

Inflectional classes in Kipsigis

Maria Kouneli
Universität Leipzig
maria.kouneli@uni-leipzig.de

Abstract In this paper, I provide a description and analysis of conjugation classes in Kipsigis (Nilotic; Kenya). While traditional descriptions discuss two conjugation classes, I show that the morphophonological properties of Class II can be reduced to the presence of a moraic affix spelling out a verbalizing head (little *v* in theories like DM). On the semantic side, I show that Class II is primarily used for causative verbs, and I identify the verbalizing head as v_{CAUSE} . The analysis highlights three properties of inflectional classes that are relevant for their analysis cross-linguistically: i) there is a close (historical or synchronic) connection between conjugation classes and transitivity, ii) what looks like a conjugation class can be reduced to the spellout of a verbalizing head, iii) there is an asymmetry between nouns and verbs for a number of languages: verbs tend to have fewer inflectional classes than nouns. Finally, the analysis of the Kipsigis facts contributes to a growing body of literature on mora affixation in Nilotic and beyond (e.g., [Trommer & Zimmermann 2014](#)), and it shows that such abstract representations in combination with regular phonology are sufficient to derive apparently complex morphophonological alternations.

Keywords: inflectional classes; mora affixation; verbalizing head; noun-verb asymmetries; Kipsigis; Nilotic

1 Introduction

Inflectional classes - usually called *declension* classes in the nominal domain and *conjugation* classes in the verbal domain - determine the allomorph that a given lexical item will choose to express morphosyntactic properties such as case, tense etc. For example, the morphological realization of gender, number, and case on a particular Modern Greek noun depends on which one of eight declension classes the noun belongs to. Thus, accusative plural will be expressed by the suffix *-es* for a Class III feminine noun like *avl-i* ‘yard’, but by the suffix *-is* for a Class IV feminine noun like *pol-i* ‘city’ (e.g., [Ralli 2000](#); [Alexiadou & Müller 2008](#)). Inflectional classes of this type are common in Indo-European languages, where they are often marked by theme vowels. For example, the three verbal conjugation classes in Spanish are associated with a different theme vowel in the infinitive: *habl-a-r* ‘to speak’ vs. *beb-e-r* ‘to drink’ vs. *viv-i-r* ‘to live’ (e.g., [Oltra-Massuet & Arregi 2005](#)).

An often-cited characteristic of inflectional classes cross-linguistically is their purely morphological status: which class a nominal or verbal stem will belong to cannot be determined by the phonological, syntactic, or semantic features of the stem alone (e.g., [Alexiadou & Müller 2008](#)). Inflectional class features are, thus, morphological features par excellence, which is why they have played an important role in theories advocating for the autonomy of morphology as a module (e.g., [Aronoff 1994](#)). However, despite their typological prevalence and their central place in morphological theorizing, generative research on inflectional classes and theme vowels has mostly focused on Indo-European languages (see [Oltra-Massuet 2020](#) for a recent overview). The goal of this paper is to expand the empirical domain of this research by describing and analyzing inflectional classes in Kipsigis, a Nilotic language spoken in Kenya.

Since declension classes in the nominal domain have already been discussed in Kouneli (2021c), the focus of this paper is on verbal conjugation classes. I argue that while Kipsigis seems, at first glance, to possess two classes of verbal conjugation, a closer investigation reveals that what is traditionally called the second conjugation (Class II) in the Nilotic literature (e.g., Dimmendaal 1983) involves a prefixal empty mora spelling out the verbalizing head, i.e., little *v* in theories like Distributed Morphology (DM; Halle & Marantz 1993). In other words, I argue that Kipsigis does not have conjugation classes, with the morphophonological effects associated with Class II being derived from the presence of an additional mora on the verbal stem. We thus find an interesting asymmetry between the nominal and verbal domain of Kipsigis: while nouns belong to various declension classes (Kouneli 2021c), there are no conjugation classes for verbs. This is the case in other languages as well: as was already mentioned earlier, Greek possesses eight declension classes in the nominal domain, but Spyropoulos et al. (2015) and Panagiotidis et al. (2017) have recently shown that there are no real conjugation classes in the verbal domain, with the traditional second conjugation being reduced to the presence of an empty vocalic slot (making it very similar to the Kipsigis second conjugation). Thus, an interesting asymmetry emerges between verbs and nouns, with a cross-linguistic tendency for the former to have fewer conjugation classes, or none at all. It also seems to be the case that verbal conjugation classes can often be reduced to overt verbalizing morphology (see also Fábregas 2017).

The remainder of the paper is structured as follows: in Section 2, I outline the morphophonological and semantic properties of the two conjugation classes in Kipsigis, and I show that Class II can be reduced to the presence of a moraic prefix on the stem. Kipsigis is thus added to a number of Nilotic languages that employ mora affixation (e.g., Trommer 2011). In Section 3, I present a DM analysis of the facts, where the moraic prefix is the spellout of v_{CAUSE} . In Section 4, I conclude, and discuss open questions and avenues for further research, including the observed asymmetry between nouns and verbs.

2 Conjugation classes in Kipsigis: not there

In this section, I first give some background on verbal inflection in Kipsigis in 2.1. In 2.2, I argue that the inflectional differences between what are traditionally called Class I and Class II follow from the presence of a moraic prefix in Class II, and in 2.3, I briefly discuss the semantics of the verbs belonging to each class.

For the reader to better understand the data that follow, a few words need to be said about Kipsigis - the language under investigation. Kipsigis is the major variety of Kalenjin, a dialect cluster of the Southern Nilotic branch of Nilo-Saharan, and it is spoken by approximately 2 million speakers in the Rift Valley region of Western Kenya (Eberhard et al. 2020). Data in this paper come from Toweett (1979) and fieldwork with six native speakers in Kenya. Kipsigis is a tonal language with three tones: H, L, and a contour HL tone which is restricted to bimoraic syllables (Creider 1982; Kouneli & Nie 2021). Tone is transcribed whenever possible, with few exceptions in a couple of examples obtained in Skype elicitation (where transcription was difficult) or via written communication. The language also has a relatively well-studied system of dominant Advanced Tongue Root [ATR] harmony: a [+ATR] vowel anywhere in the word causes all other vowels to become [+ATR] (Hall et al. 1974; Toweett 1979; Halle & Vergnaud 1981; Rottland 1982; Lodge 1995; Baković 2000; Nevins 2010). In the transcriptions of polymorphemic Kipsigis words, vowels will be given in their surface ATR value, unless underlying representations of morphemes are provided, in which case the underlying value will be given. If the underlying value is given as [-ATR], this means the vowel is recessive; if it is given as [+ATR], it means that it is dominant.

As for the syntactic properties of the language, Kipsigis is pro-drop, and the pragmatically unmarked word order is VSO (but it has extensive post-verbal scrambling; see Bossi & Diercks

Non-past	∅
Current past	ka-
Recent past	kɔ:-
Distant past	kr:-

Table 1: Tense morphemes

2019). The language has the typologically rare marked nominative case system (see König 2006; 2008; Handschuh 2014), with nominative expressed tonally (Toweett 1979; Kouneli & Nie 2021; Jolin 2022).

2.1 Background on verbal inflection in Kipsigis

Kipsigis verbs inflect for person and number agreement with the subject, mood (indicative, subjunctive, imperative), tense (non-past vs. three degrees of past), negation, and aspect (perfective vs. imperfective and simple vs. perfect) (Toweett 1979; Rottland 1982; Creider & Creider 1989).¹ The language is largely agglutinative, but certain distinctions are expressed via suprasegmental material, such as tone or vowel length alternations, as we will see later. In verbal inflection, tense, negation, and subject agreement are expressed via prefixes, while (imperfective) aspect is expressed via a suffix. When they co-occur, they follow the template in (1), which is accompanied by an example of a negated, first-person singular form in the distant past imperfective.

	a.	Tense	Negation	Agreement	Root	Imperfective
(1)	b.	ki:-	ma-	a-	tʃam-	e
		PST.DIST	NEG	1 SG	like	IPFV
		‘I didn’t like (long ago)’				

The prefixes expressing tense and negation are generally invariable (modulo ATR harmony), while some subject agreement prefixes and the imperfective suffix have allomorphs which are conditioned by the particular TAM combination (as well as conjugation class, as we will see in a bit). The tonal melody of the inflected verbal stem is determined by TAM, conjugation class, and person: local person forms have a different melody from 3rd person forms across the paradigm. It has to be noted, however, that there is a limited understanding of verbal tonology in the language. The interested reader is referred to Creider (1980) and Creider & Creider (1989: 77–78, 83–84) for complete conjugation tables of Kipsigis and the related dialect Nandi respectively, but Tables 1-2 provide a list of the tense and subject agreement prefixes, along with their allomorphs. The most common allomorphs for the imperfective suffix are *-i* and *-e*.²

Moving on to conjugation classes, according to traditional descriptions (e.g., Toweett 1979; Rottland 1982; Dimmendaal 1983), verbs in Kipsigis belong to one of two classes, called Class I and Class II in the Nilotic literature. The exact differences between the two inflectional paradigms depend on the particular TAM combination, but in most cases Class I and II differ in the vowel length of the subject agreement prefix, the imperfective allomorph and the overall tonal melody of the stem. This is illustrated in the non-past imperfective conjugation paradigm in (2). First,

¹ The terms (im)perfective and simple vs. perfect are taken from Creider & Creider’s (1989) description of the conjugation system of the related dialect Nandi (see Creider & Creider 1989: 101–106 for the semantics of those aspectual distinctions in the language). They also note that in the non-past perfect, there is an additional distinction between simultaneous and non-simultaneous action; it is not known to me whether Kipsigis behaves like Nandi in this respect.

² The language also has a number of argument structure-related morphemes (e.g., applicative, reflexive) that appear as verbal suffixes. Some of these suffixes have allomorphs conditioned by aspect, but, to my knowledge, conjugation class does not interact with them, so they will not be discussed here; see Toweett (1979); Rottland (1982) for a complete description.

1SG	a(:)-
2SG	ɪ(:)-
3	∅/kɔ(:)-
1PL	kɪ(:)-/kɛ:-
2PL	ɔ(:)-

Table 2: Subject agreement morphemes

	Class I	Class II
Imperfective suffix	-e	-i
Subject agreement (local person)	(C)V	(C)V:
Subject agreement (3rd person)	∅	i-
Tonal melody (local person)	H.H.H	HL.L.H
Tonal melody (3rd person)	H.L	H.L.L

Table 3: Class I vs. Class II for monosyllabic roots

we observe that the subject agreement prefix for all local persons has a short vowel for the Class I verb *tfam* ‘to like’, while it has a long vowel for the Class II verb *kat* ‘to greet’; in 3rd-person forms, there is no overt agreement morpheme in Class I, but a prefix *ɪ-* in Class II. Second, the imperfective suffix has the form *-e* in Class I, but *-i* in Class II. Third, the tonal melody of the stem is different in the two paradigms. Also note that *within* each paradigm the melody is different for local person and third person forms; this person-driven tonal allomorphy holds across all cells of the verbal inflection paradigm, as mentioned earlier. The differences between Class I and Class II for the non-past imperfective are summarized in Table 3, noting that both the imperfective suffix and the tonal melody also depend on the number of syllables and length of the last vowel of the root, as will be explained in more detail in the next section.

(2) Non-past imperfective (subject agreement - root - imperfective)

a. Class I verb *tfam* ‘to like’

1SG: á-tʃám-é

2SG: í-tʃám-é

3: ∅-tʃám-è

1PL: kí-tʃám-é

2PL: ó-tʃám-é

b. Class II verb *kat* ‘to greet’

1SG: â:-kàt-í

2SG: î:-kàt-í

3: í-kàt-ì

1PL: kî:-kàt-í

2PL: ô:-kàt-í

In the next section, I provide arguments according to which the differences between Class I and Class II follow from the presence of an empty moraic prefix in Class II, without the need for conjugation class features in the grammar.

2.2 Conjugation class II contains a moraic prefix

The argument for the presence of a moraic prefix in Class II verbs begins with the analysis of the *ɪ*-prefix that we observe in 3rd person; the relevant form is repeated in (3) for convenience.

- (3) *í-kùt-ì*
 ?-greet-IPFV
 ‘He/she greets.’

There are two possible ways of analyzing this morpheme: it could either be the 3rd person subject agreement allomorph for Class II or it could be a thematic element (akin a theme vowel) associated with Class II. I am going to argue in favor of the latter analysis, but with the twist that the thematic suffix is in fact an empty mora and *ɪ*- is the epenthetic vowel filling this slot.

The clearest evidence against treating *ɪ*- as a subject agreement prefix comes from its behavior with respect to vowel coalescence. Kipsigis has a regular phonological rule of vowel coalescence, where adjacent short vowels [a] and [i] merge into a long [e] (this rule is independent of ATR vowel harmony; see Kouneli 2019: 27–28 for more details).

- (4) Vowel coalescence rule
 /ai/ → [e:]

The rule is active both in the nominal and the verbal domain, as can be seen in (5): the vowel of the thematic suffix coalesces with that of the secondary suffix (more details on these morphemes will be given in Section 4) in (5a), while the vowel of the current past tense morpheme coalesces with that of the second person agreement prefix in (5b).

- (5) Vowel coalescence examples
- a. /la:k-wà-í-t/ → [la:kwé:t]
 child-TH-SEC
 ‘child’
- b. /ka-í-tʃam/ → [ké:tʃám]
 PST.CURR-2SG-like
 ‘you liked’

What example (5b) shows is that verbal agreement prefixes are subject to vowel coalescence when adjacent to the current past tense prefix. The rule does not apply, however, in examples like (6) where /i/ is part of the (Class I) verbal stem, and not an agreement prefix. This may be because of the intervening (covert) 3rd person agreement morpheme or because of a morphological domain boundary (presumably the agreement prefix is closer to tense than the root is).

- (6) Kà-Ø-ílís (*ke:lis) Kíbê:t.
 PST.CURR-3-drown Kibeet.NOM
 ‘Kibeet drowned.’

The (non-)application of vowel coalescence thus makes predictions regarding the [ɪ] vowel appearing on 3rd person forms of Class II verbs. If [ɪ] is an agreement prefix, we expect it to undergo vowel coalescence with the vowel of the past tense prefix (cf. (5b)). If, on the other hand, [ɪ] is a thematic element associated with the verbal stem, coalescence may not apply (cf. (6)). What we observe in (7) is that coalescence between the tense prefix vowel and [ɪ] is impossible, indicating that [ɪ] is not an agreement morpheme, and is rather associated with the stem. This means that

3rd person agreement is zero for both Class I and Class II verbs, with *ɪ-* in the latter class being a morpheme associated with Class II verbal stems.³

- (7) /Ka-Ø-ɪ-kat-an/ → [kaɪkatan] (*kɛ:katan)
 PST.CURR-CL2-greet-1SG
 ‘He/she greeted me.’

Further evidence against treating *ɪ-* as a Class II 3rd person agreement prefix comes from imperatives. As can be seen in (8), the 2nd person singular imperative of Class I verbs does not bear any (overt) agreement morphology, while imperatives of Class II verbs appear with an *ɪ-* prefix. Since these forms do not involve 3rd person, these data support the analysis of *ɪ-* as a morpheme belonging to the stem of Class II verbs.⁴

- (8) Class I vs. Class II imperatives (Toweett 1979: 214)
- a. Kér!
 see/look
 ‘Look!’
 - b. ì-kát!
 CL2-greet
 ‘Greet!’

Summing up, the morphophonological behavior of *ɪ-* in Class II verbs supports its analysis as a thematic element, and not an agreement morpheme. This is also the consensus in previous literature. For example, Toweett (1979: 218) calls it a semi-thematic vowel and adds the phrase “or may be it is thematic”. Similarly, Dimmendaal (1983) argues that Class II stems include an *i-* prefix, which he traces back to a Proto-Nilotic causative prefix **i-*. Finally, Creider & Creider (1989: 81) write for the related dialect Nandi: “[a] large number of verbs have stems which begin with an initial vowel *i-*. Traditional analyses have posited two morphological classes on the basis of the separate segmental and tonal behaviour of regular verbs and the *i-* initial verbs.” While everyone seems to agree that the vowel [ɪ] forms a unit with the verbal stem in Class II verbs, my analysis differs from previous descriptions in the following way: I argue that the thematic element is not underlyingly /ɪ/, but rather an empty mora, which is filled by epenthetic [ɪ] in certain cases.

The main evidence against positing an underlying /ɪ/ comes from the form of the subject agreement prefixes. Going back to the inflection of Class II verbs in (2), we observe that the vowel of local person agreement prefixes is always long. This is a stable feature of Class II verbs across the paradigm: while agreement prefixes are short in most cells of the Class I inflectional paradigm, they are always long - without any exception - for Class II verbs.⁵ Thus, we have *a:-kat-i* for ‘I greet’. The 1SG agreement prefix is /a/ underlyingly (as seen in the inflection of Class I verbs, but also the form of the pronoun: *a-nɛ*: ‘I/me’). If the Class II verb *kat* ‘to greet’ had an underlying *ɪ-*

³ It is worth pointing out that 3rd person agreement is not always zero; in the subjunctive, for example, there is an overt prefix *kɔ-*, which appears with a long vowel in the case of Class II verbs, in an analogous fashion to local person prefixes. This follows from the analysis of Class II stems as containing a moraic prefix, as will be discussed later.

⁴ An anonymous reviewer asks whether *ɪ-* in (8b) could be a 2SG agreement prefix. This is a plausible assumption given the usual form of 2SG in the language (see Table 2), but it is incompatible with the formation of subjunctives for Class II verbs, which never bear an agreement prefix in the singular. In the plural, Class I verbs do take a prefix (the 2PL *ɔ-*), while Class II verbs appear with a long vowel (*ɔ:-*). This length difference can be explained by the presence of an additional mora on the stem of Class II verbs, as will be explained later.

⁵ Agreement prefixes of Class I verbs surface with a long vowel in the perfect aspect as well as in most cells of the subjunctive. Both perfect and subjunctive are expressed by vowel quantity and tonal manipulations. These categories will not be examined in this paper, as they are not well-understood for Kipsigis (but see Driemel & Kouneli 2022 for preliminary thoughts on the subjunctive).

as a prefixal theme vowel, we would predict the following 1SG forms depending on whether vowel coalescence applies or not:

- (9) a. Vowel coalescence: /a-ɪ-kat-i/ → [e:kati]
 b. No vowel coalescence: /a-ɪ-kat-i/ → [aɪkati]

However, neither of these forms is grammatical. This shows that it is impossible for Kipsigis phonology to derive the correct form **a:-kat-i** if we assume an /ɪ/ underlying vowel. Indeed, [Creider & Creider \(1989: 84\)](#) note the same problem for Nandi, namely that the general rules of vowel coalescence in the language cannot account for the behavior of the subject agreement vowels; they suggest morpheme-specific vowel coalescence rules just for the Class II *ɪ-* prefix (for example, they argue that just in this case, [a] + [ɪ] → [a:]).

However, in a theory that allows affixes to have the shape of a mora, i.e., empty prosodic structure (e.g., [McCarthy & Prince 1986](#); [Lombardi & McCarthy 1991](#); [Flack 2007](#); [Trommer 2014; 2015](#); [Trommer & Zimmermann 2014](#)), and under the assumption that morphological vowel lengthening can be modeled via the affixation of a mora and/or association of the vowel to a new mora (e.g., [Hyman 1985](#); [Hayes 1989](#); [Zimmermann 2017](#)), the Kipsigis facts receive a straightforward explanation if the thematic element of Class II verbs is a moraic prefix.

Assuming autosegmental representations ([Goldsmith 1976](#) and subsequent work) that include moras, a surface form like *a:-kat-i* ‘I greet’, where a Class II verb is inflected for 1SG, has the underlying representation in (10).⁶

- (10)
- | | | | |
|---|---|----|----|
| μ | μ | μ | μ |
| | | | |
| a | | ka | ti |

We therefore see that there is a floating mora (i.e., a mora that is not associated to segmental material) in the underlying representation. I propose that there is a constraint in Kipsigis that requires moras to be associated in the surface form. In the usual case, there is leftwards association, with the mora associating to the vowel of the subject agreement prefix, resulting in vowel lengthening. This can explain all cases of vowel lengthening of the subject agreement prefix, without resorting to morpheme-specific vowel coalescence rules such as those in [Creider & Creider \(1989\)](#). Apart from the local person prefixes, which we have already seen, this analysis predicts that the 3rd person allomorph *kɔ-* should also surface with a long vowel with Class II verbs. This prediction is borne out, as illustrated by the 3rd person perfective subjunctive form of the Class II *kat* ‘to greet’ in (11).

- (11) *kɔ:-kat*
 3-greet.SBJV

This leaves us with the vowel [ɪ] which appears in 3rd person forms, as well as the imperative (cf. (8)). Looking at these forms, we observe that in this case there is no vowel to the left of the moraic prefix; therefore, the floating mora fails to associate, and I propose that an epenthetic vowel [ɪ] is inserted as a repair.⁷ This pattern is reminiscent of mora augmentation processes in Japanese, where

⁶ It is assumed that only vowels (and perhaps sonorant codas in Kipsigis) are associated to moras (e.g., [Hayes 1989](#)). Higher prosodic structure (e.g., syllables) are not represented here, as they are not relevant for the point being made.

⁷ It might seem problematic that [ɪ] surfaces in examples like (7), instead of causing lengthening of the vowel of the past prefix *ka-*. There are two observations that might help resolve the problem, but further work is needed for a detailed solution: i) for one speaker (out of six), lengthening of the vowel of *ka-* is indeed possible, with that form being in free variation with the one in (7), and ii) in examples like (7), 3rd person agreement (even if silent) intervenes between the thematic mora and the past prefix, while no morpheme - covert or not - intervenes between the mora and subject agreement prefixes. We have already seen that the silent 3rd person agreement prefix might be the reason why vowel coalescence is blocked with *ɪ*-initial verbs (see (6)), and so it is reasonable to hypothesize that this also blocks the association of the empty mora to the tense prefix.

the additional mora leads to gemination, vowel lengthening or epenthesis (of a nasal) depending on the phonological environment (e.g., [Davis & Ueda 2002](#)).⁸

The insertion of [ɪ] to realize floating material is further motivated by an alternation in the formation of polar questions in Kipsigis. More specifically, polar questions are characterized by a clause-final H tone. However, the change in pitch is accompanied by segmental changes in the last word of the clause: vowel lengthening if the word ends in a vowel (12), but insertion of [ɪ] if the word ends in a consonant (13).

- (12) V-final clause: epenthesis
- a. Tórô:r Tjé:bê:t.
tall Cheebeet.NOM
'Cheebeet is tall.'
 - b. Tórô:r Tjé:bê:t-í?
tall Cheebeet.NOM-Q
'Is Cheebeet tall?'
- (13) C-final clause: vowel lengthening
- a. Tórô:r ɲó:ktá.
tall dog.NOM
'The dog is tall.'
 - b. Tórô:r ɲó:ktá:
tall dog.NOM.Q
'Is the dog tall?'

Polar questions thus seem to be formed by a floating mora (and a H tone). If the mora attaches to a clause that ends in a vowel, it associates to the left (same as in the case of Class II verbs), but if it attaches to a consonant-final clause, then it fails to associate and [ɪ] is inserted instead. Finally, it is worth mentioning that [ɪ] is the general epenthetic vowel in the language: [Toweett \(1979\)](#) often refers to it as “epenthetic” (though he does not have a section dedicated to epenthesis), and it is also the vowel usually inserted in loanwords that violate Kipsigis phonotactics, as can be seen in (14), a loan from English ‘box’.⁹

- (14) bò:gìs-ì-ít (bò:gìsít)
box-TH-SEC
'box'

Summing up the discussion so far, the differences between Class I and Class II verbs with respect to the vowel length of the subject agreement prefix follow straightforwardly from the presence of a moraic prefix in the latter case. This is in line with the description of Nandi in [Creider & Creider \(1989\)](#), who argue that the inflectional differences between Class I and Class II can be explained by regular phonology if we assume that Class II verbs have an *ɪ*-thematic prefix. However, as was already explained, they need to resort to morpheme-specific phonology to account for the shape of subject agreement morphemes. Postulating a moraic prefix, on the other hand, avoids this problem: the general phonology of the language is enough, as evidenced by the similar behavior of polar question formation. It is also worth noting that mora affixation is common in Nilotic languages (see e.g., [Flack 2007](#); [Trommer 2011](#); [2015](#) on Dinka, [Trommer 2014](#); [Trommer &](#)

⁸ Gemination is not an option in Kipsigis, since geminates are banned in the language.

⁹ An anonymous reviewer asks whether the language has other epenthetic vowels. To my knowledge, the answer is no, but the phonology of the language is understudied, and there has never been any research on epenthesis in any Southern Nilotic language. Thus, the existence of other epenthetic vowels cannot be ruled out with certainty at this stage.

Zimmermann 2014 on Anywa, Trommer & Zimmermann 2014 on Pări, Remijsen & Ayoker 2020 on Shilluk), and has been used to explain complex morphophonological phenomena, including cases of subtractive morphology (Trommer & Zimmermann 2014).¹⁰ Kipsigis is thus added to the list of Nilotic languages that employ mora affixation.

So far, I have explained the differences between Class I and Class II verbs with respect to subject agreement morphology. Recall, however, that the two classes of verbs also differ in the allomorph of imperfective aspect, as well as in the overall tonal melody of the inflected stem. In the remainder of this section, I show that these differences also follow from the presence of a moraic prefix in Class II verbs.

Let's start with the form of the imperfective suffix. If we look at the paradigm in (2), we observe that the imperfective suffix has the form *-e* for a monosyllabic Class I verb, but the form *-i* for a Class II verb with a monosyllabic root.¹¹ The relevant difference is repeated in (15) below.

- (15) a. Class I: á-tʃám-é
1 SG-like-IPFV
- b. Class II: â:-kàt-í
1 SG-greet-IPFV

However, the distribution of these two aspect allomorphs (*-e* and *-i*) is best described in phonological terms, not in terms of conjugation class. Once we look at verbs of different phonological shapes, the generalization that emerges is the following: the default exponent of imperfective is the suffix *-e*, except in polysyllabic verbs (=verbs with two or more syllables) with a short vowel in the last syllable, where the allomorph *-i* is chosen. The Vocabulary Insertion rules are summarized in (16).¹²

- (16) a. $e \leftrightarrow \text{IPFV}$
b. $i \leftrightarrow \text{IPFV} / (\sigma)\sigma(\text{C})\text{V}(\text{C})$

Crucially, the phonological environment in (16b) refers to the *stem*, and not the *root*. This means that Class II verbs will always count as polysyllabic, since they contain a moraic prefix in addition to any root material.¹³ With the rules in (16) in place, the correct imperfective allomorph is derived for all forms known to me, with a summary provided in Table 4 (see also Toweett 1979: 188–192 for further examples).¹⁴ It becomes clear from this table that it is the prosodic shape of the stem, and not the conjugation class of the verb, that determines allomorph choice.¹⁵

Similar to the distribution of agreement prefixes, the choice of imperfective allomorph is therefore entirely determined by the presence of an additional mora on Class II verbs. This leaves us with the tonal differences between the two classes. Unfortunately, the discussion surrounding tone is preliminary at this stage, since there is, to my knowledge, no study of verbal tonology in Kipsigis.

¹⁰ Floating moras have a very broad range of uses in Nilotic (e.g., 3SG verbal inflection in Dinka, part of nominal stems in Shilluk). Western Nilotic languages, in particular, are famous for their almost exclusive use of (apparent) non-concatenative morphology, since most morphological distinctions are expressed by vowel length and/or quality manipulations or via tonal means (Trommer 2011). Within Southern Nilotic, it has been shown that moras (and prosodic structure more generally) interact in crucial ways with morphological tone (e.g., in the expression of nominative case; Dimmendaal 2012; Jolin 2022).

¹¹ Both allomorphs are dominant for [ATR] harmony.

¹² In (16), the two allomorphs are treated as suppletive, but it is possible that [i] is derived from [e] via a phonological rule triggered by the prosodic shape of the stem. At the moment, it is not clear what this phonological process would be, but future research can help resolve this issue.

¹³ In Kipsigis, verbal roots are maximally disyllabic; given the possibility of a moraic prefix in Class II, this means that the maximum number of syllables for underived verbal stems is three.

¹⁴ In the table, 3rd person forms are provided in the examples, but local person forms show the same pattern.

¹⁵ The imperfective has additional allomorphs which appear after derivational morphemes such as the applicative. See Toweett (1979) for details.

	Class I	Class II	Example Class I	Example Class II
Monosyllabic, short V	-e	NA	Ø-tʃám-è '(s)he likes'	NA
Monosyllabic, long V	-e	NA	Ø-tʃā:m-é '(s)he whispers'	NA
Polysyllabic, short V	-i	-i	Ø-kánàp-i '(s)he lifts'	Ø-í-kàt-i '(s)he greets'
Polysyllabic, long V	-e	-e	Ø-komòt-e '(s)he pinches'	Ø-í-sù:p-é '(s)he heaps'

Table 4: Distribution of imperfective aspect allomorphs

A cursory look at the examples in this section, however, reveals that the tonal melody of the stem varies depending on both vowel length and the number of syllables of the verb. Furthermore, a minimal pair is provided in (17) below, where a Class I verb has a different melody in 3rd person depending on the vowel length of the stem.¹⁶

- (17) a. Short vowel: H.L melody
 Ø-tʃám-è
 3-like-IPFV
 'he/she likes'
- b. Long vowel: L.H melody
 Ø-tʃā:m-é
 3-whisper-IPFV
 'he/she whispers'

This means that the presence of an additional mora in Class II, which is absent in Class I, will certainly have an effect on tonal inflection. Whether this will be enough to derive all tonal differences across the paradigm needs to be verified in future work, but preliminary data show that it is possible to reduce the tonal differences to the presence of the moraic prefix: as shown in (18), the tonal melody of a disyllabic Class I verb with a short vowel in the last syllable is the same as that of a Class II verb with a short vowel.

- (18) a. Class 1 verb, 3rd person: H.L.L melody
 Ø-túrùs-i
 3-pierce-IPFV
 'he/she pierces'
- b. Class 2 verb, 3rd person: H.L.L melody
 Ø-í-kàt-i
 3-CL2-greet-IPFV
 'he/she greets'

I have shown in this section that Class I verbs are morphologically unmarked, while Class II verbs contain a moraic thematic prefix; from now on only Class II will be glossed. The inflectional differences between the two classes of verbs can be explained by regular phonological processes once the presence of the additional mora in Class II is acknowledged. However, this has been adequately demonstrated only for part of the paradigm (e.g., we haven't looked at perfect or subjunctive forms in detail), and further work on Kipsigis (especially tonal) phonology is needed before providing a detailed derivation of all forms. Despite the current limitations, big part of the inflection of Class II verbs can be clearly reduced to the presence of an additional morpheme in

¹⁶ To my knowledge, local person forms of monosyllabic verbs in Class I have the same melody (H.H.H) irrespective of vowel length.

Class II (a morpheme that is acknowledged in all previous descriptions of the language); it would be surprising if other cells of the paradigm turned out to be different in a fundamental way. In the next section, I discuss the factors determining class membership.

2.3 Conjugation classes: syntax and semantics

Many verbs appear only in Class I or Class II. However, most verbs participating in the causative alternation (e.g., *The cup broke* vs. *Mary broke the cup* in English) do so by alternating between Class I (intransitive, anticausative variant) and Class II (transitive, causative variant), as illustrated in (19). More examples from my fieldnotes that participate in the Class I - Class II alternation include the following: *sap* ‘to heal’, *tɔt* ‘to rot’, *tʃɔ:t* ‘to melt’, *tʃus* ‘to deflate’, *nu:r* ‘to soak’, *pɪt* ‘to grow’.¹⁷

- (19) a. Kà-Ø-bét ɲô:ktà.
PST.CURR-3-get.lost dog.NOM
‘The dog got lost.’
- b. Kà-Ø-í-bê:t Kíbê:t ɲó:ktá.
PST.CURR-3-CL2-get.lost Kibeet.NOM dog
‘Kibeet lost the dog.’

For those verbs that alternate, there is an additional phonological difference between the two classes: if the vowel of the last syllable of the verb is short in Class I, it is lengthened in Class II. This can be seen in (19) above, where the vowel of the verb *bet* ‘to lose’ is short in Class I, but long in Class II. If the verb already has a long vowel in Class I, no change occurs in Class II, as shown in (20), where the length of the verbal stem is invariable. This means that the vowel length of Class II can be predicted by the length of the Class I variant, but not vice versa; this is one more reason (in addition to the moraic prefix present in Class II) why Class II is taken to be marked compared to Class I.

- (20) a. Kà-Ø-ɲé:t Kíplàngàt.
PST.CURR-3-awaken Kiplangat.NOM
‘Kiplangat woke up.’
- b. Kà-Ø-í-ɲê:t Kíbê:t Kíplàngàt.
PST.CURR-3-CL2-awaken Kibeet.NOM Kiplangat
‘Kibeet woke Kiplangat up.’

According to Toweett (1979), about 60% of Kipsigis verbs alternate between Class I and Class II. The alternation is fully productive: derived verbs (e.g., all de-adjectival verbs) participate (21), as well as loanwords (22). The pair in (22) comes from the Swahili verbs *chemka* (intransitive) - *chemsha* (transitive) ‘to boil’.

- (21) a. Kà-múr-ít ɲgóríjè:t.
PST.CURR-dirty-V cloth.NOM
‘The cloth got dirty.’

¹⁷ The Class I - Class II distinction is sometimes associated with slightly irregular meanings. For example, the verb *kənɔr* means ‘to keep’ in Class I, but ‘to dedicate’ in Class II.

- b. kà-Ø-í-mùr-ít Kíbê:t ñgòrà:k.
PST.CURR-3-CL2-dirty-V Kibeet.NOM clothes
'Kibeet got the clothes dirty.'
- (22) a. Ø-tfumakən-to:s pè:k.
3-boil-PL.IPFV water.NOM
'The water is boiling.'
- b. Kà-Ø-í-tfumo:sən Kíbê:t pè:k.
PST.CURR-3-CL2-boil Kibeet.NOM water
'Kibeet boiled water.'

About 40% of verbs, however, do not alternate between Class I and Class II: they occur only in one of the two classes. The vast majority of these verbs belong to Class I, which is in line with the phonological facts that point towards it being the unmarked class. Similarly, there are no emerging generalizations about the lexical semantics or transitivity of the verbs that belong to Class I. Toweett (1979) notes that out of 714 verbs in his sample, there are only 60 non-alternating Class II verbs, out of which 40 are transitive and 20 are intransitive.¹⁸

Before closing this section, it is worth noting that an alternation between the two classes is not the only way to participate in the causative alternation, with more strategies being available (see Kouneli 2021b for details). One strategy that may be of relevance is the addition of the causative morpheme *-sɪ*, which obligatorily co-occurs with Class II morphology. An example is provided in (23), where the intransitive Class I verb *jam* 'to dry' forms its causative with the suffix *-sɪ*, accompanied by a switch to Class II.¹⁹

- (23) a. Kà-Ø-já:m-já pà:ndè:k.
PST.CURR-3-dry-PL maize.NOM
'The maize dried.'
- b. Kà-Ø-í-já:m-sì Tjé:bê:t/ àsístà pà:ndé:k.
PST.CURR-3-CL2-dry-CAUS Cheebet.NOM/ sun.NOM maize
'Cheebet/ the sun dried the maize.'

While an extensive investigation of the causative suffix *-sɪ* is still pending, it is mostly used to form causatives of change of state verbs (of the type illustrated in (23) above), as well as causatives of a variety of verbs which pattern with unergatives in other languages, as shown in (24).

- (24) Kà-Ø-í-rír-sì Kíbê:t là:kwé:t.
PST.CURR-3-CL2-cry-CAUS Kibeet.NOM child
'Kibeet made the child cry.'

It is, however, not possible to causativize transitive verbs with *-sɪ*, with the exception of the following two: *la:p* 'to climb' and *sir* 'to pass/exceed'.²⁰ Furthermore, in the case of change of state verbs, whether a verb will take *-sɪ* in addition to the switch to Class II is lexically determined. The suffix, thus, does not show clear properties of productive morphological causatives cross-linguistically.

¹⁸ An anonymous reviewer asks whether there are any generalizations concerning unaccusative and unergative verbs. Unfortunately, there are no known unaccusativity diagnostics in the language (Kouneli 2021a).

¹⁹ Further examples of verbs that form their causative by Class II + *si* are the following: *ilis* 'to sink', *je* 'to break', *nun* 'to rot', *jet* 'to grow', *sa* 'to dry', *neretf* 'to get angry', *me* 'to die'.

²⁰ Transitive verbs form periphrastic causatives with the verb *ja* 'to do/make' (Bii et al. 2014).

3 Analysis

In Section 2.2, I argued that Kipsigis verbs only inflect in one way, with what is traditionally described as Class II being reduced to regular inflection plus a moraic prefix. In Section 2.3, it was shown that for many verbs, this moraic prefix has a causative meaning, since it is used to derive causative verbs from their anticausative variants. In this section, I develop a DM analysis of Class II whose goal is to explain these observations.

3.1 Theoretical background

In what follows, I adopt the assumptions of Distributed Morphology: words are built in the syntax, with vocabulary items being inserted at terminal nodes post-syntactically. Of particular importance is the assumption that words are decomposed into a categorizing head and a root (Marantz 1997 a.o.); in the case of verbs, the categorizing head is assumed to be little *v*.

Furthermore, I follow work according to which both little *v* and Voice (Kratzer 1996) are present in the syntax. Little *v* is responsible for verbalizing the root and for providing event semantics, while Voice is responsible for introducing the external argument (Pylkkänen 2008; Harley 2013; Legate 2014 a.o.). I also adopt the ‘flavors of little *v*’ approach to the causative alternation (e.g., Folli & Harley 2005; 2007), according to which verbalizing heads come in different flavors, such as v_{DO} , v_{BECOME} and v_{CAUSE} . Since the focus of this paper is on Class II verbs, most of which involve causative semantics, the flavors of little *v* that will be used are v_{BECOME} and v_{CAUSE} , the two heads typically used in analyses of the causative alternation (e.g., Pylkkänen 2008).²¹ Finally, it should be noted that whenever ‘causative semantics’ are mentioned in relation to Class II, what is meant is the interpretation associated with lexical causatives, since Class II is used to create the transitive variant of change of state verbs.²²

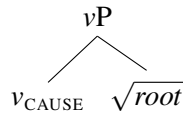
3.2 The Class II mora spells out v_{cause}

I argue that there is no need for class features, with the moraic prefix of Class II being an overt verbalizer, in the same way that morphemes such as *-ize*, *-ify* etc. are overt verbalizers in English. Given the clear connection of Class II to the causative alternation in Kipsigis, I argue that the moraic prefix spells out v_{CAUSE} . I further propose that this v_{CAUSE} can either merge directly with the root or it can merge with an already categorized root, as illustrated in (25) below. These two structures correspond to non-alternating and alternating(=causative) Class II verbs, respectively.

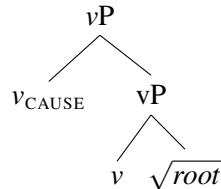
²¹ Some recent approaches to the causative alternation within DM argue against the flavors of little *v* theories. These approaches argue that the causative and anticausative variant are the same at vP layer (there are thus no different semantic types of verbalizers), with the only difference between them being the presence of a transitive Voice head in the former; in these theories, causative semantics are read off the structural configuration (e.g., Marantz 2013; Alexiadou et al. 2015; Wood 2015; Wood & Marantz 2017; Kastner 2020; Nie 2020; Tyler 2020). However, I show in Kouneli (2021b) that these theories make wrong predictions regarding the morphological expression of the causative alternation in Kipsigis; no such problem arises with flavors of little *v* theories. Some of the arguments in favor of Class II spelling out a little *v*, and not a Voice head (or a *v* in the context of a Voice head) will be given in the next section.

²² As was discussed in the previous section, it is not clear that the language has morphological causatives (of the type found in languages like Japanese).

- (25) a. Root-selecting: non-alternating Class II verbs



- b. Verb-selecting: alternating Class II verbs



Both the spellout and the interpretation of v_{CAUSE} will depend on whether it appears in the root-selecting (25a) or verb-selecting structure (25b). Starting with the phonological effects, recall that for verbs that alternate between Class I and Class II, there is a regular process of lengthening of the vowel of the final syllable of the verb in the causative variant; the relevant example is repeated here as (26).

- (26) a. Kù-Ø-bét ηô:ktà.
 PST-3-get.lost dog.NOM
 ‘The dog got lost.’
- b. Kù-Ø-í-bê:t Kíbê:t ηó:ktá.
 PST-3-CL2-get.lost Kibeet.NOM dog
 ‘Kibeet lost the dog.’

Thus, both non-alternating and alternating Class II verbs come with a moraic prefix, but only the latter exhibit lengthening of the vowel of their last syllable. In order to capture the similarity (=presence of the moraic prefix) between the two structures, I propose that v_{CAUSE} is always spelled out as a mora, as in (27), irrespective of whether v_{CAUSE} is in (25a) or (25b).

- (27) $v_{CAUSE} \leftrightarrow \mu$

This leaves us with the vowel lengthening effect for alternating verbs. Here, we observe that these verbs come with more structure, as two verbalizing heads are stacked. I see (at least) two possible solutions, but unfortunately it is not clear at this stage how to choose between them. First, it is possible that vowel lengthening in the last syllable of the root is a regular (morpho)phonological process caused in the context of two stacked verbalizing heads. In order to evaluate the validity of this claim, one would have to investigate other contexts of stacking of little v ’s and see if lengthening obtains there as well. Unfortunately, I do not currently have access to such data. Second, it may be that v_{CAUSE} has two allomorphs: a moraic prefix in the context of a root, but a moraic circumfix (i.e., a mora that associates to the edges of the root) in the context of another verbalizer, as in (25b). This solution seems attractive in light of the shape of the L.H₀.L nominative tonal melody for nouns in the language, where a low tone associates to the first and last syllable, with high tones in the intermediate syllables (Kouneli & Nie 2021). This melody has been recently analyzed by Jolin (2022) via reference to edge-in association along the lines of Yip (1988). Nevertheless, a potential problem arises, which means that further research is needed to see whether this is indeed a viable solution: in polar question formation, the affixation of a mora leads to epenthesis of [ɪ] if the word ends in a consonant, whereas in this case, the mora is able to ‘skip’ a final consonant and cause lengthening inside the syllable. Of course, many differences exist between polar questions and

causative verbs (e.g., the polar question particle certainly comes at a later cycle, when words are already formed), which may be able to explain the different behavior of the moraic affix in the two cases. More research on the phonology of moraic affixes in Kipsigis is needed to resolve this issue.

Moving on to the interpretation of v_{CAUSE} in the two constructions, we observe that in the verb-selecting structure, the verb is always the lexical causative of a change of state verb. Therefore, v_{CAUSE} has in this case ‘regular’ causative semantics, of the type that is proposed for the causative variant in theories of the causative alternation that employ flavors of little v . Indeed, the structure in (25b) is identical to the structure proposed for marked causatives in those theories (e.g., Folli & Harley 2005; Pytkänen 2008), with the lower v usually identified as v_{BECOME} .²³ Since in Kipsigis the only morphological distinction is between causatives (Class II) and everything else (Class I), I will not be representing other types of little v here (e.g., v_{BECOME} , v_{DO}), but given the semantics of other classes, it is of course entirely plausible that these flavors of little v exist, but have only semantic effects.

As for the root-selecting structure, it is important to note that the vast majority of non-alternating verbs in Kipsigis belong to the unmarked Class I, with only 60 out of 714 verbs in Toweett’s sample being Class II. Out of these 60 verbs, 40 are transitive with relics of causative semantics. This means that they tend to be agentive, historically related to verbs that alternated, or verbs that have a lexical causative component without having a corresponding intransitive (e.g., *net* ‘to teach’). Thus, I propose that verbs in Kipsigis are generally formed by merging a silent little v (descriptively Class I) with a root. A small class of verbs, however, are formed by merging a root with v_{CAUSE} (the structure in (25a)). These are the non-alternating Class II verbs. For some of them, v_{CAUSE} will have the lexical causative meaning. For others, it will receive an idiosyncratic interpretation depending on the root. This follows from the fact that v_{CAUSE} directly merges with the root in this case, and the first-categorizing head is assumed to delimit the domain for idiosyncratic interpretation (Marantz 1997 and subsequent work). Therefore, non-alternating Class II verbs do not have obvious causative semantics; the interpretation will depend on the particular root.

Given the clear connection of Class II to the causative alternation, a question that may arise at this point is whether there is independent evidence for locating the moraic prefix on little v , rather than on some other verbal projection; possible candidates for such a projection include Voice or even a dedicated Caus head (e.g., Key 2013; Harley 2017). The first clear shortcoming of this alternative is that if the moraic prefix spelled out Voice or Caus, it would be difficult to account for its presence on non-alternating verbs without causative semantics; its analysis as a verbalizer allows us to capture both its uses in a uniform way. There are, however, further arguments in favor of a little v analysis, which are discussed in detail in Kouneli (2021b). Two of the main arguments are summarized below.

I begin with the evidence from reduplication. Kipsigis has productive verbal reduplication expressing multiple events.²⁴ An example of reduplication of a (Class II) verb with a long vowel, *twa:l* ‘to jump’, is shown in (28).²⁵

²³ It is worth noting that v_{CAUSE} merges above v_{BECOME} , as in (25b), in most *but not all* theories that employ flavors of little v .

²⁴ Reduplication seems to only be possible with monosyllabic roots. Toweett (1979) provides some examples from disyllabic verbs, but my consultants consistently judge those examples as ungrammatical. What is interesting here is that reduplication is sensitive to the number of syllables of the verbal root, and not the stem, since Class II verbs can be reduplicated despite the presence of the moraic prefix. Reduplication thus counts syllables differently from aspect (as a reminder, imperfective allomorph choice is conditioned by the number of syllables of the verbal *stem*).

²⁵ In this particular example, we see that the reduplicant has a short vowel in (28b). However, Toweett (1979) also provides examples where vowel shortening has not taken place. It is not clear what determines vowel shortening in reduplication of verbs with long vowels.

- (28) a. Ø-i-twa:l-e là:kwè:t.
 3-CL2-jump-IPFV child.NOM
 ‘The child is jumping.’
- b. Ø-i-twal-twa:l-e là:kwè:t.
 3-CL2-jump-jump-IPFV child.NOM
 ‘The child is jumping repeatedly.’

When the verb undergoing reduplication has a short vowel, a linking affix *-aa-* is present between the two copies of the root, as shown in (29).

- (29) a. Ø-pír-è là:kwè:t kítàbút.
 3-hit-IPFV child.NOM book
 ‘The child is hitting the book.’
- b. Ø-pir-ɑ:pír-i là:kwè:t kítàbút.
 3-hit-LK-hit-IPFV child.NOM book
 ‘The child is hitting the book repeatedly.’

Recall now that alternating verbs with a short vowel have a long vowel in Class II. The sensitivity of the linking vowel *-aa-* to vowel length allows us to determine the order of application of reduplication relative to Class II determination. If reduplication applies before merging the head responsible for lengthening, then we expect those verbs to appear with a linking vowel in reduplicated contexts; this vowel should be absent if the head responsible for vowel lengthening merges before reduplication applies. We observe the latter in the data. As shown in (30), the reduplicated form of the Class I verb *sap* ‘to heal (intransitive)’ has a linking vowel since the verb has a short vowel. The crucial data point is the behavior of its Class II counterpart *sa:p* ‘to heal (transitive)’; as shown in (30b), no linking vowel appears in this case, indicating that at the point when reduplication applies, the root has already undergone vowel lengthening.

(30) *sap* vs. *sa:p* ‘to heal’

- a. Kì:Ø-sap-ɑ:sap-i Kíbê:t.
 PST.DIST-3-heal-LK-heal-IPFV Kibeet.NOM
 ‘Kibeet healed (himself) over and over.’ (anticausative)
- b. Kì:Ø-i-sa:p-sa:p-i Kíbê:t Kìp-làngàt.
 PST.DIST-3-CL2-heal-heal-IPFV Kibeet.NOM Kiplangat
 ‘Kibeet was healing Kiplangat over and over.’ (causative)

Verbal reduplication expresses event plurality, and thus a straightforward assumption is that it targets little *v*, i.e., the head responsible for event semantics. Since Class II information for alternating verbs (i.e., vowel lengthening) is present *before* the application of reduplication, these data support the claim that Class II is the spellout of a little *v* head.²⁶

The strongest piece of evidence in favor of placing the Class II moraic prefix on little *v* comes from nominalizations. There is a debate in the literature about ‘how much’ functional structure is

²⁶ An anonymous reviewer asks how lengthening (= association of a mora) takes place before reduplication under the analysis proposed in this paper. What the reduplication facts show is that lengthening has to happen before reduplication, since the input to reduplication must already contain a long vowel. A way to implement this theoretically is to assume that mora association happens in an earlier (morpho)phonological cycle compared to reduplication, which follows from the claim that the mora is present on a head lower than whichever head causes event plurality.

embedded in complex event nominals, especially with respect to Voice (see [Alexiadou 2001; 2017; Wood 2019](#) and references therein). It is uncontroversial though that result nominals do not embed Voice; they always embed very small verbal structures corresponding to a verbalized root (vP).²⁷ Interestingly, all Kipsigis nouns that are derived from Class II verbs (whether they alternate or not) contain a prefix *ka:-*, which is the nominal allomorph of the verbalizing head associated with Class II ([Toweett 1979](#); see also [Creider & Creider 1989](#) for Nandi). In (31) you see the (non-event) nominalization of the non-alternating transitive verb *kat* ‘to greet’, while (32) shows the nominalization of an alternating verb.

(31) *(*ka:-*)-*ka:t-ε:t* ‘hello’.

CL2-greet-N hello

‘Hello is a greeting.’

(32) a. sap-*ε:t-a:p* *Kibê:t*.

heal-N-POSS Kibeet

‘Kibeet’s healing (on his own)’

b. ka:-sa:p-*ε:t-a:p* *Kibê:t*.

CL2-heal-N-POSS Kibeet

‘Kibeet’s healing (by someone)’

([Kouneli 2021b](#): 62)

What is important to note here is that *ka:-* does not do any nominalizing work: it is the suffix in both (31) and (32) that is responsible for the nominalization.²⁸ What this means is that *ka:-* simply indicates the presence of v_{CAUSE} in the structure being embedded. This prefix is present in all types of nominalizations; while (31) is a result nominal, (33) below shows an agent nominalization from a Class I verb in (33a) and from a Class II verb in (33b). This minimal pair nicely illustrates how *ka:-* simply shows that a ‘Class II structure’ is being embedded, without doing any nominalizing work itself.

(33) a. *labat-i:ndet*

run-AG

‘runner’

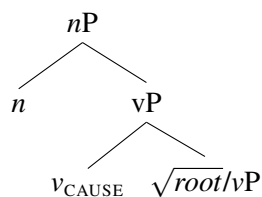
b. *ka:-ne:t-i:ndet*.

CL2-teach-AG

‘teacher’

The most straightforward analysis of *ka:-* is as the spellout of our overt verbalizer in the context of a nominal head. More specifically, assuming the structure in (34) for nominalizations, we can postulate the VI rule in (35) for *ka:-*: this prefix is the allomorph of v_{CAUSE} in the context of little *n*.

(34) Nominalization



²⁷ For [Wood 2019](#), all nominalizations embed just vP (at least in Icelandic).

²⁸ Both this suffix and the one glossed as AG ‘agent nominalization’ in (33) are in reality morphologically complex, but the details are not relevant for the discussion at this point. See [Kouneli \(2019; 2021c\)](#) and Section 4 for more details on the morphological makeup of Kipsigis nouns.

(35) $ka:- \leftrightarrow v_{\text{CAUSE}} / n$

Before concluding the analysis section, it is worth saying a couple of words about the causative suffix *-sɪ*, which is also used in the causative alternation, as well as to form causatives of verbs that are usually classified as unergatives in other languages (see Section 2.3). An important feature of this suffix is that it always co-occurs with the moraic prefix of Class II. The most straightforward assumption about it is, thus, that it spells out a separate head, most likely above *vP*. The obvious candidate is a dedicated Caus head. If this is indeed the case, then at least two predictions are made: i) verbs with *-sɪ* must always have causative semantics (unlike Class II verbs which could have idiosyncratic meanings if v_{CAUSE} is root-selecting), and ii) *-sɪ* should be a productive morphological causative. The first prediction is borne out, as there are, to my knowledge, no verbs that take *-sɪ* and do not have clear transitive syntax and causative semantics. The second prediction is trickier, since *-sɪ* seems to be lexically determined with some change of state verbs, and it cannot be used with transitive verbs. It does, however, seem fairly productive with (potential) unergative verbs, which would be in line with this prediction. Further research is needed to determine whether there are any semantic differences between causatives of change of state verbs that take *-sɪ* and those that do not.²⁹

4 Conclusion and avenues for further research

In this paper, I have argued that what is traditionally described as two conjugation classes - Class I and II - in Kipsigis can be reanalyzed: all Kipsigis verbs inflect in the same way, but Class II verbs contain a moraic prefix which spells out a verbalizing head; this verbalizing head usually comes with causative semantics, but can sometimes have idiosyncratic interpretations. If the analysis is on the right track, this means that there is no need for conjugation class features in Kipsigis. This work thus adds to an increasing body of literature according to which abstract representations (such as moraic affixes) in combination with the general phonology of a given language can be used to model complex morphophonological systems (see discussion in e.g., [Trommer & Zimmermann 2014](#) and the papers in the edited volume by [Newell & Ulfsgjorninn 2021](#)).

Throughout the paper I have mentioned various open questions and avenues for further research that are Kipsigis-specific. In the remainder of this section, I discuss cross-linguistic implications of certain claims, and more general topics for further research.

4.1 Moraic prefixes and argument structure

In this section, I briefly discuss the following two properties of the Kipsigis system which have counterparts in other languages, and which are of theoretical interest: a) the moraic form of the verbalizer, and b) the connection of the verbalizer to argument structure (and more specifically, the causative alternation).

I have shown in this paper that Kipsigis has a little *v* head which is spelled out by an empty mora. While this may not seem strange for a Nilotic language, where moraic morphemes are common, what is interesting is that the same claim (i.e., that a “conjugation class” can be analyzed in terms of the presence of a little *v* head spelled out as an empty mora) has been made for Greek ([Spyropoulos et al. 2015](#); [Panagiotidis et al. 2017](#)).³⁰ A somewhat similar claim has also been made for Sinhala; [Letterman \(1997\)](#) argues that the language has two conjugation classes, where one class is marked

²⁹ Preliminary data show that change of state verbs that form their causative with *-sɪ* involve more ‘indirect’ causation, compared to those that only switch to Class II (i.e., consultants often report that the causer/agent has to do something to cause the change of state, rather than being the direct cause for it). However, the generalization is not without exceptions, and more research is needed for firm conclusions to be drawn.

³⁰ [Spyropoulos et al. \(2015\)](#) and [Panagiotidis et al. \(2017\)](#) use the term *empty vocalic slot*.

by a theme vowel, while the other has an empty slot that is filled by epenthetic material. Finally, [Lampitelli et al. \(2021\)](#) argue that the thematic element of the first conjugation class in the Negrons dialect of Friulian has a moraic affix allomorph. These languages are unrelated, and it is probably not a coincidence that all of them feature a moraic morpheme with effects resembling those of a conjugation class. Thus, if this work is on the right track, an interesting topic for further research is why moraic material is preferred for verbalizing heads near the root.

In Kipsigis, the two (descriptively speaking) conjugation classes are clearly related to argument structure, and more specifically the causative alternation - a prototypical transitivity alternation. As has already been mentioned, [Dimmendaal \(1983\)](#) argues that most Nilotic languages have the Class I vs. Class II distinction, and he shows that historically it emerged from a Proto-Nilotic causative prefix *i. The Kalenjin dialects (which include Kipsigis) have maintained the causative nature of the distinction, but there seem to be two differences from Proto-Nilotic; first, the verbalizer now has the form of a mora, and not invariably an *i*-, and second, there are Class II verbs without causative semantics (the non-alternating verbs, which are root-merging in my analysis). [Dimmendaal \(1983\)](#) argues that the distinction has been mostly lost in Western Nilotic (and the Eastern Nilotic language Bari) which have developed prosodic classes instead, while it is purely morphological in Eastern Nilotic, where verbs do not generally alternate between the two classes.³¹ Therefore, what we see is that while Proto-Nilotic had a causative morpheme, Kalenjin dialects have moved to a stage where this morpheme can also be used as a verbal marker without causative semantics (non-alternating verbs), and Eastern Nilotic languages now only use it as a verbal marker. The variation within Nilotic can, therefore, shed light on theories of the historical evolution of conjugation classes and theme vowels, and can help explain the common observation that there is a correlation (but *not* a one-to-one relationship) between transitivity and conjugation classes in many languages (e.g., Armenian, [Dolatian & Guekguezian 2021](#)). This is reminiscent of the well-known correlation between declension class and gender in the nominal domain, and is an obvious topic for further research.

4.2 Comparison to declension classes in the nominal domain

In this section, I first provide a brief discussion of declension classes in Kipsigis, before comparing to the verbal domain and discussing a potential typological asymmetry between verbs and nouns.

Kipsigis nouns follow a tripartite system of number marking: some nouns are unmarked in the singular and form their plural with a plural suffix (inherently singular nouns), some are unmarked in the plural and form their singular with a singulative suffix (inherently plural nouns), while a third class forms its singular with a singulative and its plural with a plural (numberless nouns). Irrespective of number class, nouns in the language generally have the following template ([Kouneli 2019; 2021c](#)):

(36) Root - (plural/singulative affix) - thematic suffix - ‘secondary suffix’³²

The thematic suffix usually consists of either a vowel or a glide + vowel combination. If a number (plural or singulative) suffix is present, the thematic suffix is determined by the number suffix; if a number suffix is absent, the thematic suffix is determined by the root. Representative examples are provided in (37)–(38), where the form to the left of the arrow shows the morphological make-up of the noun and the form to the right of the arrow shows the surface form, after regular phonological processes have taken place.

³¹ This means that there are no regular alternations of the Kipsigis type, but there are still relics of causative semantics in Class II verbs. For example, there are still a couple of verbs that alternate, and there is a tendency for Class II verbs to be transitive and/or eventive. This is, however, only a tendency, with various exceptions.

³² The secondary suffix has evolved from a specificity marker, but seems to function as a nominal marker synchronically (see [Kouneli 2019; 2021c](#) for details).

- (37) a. pe:t-u-it → pê:tú:t
day-TH-SEC
'day'
- b. pe:t-u:s-ja-ik → pê:tù:sjék
day-PL-TH-SEC
'days'
- (38) a. la:k-wa-it → là:kwé:t
child-TH-SEC
'child'
- b. la:k-oj-i-ik → là:gók
child-PL-TH-SEC
'children'

In Kouneli (2021c), I show that Kipsigis thematic suffixes bear striking similarities to Romance theme vowels in the nominal domain (e.g., Roca 1989; Aronoff 1994; Alexiadou & Müller 2008; Oltra-Massuet 1999; 2020). First, they are usually vocalic elements, as was already mentioned.³³ Second, they cannot be predicted by the semantic content or phonological shape of the root (or number affix). Third, they do not have semantic content of their own and do not play any role in the syntax. Finally, the language has a variety of plural affixes, and the choice of plural affix (partially) depends on the thematic suffix that a noun has in the singular (e.g., nouns with an *-i* theme vowel take the *-i:s* plural suffix). This indicates that thematic suffixes are associated with declension class in the language.³⁴

Due to these similarities to Romance theme vowels, in Kouneli (2021c) I extend Oltra-Massuet & Arregi's (2005) analysis of Spanish theme vowels to Kipsigis. I argue that theme nodes are added postsyntactically (as dissociated nodes) to each functional head in the DP, but only one theme node is pronounced. For Spanish, Oltra-Massuet & Arregi (2005) argue that the theme node that is pronounced is the highest one below Num. In Kouneli (2021c) I argue that in Kipsigis, it is the theme node attached to Num that is spelled out instead (thematic suffixes follow the number suffix in Kipsigis, but precede it in Spanish). I therefore conclude that there is cross-linguistic variation in the choice of the theme node that is pronounced.³⁵

There are at least eight different thematic suffixes in Kipsigis (*-a*, *-o*, *-i*, *-u*, *-e*, *-wa*, *-ja*, \emptyset) and the number could be even higher if tone is also taken into account (most thematic suffixes come in H- and L-toned counterparts). Furthermore, they cannot be easily associated with a projection in the DP, which is why I opt for an analysis in terms of dissociated nodes added post-syntactically in Kouneli (2021c). The situation in the nominal domain is, therefore, very different from the verbal domain. In the latter, there is no need for conjugation class features or dissociated nodes, since Class II can be reduced to the presence of a little *v* spelled out as a mora. There is therefore an asymmetry between nouns and verbs: nouns have declension classes and theme vowels, while verbs have neither.

Interestingly, we find a similar pattern in Greek, an unrelated language. As has already been mentioned at various points, Spyropoulos et al. (2015) and Panagiotidis et al. (2017) argue that the

³³ There are also nouns without/with a silent thematic suffix, which condition allomorphy on the secondary suffix. An example is provided in (i) below.

(i) ɲo:k-ta → ɲo:k-tá
dog-SEC
'dog'

³⁴ According to Creider & Creider (1989), thematic suffixes have historically evolved from case markers in Kalenjin.

³⁵ See Kouneli (2021c) for more details, and also Blix (2022) for an alternative analysis.

second conjugation class can be explained away if we assume the presence of an empty vocalic slot. Even if one maintains the traditional description, Greek would have two conjugation classes in the verbal domain, while there are eight declension classes in the nominal domain (e.g., [Ralli 2000](#); [Alexiadou & Müller 2008](#)). Similarly, [Barillot et al. \(2018\)](#) have shown that Somali (Cushitic), yet another unrelated language, does not really have conjugation classes in the verbal domain, with differences in inflection being reducible to regular phonology; the same cannot be done for the nominal domain, where it is usually assumed that nouns come in various classes.

We therefore have (at least) three languages with various declension classes in the nominal domain, but few or no conjugation classes in the verbal domain. I am not aware of a language with the reverse pattern: no declension classes (and/or theme vowels) in the nominal domain, but many conjugation classes in the verbal domain. However, this statement needs to be evaluated in a proper typological study, which is beyond the scope of this paper. I do note that data from European languages seem consistent with the observation that nouns have more classes than verbs. Whether the pattern holds in a given language partly depends on how one counts classes, but in Spanish (and other Romance), for example, we usually find three verbal classes, but four theme vowels for nouns; in Lithuanian, we find four (major) classes for nouns, but three for verbs (Yuriy Kushnir, p.c.). While the asymmetries here are not as significant as in the Greek or Kipsigis case, they are in the same general direction of nouns showing more distinctions than verbs.

It is generally acknowledged that there are category-specific phonological effects ([Bobaljik 2008](#); [Smith 2011](#); [Hyman 2019](#): e.g.,). In an overview of the documented patterns, [Smith \(2011\)](#) observes that in most cases, nouns show more phonological distinctions than verbs, which would be in line with the observations made here regarding morphological classes. It is therefore an interesting topic for further research whether the generalization that nouns have more inflectional classes than verbs is robust typologically, and if so, how our theory of lexical categories can account for it.

Abbreviations (mandatory)

1/2/3 = first/second/third person, AG = agent, CL2 = Class II, IPFV = imperfective, LK = linker, N = nominalizer, NEG = negation, NOM = nominative, PL = plural, PST.CURR = current past, PST.DIST = distant past, SEC = secondary suffix, SG = singular, TH = thematic suffix, V = verbalizer

Funding information

The research reported in this paper was generously funded by the German Research Foundation (DFG) through the project 4FOR5175 “Cyclic Optimization”.

Acknowledgements

I am grateful to Boniface Kemboi, Enock Kipkorir, Wesley Kirui, Hillary Mosonik, and Philemon Ronoh for their valuable work as linguistic consultants. I would also like to thank Artemis Alexiadou, Itamar Kastner, Alec Marantz, Yining Nie, Matthew Tyler, Jim Wood, and the audiences at Yale University, University of Leiden, Humboldt University, NELS 51, and the Workshop on Theme vowels in V(P) Structure and beyond for feedback on previous stages of this work, as well as the editors of the special collection and three anonymous reviewers for comments on this manuscript. All errors are my own.

Competing interests

Not applicable.

References

- Alexiadou, Artemis. 2001. *Functional structure in nominals: Nominalization and ergativity*. Amsterdam: John Benjamins.
- Alexiadou, Artemis. 2017. Ergativity in nominalization. In Coon, Jessica & Massam, Diane & Travis, Lisa (eds.), *The Oxford handbook of ergativity*, 355–372. Oxford: Oxford University Press.
- Alexiadou, Artemis & Anagnostopoulou, Elena & Schäfer, Florian. 2015. *External Arguments in Transitivity Alternations: A Layering Approach*. Oxford: Oxford University Press.
- Alexiadou, Artemis & Müller, Gereon. 2008. Class features as probes. In Bachrach, Asaf & Nevins, Andrew (eds.), *Inflectional Identity*, 101–155. Oxford: Oxford University Press.
- Aronoff, Mark. 1994. *Morphology by Itself: Stems and Inflectional Classes*. Cambridge, MA: MIT Press.
- Baković, Eric. 2000. *Harmony, dominance, and control*. Rutgers, NJ: Rutgers University dissertation.
- Barillot, Xavier & Bendjaballah, Sabrina & Lampitelli, Nicola. 2018. Verbal classes in Somali: Allomorphy has no classificatory function. *Journal of Linguistics* 3–43.
- Bii, John Kibet & Lonyangapuo, Mary & Chelimo, Andrew Kiprop. 2014. Verbal Extensions in Kipsigis. *International Journal of Humanities and Social Science* 4(9).
- Blix, Hagen. 2022. Interface Legibility and Nominal Classification: A Nanosyntactic Account of Kipsigis Singulatives. *Glossa: a journal of general linguistics* 7(1).
- Bobaljik, Jonathan. 2008. Paradigms (Optimal and otherwise): A case for skepticism. In Bachrach, Asaf & Nevins, Andrew (eds.), *Inflectional Identity*, 29–54. Oxford: Oxford University Press.
- Bossi, Madeline & Diercks, Michael. 2019. V1 in Kipsigis: Head movement and discourse-based scrambling. *Glossa: a journal of general linguistics* 4.1. 65.
- Creider, Chet. 1980. The verb in Kipsigis. *Mila* 5. 40–62.
- Creider, Chet. 1982. *Studies in Kalenjin nominal tonology*. Berlin: Dietrich Reimer Verlag.
- Creider, Chet & Creider, Jane Tapsubei. 1989. *A grammar of Nandi*. Hamburg: Helmut Buske Verlag Hamburg.
- Davis, Stuart & Ueda, Isao. 2002. Mora augmentation processes in Japanese. *Journal of Japanese Linguistics* 18. 1–23.
- Dimmendaal, Gerrit J. 1983. The two morphological verb classes in Nilotic. In Vossen, Rainer & Becchaus-Gerst, Marianne (eds.), *Nilotic Studies 2: Proceedings of the International Symposium on Languages and History of the Nilotic Peoples*, 269–309. Berlin: D. Reimer.
- Dimmendaal, Gerrit J. 2012. Metrical structures: A neglected property of Nilotic languages. *Studies in Nilotic Linguistics* 5. 1–26.
- Dolatian, Hossep & Guekguezian, Peter. 2021. Relativized Locality: Phases and Tiers in Long-Distance Allomorphy in Armenian. *Linguistic Inquiry*.
- Driemel, Imke & Kouneli, Maria. 2022. C-Agree is local subject-verb agreement in Kipsigis. Manuscript, Humboldt-Universität zu Berlin and Universität Leipzig, available at <https://ling.auf.net/lingbuzz/005661>.
- Eberhard, David M. & Simons, Gary F. & Fennig, Charles D. (eds.). 2020. *Ethnologue: Languages of the world. twenty-third edition*. Dallas, Texas: SIL International.
- Flack, Kathryn. 2007. Templatic morphology and indexed markedness constraints. *Linguistic Inquiry* 38(4). 749–758.

- Folli, Rafaella & Harley, Heidi. 2005. Flavours of v: Consuming results in Italian & English. In Kempchinsky, Paula & Slabakova, Roumyana (eds.), *Aspectual enquiries*, 95–120. Dordrecht: Springer.
- Folli, Raffaella & Harley, Heidi. 2007. Causation, obligation, and argument structure: On the nature of little v. *Linguistic Inquiry* 38(2). 197–238.
- Fábregas, Antonio. 2017. Theme vowels are verbs. *Rivista di Grammatica Generativa* 39. 79–89.
- Goldsmith, John A. 1976. *Autosegmental phonology*: MIT dissertation.
- Hall, Beatrice & Hall, R.M.R. & Pam, Martin D. & Myers, Amy & Antell, Stephen A. & Cheron, Godfrey K. 1974. African Vowel Harmony Systems from the Vantage Point of Kalenjin. *Afrika und Übersee* 57. 241–267.
- Halle, Morris & Marantz, Alec. 1993. Distributed Morphology and the pieces of inflection. In Hale, Kenneth & Keyser, S. Jay (eds.), *The view from building 20*, 111–176. Cambridge MA: MIT Press.
- Halle, Morris & Vergnaud, Jean-Roger. 1981. Harmony processes. In *Crossing the boundaries in linguistics: Studies presented to Manfred Bierwisch*, 1–22. Dordrecht: Springer.
- Handschuh, Corinna. 2014. *A typology of marked-S languages*. Berlin: Language Science Press.
- Harley, Heidi. 2013. External arguments and the Mirror Principle: On the distinctness of Voice and v. *Lingua* 125. 34–57.
- Harley, Heidi. 2017. The “bundling” hypothesis and the disparate functions of little v. In Roberta d’Alessandro, Irene Franco & Ángel Gallego (eds.), *The Verbal Domain*, 3–28. New York: Oxford University Press.
- Hayes, Bruce. 1989. Compensatory lengthening in moraic phonology. *Linguistic Inquiry* 20(2). 253–306.
- Hyman, Larry. 1985. *A Theory of Phonological Weight*. Dordrecht: Foris.
- Hyman, Larry. 2019. Prosodic asymmetries in nominal vs. verbal phrases in Bantu. *UC Berkeley Phonetics and Phonology Lab Annual Report* 15(1). 90–107.
- Jolin, Armel J. 2022. Topics in the morphophonology of tonal case in Southern Nilotic languages. MA thesis, Universität Leipzig.
- Kastner, Itamar. 2020. *Voice at the interfaces: The syntax, semantics and morphology of the Hebrew verb*. Berlin: Language Science Press.
- Key, Gregory. 2013. *The morphosyntax of the Turkish causative construction*. Tucson, AZ: University of Arizona dissertation.
- König, Christa. 2006. Marked nominative in Africa. *Studies in Language* 30.4. 655–732.
- König, Christa. 2008. *Case in Africa*. Oxford: Oxford University Press.
- Kouneli, Maria. 2019. *The syntax of number and modification: An investigation of the Kipsigis DP*. New York, NY: New York University dissertation.
- Kouneli, Maria. 2021a. High vs. Low external arguments: Evidence from Kipsigis. Handout from talk given at SAIAL, Potsdam.
- Kouneli, Maria. 2021b. Low (in)transitivity: Evidence from Kipsigis. In Farinella, Alessa & Hill, Angelica (eds.), *Proceedings of the Fifty-First Annual Meeting of the North East Linguistic Society*. 53–66. Amherst, MA: GLSA.
- Kouneli, Maria. 2021c. Number-based noun classification: The view from Kipsigis. *Natural Language & Linguistic Theory* 39(4). 1195–1251.
- Kouneli, Maria & Nie, Yining. 2021. Across-the-board tonal polarity in Kipsigis: Implications for the morphology-phonology interface. *Language* 97(2). e111–e138.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In Rooryck, Johan & Zaring, Laurie (eds.), *Phrase Structure and the Lexicon*, 109–137. Dordrecht: Kluwer.
- Lampitelli, Nicola & Roseano, Paolo & Torres-Tamarit, Francesc. 2021. Vowel length in Friulian verbs: a case of mora affixation. *Morphology* 32. 93–120.
- Legate, Julie. 2014. *Voice and v: Lessons from Acehnese*. Cambridge, MA: MIT Press.

- Letterman, Rebecca Susan. 1997. *The effects of word-internal prosody in Sinhala: A constraint-based analysis*. Ithaca, NY: Cornell University dissertation.
- Lodge, Ken. 1995. Kalenjin phonology and morphology: A further exemplification of underspecification and non-destructive phonology. *Lingua* 96.1. 29–43.
- Lombardi, Linda & McCarthy, John. 1991. Prosodic circumscription in Choctaw morphology. *Phonology* 8(1).
- Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. *UPenn working papers in linguistics* 4.2. 201–225.
- Marantz, Alec. 2013. Verbal argument structure: Events and participants. *Lingua* 124. 152–168.
- McCarthy, John & Prince, Alan. 1986. Prosodic Morphology. Manuscript, UMass-Amherst and Brandeis University.
- Nevins, Andrew. 2010. *Locality in vowel harmony*. Cambridge, MA: MIT Press.
- Newell, Heather & Ulfsgjorninn, Shanti. 2021. Phonological solutions to morphological problems. *The Linguistic Review* 38(3). 321–326.
- Nie, Yining. 2020. *Licensing arguments*. New York, NY: New York University dissertation.
- Oltra-Massuet, Isabel. 2020. Conjugation Class. In *Oxford Research Encyclopedia of Linguistics*, .
- Oltra-Massuet, Isabel & Arregi, Karlos. 2005. Stress-by-structure in Spanish. *Linguistic Inquiry* 36(1). 43–84.
- Oltra-Massuet, Maria Isabel. 1999. *On the notion of theme vowel: a new approach to Catalan verbal morphology*: MIT MA thesis.
- Panagiotidis, Phoevos & Revithiadou, Anthi & Spyropoulos, Vassilis. 2017. Little v as a categorizing verbal head: Evidence from Greek. In Roberta d'Alessandro, Irene Franco & Ángel Gallego (eds.), *The verbal domain*, 29–48. New York: Oxford University Press.
- Pylkkänen, Liina. 2008. *Introducing arguments*. Cambridge, MA: MIT Press.
- Ralli, Angela. 2000. A Feature-based Analysis of Greek Nominal Inflection. *Glossologia* 11-12. 201–227.
- Remijsen, Bert & Ayoker, Otto Gwado. 2020. Floating quantity in Shilluk. *Language* 96(3). e135–e156.
- Roca, Iggy M. 1989. The organisation of grammatical gender. *Transactions of the Philological Society* 87. 1–32.
- Rottland, Franz. 1982. *Die Südnilotischen Sprachen: Beschreibung, Vergleichung und Rekonstruktion*, vol. 7 (Kölner Beiträge zur Afrikanistik). Berlin: D. R. Verlag.
- Smith, Jennifer. 2011. Category-specific effects. In Marc van Oostendorp, Elizabeth Hume, Colin Ewen & Rice, Keren (eds.), *The Blackwell Companion to Phonology*, Oxford: Wiley-Blackwell.
- Spyropoulos, Vassilios & Revithiadou, Anthi & Panagiotidis, Phoevos. 2015. Verbalizers leave marks: evidence from Greek. *Morphology* 25(3). 299–325.
- Toweett, Taaita. 1979. *A study of Kalenjin linguistics*. Nairobi: Kenya Literature Bureau.
- Trommer, Jochen. 2011. Phonological aspects of Western Nilotic mutation morphology. Habilitation thesis, Universität Leipzig.
- Trommer, Jochen. 2014. Moraic prefixes and suffixes in Anywa. *Lingua* 140. 1–34.
- Trommer, Jochen. 2015. Moraic affixes and morphological colors in Dinka. *Linguistic Inquiry* 46(1). 77–112.
- Trommer, Jochen & Zimmermann, Eva. 2014. Generalised mora affixation and quantity-manipulating morphology. *Phonology* 463–510.
- Tyler, Matthew. 2020. *Argument structure and argument-marking in Choctaw*. New Haven, CT: Yale University dissertation.
- Wood, Jim. 2015. *Icelandic morphosyntax and argument structure*. Dordrecht: Springer.
- Wood, Jim. 2019. Icelandic nominalizations and allosemy. Manuscript, Yale University.

- Wood, Jim & Marantz, Alec. 2017. The Interpretation of External Arguments. In Roberta d'Alessandro, Irene Franco & Ángel Gallego (eds.), *The verbal domain*, 255–278. New York: Oxford University Press.
- Yip, Moira. 1988. Template morphology and the direction of association. *Natural Language & Linguistic Theory* 6(4). 551–577.
- Zimmermann, Eva. 2017. *Morphological length and prosodically defective morphemes*. Oxford: Oxford University Press.