls on one of the last three syllables within a prosodic word. In our analysis, lack of vowel length in proparoxytonic forms easily follows from satisfying two constraints: an alignment constraint requiring maximal feet to align with the right edge of prosodic words, ALIGN-Right(Ft_{max}, ω), and a foot form constraint against uneven trochees, *('HL). These two constraints are defined in (24).

(24) Constraints deriving lack of vowel length in proparoxytones

a. *('HL) (McCarthy 2008: 227)
Assign one violation mark for every disyllabic trochaic foot with unequal weight ('HL).

b. ALIGN-Right(Ft_{max}, ω) (Martínez-Paricio and Kager 2015: 470)
Assign one violation mark for every maximal foot whose right edge does not coincide with the right edge of a prosodic word.

The two constraints in (24) must also dominate the faithfulness constraint MAX-μ, prohibiting mora deletion. If the input mora is realized, as shown in candidate (25c), the minimal foot is necessarily an uneven trochee, in violation of undominated *('HL). One way to avoid a violation of *('HL) and preserve the input mora, as shown by candidate (25b), is to parse the stressed syllable into its own minimal foot and adjoin the posttonic syllable to the maximal foot. Such a configuration, however, fatally violates ALIGN-Right(Ft_{max}, ω). The only way to satisfy both undominated constraints is to leave the input mora unrealized on the surface, as shown by candidate (25a), which violates low-ranked MAX-μ.[22]

(25) /liber-μ-i/ → ['li.be.ɾi]

/liber-μ-i/	*('HL)	ALIGN-Right(Ft_{max}, ω)	MAX-μ
a. ☞ (('li$_\mu$be$_\mu$)ɾi$_\mu$)			*
b. (('li$_{\mu\mu}$)be$_\mu$)ɾi$_\mu$		*W	L
c. (('li$_{\mu\mu}$be$_\mu$)ɾi$_\mu$)	*W		L

[22] In NE Friulian stressed vowels are always long before /lt, ld, ltʃ, ldʒ/ clusters, irrespective of whether stress falls on the last, penultimate, or antepenultimate syllable, as in ['a:lt] 'tall.M.SG', ['u:l.timp] 'last.M.SG', ['ca:l.da] 'hot.F.SG', ['do:l.tʃa] 'sweet.F.SG', ['mo:l.dʒi] 'to milk an animal'. The same type of contextual vowel lengthening occurs before the voiced sibilants /z, ʒ/ irrespective of the position of the stress, as in [ca.'me:.ʒa] 'shirt', ['tʃi:.za] 'hedge', ['tʃe:.ʒa.ɾa] 'pea', ['ko:.zu.la] 'pod'. Such specific cases of context-dependent vowel lengthening makes it possible to find verbs with a stressed long vowel in both closed syllables and in proparoxytonic forms, as in ['ʃca:l.di] 1SG PI 'I heat up', ['u:l.ti.mi] 1SG PI 'I end', ['ʃko:.zu.li] 1SG PI 'I take out of the pod'. This vowel length is not the realization of the moraic allomorph of Th, as all forms in the paradigm also show vowel length, ['ʃca:l.das] 2SG PI 'you heat up', ['u:l.ti.mas] 2SG PI 'you end', ['ʃko:.zu.las] 2SG PI 'you take out of the pod'. These forms show that whatever markedness constraint is responsible for this specific type of context-dependent vowel lengthening, this constraint must outrank WBP, *[$\mu\mu\mu$]$_\sigma$, *('HL) and ALIGN-Right(Ft_{max}, ω).

The floating mora, one of the allomorphs of Th, is only realized in paroxytonic forms and in open syllables, as we have seen so far. This is not the case in paroxytones with a stressed closed syllable. With an 1SG PI input like /cant-μ-i/, which constitutes a linearized array of morphs including a mora after a verbal root ending in a consonantal cluster, there is no surface realization of the mora. The analysis of proparoxytones has demonstrated that uneven trochees are prohibited in NE. Otherwise, we would expect lengthening to occur in antepenultimate position. Crucially, forms like ($\text{'ca}_{\mu}\text{n}_{\mu}\text{.ti}_{\mu}$), with a short vowel but with a moraic coda, or ($\text{'ca}_{\mu\mu}\text{n.ti}_{\mu}$), with a long vowel but no moraic coda, fatally violate the constraint against uneven trochees, which is undominated in NE. WEIGHT-BY-POSITION, responsible for assigning moras to coda consonants, is also undominated in NE, a quantity-sensitive language (formulated in 26a). Finally, having a moraic coda and a long vowel gives rise to a superheavy, trimoraic syllable, a configuration that violates the markedness constraint *$[\mu\mu\mu]_{\sigma}$ (formulated in 26b).

(26) Constraints on moraic structure

a. WEIGHT-BY-POSITION
Assign one violation mark for every coda consonant that does not project a mora.

b. *$[\mu\mu\mu]_{\sigma}$ (McCarthy 2008: 224)
Assign one violation mark for every superheavy (=trimoraic) syllable.

We assume that paroxytones with a penultimate closed syllable are also parsed into an internally layered foot, and that the minimal foot must be minimally and maximally bimoraic: (($\text{'ca}_{\mu}\text{n}_{\mu}$)$\text{ti}_{\mu}$), which violates dominated MAX-μ. All constraints presented so far dominate MAX-μ, as illustrated in the tableau in (27).

(27) /cant-μ-i/ → ['can.ti]

/cant-μ-i/	*('HL)	WBP	*$[\mu\mu\mu]_{\sigma}$	MAX-μ
a. ☞ (($\text{'ca}_{\mu}\text{n}_{\mu}$)$\text{ti}_{\mu}$)				*
b. (($\text{'ca}_{\mu\mu}\text{n}_{\mu}$)$\text{ti}_{\mu}$)			*W	L
c. (($\text{'ca}_{\mu\mu}$n)ti_{μ})		*W		L
d. ($\text{'ca}_{\mu\mu}\text{nti}_{\mu}$)	*W			L

Verbal forms with a long vowel in an open penultimate syllable are also parsed into a layered foot to avoid a fatal violation of *('HL). Our analysis, based on layered feet, perfectly derives the distribution of long vowels in verbal forms. Assuming right-aligned layered feet, and a bimoraic minimal foot, long vowels are restricted to paroxytone forms with a stressed open syllable. The next tableau shows the parsing of ((na:)di) into a layered foot.

(28) /nad-μ-i/ → ['na:.di]

/nad-μ-i/	*('HL)	MAX-μ
a. ☞ (($\text{'na}_{\mu\mu}$)di_{μ})		
b. ($\text{'na}_{\mu}\text{di}_{\mu}$)		*W
c. ($\text{'na}_{\mu\mu}\text{di}_{\mu}$)	*W	

Finally, it must be noted that the input mora, an allomorph of the Th morpheme, is always realized on the stressed root vowel (e.g. ['na:d-i] 1SG 'I swim', but not ['nad-i:]). As mentioned

above, this follows from both phonological and morphological considerations. First, Friulian only allows vowel length in stressed position. This can be easily explained making use of a positional markedness constraint *ˈV: relativized to a metrically non-prominent prosodic position, the dependent of the foot, that is, *ˈV:/$_{Ft's Dep}$. Second, stress on verbs is morphologically governed in Romance. A form like *[nad-ˈi:] is out because the morphs realizing ϕ-features are always unstressed. In other verbal forms in which Th is realized segmentally, length never occurs because, as we have demonstrated, length and overt Th stand in complementary distribution. If length on the stressed root vowel were to co-occur with an overt Th morph, a single affix would be realized twice. In other verbal forms in which stress falls not on the root but on morphs realizing T/M morphemes, like in the future and conditional tenses, Th is always realized overtly, which automatically explains the absence of the moraic allomorph.

4 Conclusions

The source of vowel length in Friulian is multiple. Vowel length in Friulian can be phonological. Underlyingly voiced obstruents in final position, which undergo devoicing, trigger lengthening of a preceding stressed vowel. Vowel length in Friulian can also be contrastive in nominal forms, as it cannot always be predicted contextually. This is the case, for instance, in forms like [ˈvo:li] 'eye' (as opposed to [ˈvoli] 3SG PS 'he/she wanted'). Finally, the source of vowel length in some varieties of Friulian is morphological. This is the case of Negrons, in which vowel length is also the phonological exponent of the Theme morpheme in conjugation 1 verbs. This morpheme has distinct allomorphs (/i/, /a/ and /μ/), and we have shown that the moraic affix subcategorizes for 1SG present indicative, 1SG-3SG and 3PL present subjective. Vowel length in Negrons verbs is therefore analyzed as a case of mora affixation. We have also developed an Optimality Theoretic analysis of why mora affixation can only surface in paroxytones with a stressed open syllable. Proparoxytones and paroxytones with a stressed closed syllable always surface with a short vowel because otherwise an uneven trochee would be created, which is a metrical configuration banned in Friulian. The phonological analysis crucially relies on layered feet. The present analysis of morphological length in Friulian shows that there is no need for a morphome-based analysis of the data. In our analysis, each morph, including length, spells out a morphosyntactic property. Future research needs to focus on a wider set of Friulian varieties and apply the decompositional analysis of the inflected forms proposed in this paper to each of them in order to better understand the morphological structure of the Friulian verb and the role of vowel length in the language.

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Conflict of interest

The authors declare that they have no conflict of interest.

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