Forms and functions in the spatial-deixis derivations of Shilluk transitive verbs

CHAPTER 3

Forms and functions of the associated-motion derivations of Shilluk transitive verbs

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Abstract · The base paradigm of Shilluk transitive verbs includes inflectional marking for voice, subject, and tense-aspect-modality. This paradigm is described in Chapter 1. In addition to this base paradigm, however, transitive verbs present up to six derived paradigms: iterative, benefactive, ambitransitive, antipassive, and, depending on the ATR value of the root vowel, either one or two derivations that mark associated motion. Each of these six derivations presents its own set of forms marked for voice, subject, and tense-aspect-modality. The current chapter presents a descriptive analysis of the two derivations that mark associated motion. Apart from the patterns of morphological exponence, we also describe the morphosyntactic characteristics that are associated with these derivations. As in the earlier chapters, sound examples are embedded to make the phenomena accessible and the analysis accountable.

1 Introduction

In Chapter 1, we described the base inflectional paradigm of Shilluk transitive verbs. This inflectional paradigm marks voice, tense-aspect-modality, and subject. In addition to the base paradigm, however, transitive verbs present up to six derived paradigms: iterative, benefactive, ambitransitive, antipassive, and, depending on the ATR value of the root vowel, either one or two associated-motion derivations. Each of these six derivations presents a set of forms marked for voice, tense-aspect-modality, and subject. The paradigm of a Shilluk transitive verb, then, consists of up to seven component paradigms: the base paradigm and up to six derived paradigms. The current chapter presents a descriptive analysis of the two derivations that mark associated motion. Apart from the patterns of morphological exponence, we also describe the morphosyntactic characteristics that are associated with these derivations.

When a Shilluk verb is marked for associated motion, this conveys that the event referenced by the clause involves a movement towards a destination. A first illustration of this phenomenon is presented in (1), which is drawn from a narrative.[1] The verb that is marked for associated motion is **à-gôooɲ**. The verb is in the sequential past, which is expressed inflectionally through the Low-toned prefix **à-**. The A and P arguments[2] are both expressed as pronouns following the verb. But note that there is a third argument, **pâac** 'village', which expresses the semantic role of a destination. Crucially, this argument is not morphologically marked for case, nor is it introduced by a preposition. Instead, it is the morphological marking on the verb which a) licenses the presence of this third core argument, and b) signposts its semantic role, i.e., Destination.

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1   The diacritic ˆ following the illustration number signposts that the illustration was drawn from spontaneously uttered speech. In each case, the name of the narrative and the time interval of the relevant extract in that recording are specified between square brackets. The audio recordings and annotations of the narratives in question are publicly available online, through Edinbugh DataShare (Remijsen & Ayoker, no date). Illustrations lacking this marker were collected through controlled elicitation.

2   Throughout this chapter, we use P for the argument of a transitive verb that expresses the most patient-like semantic role, and A for the argument expressing the most agent-like semantic role (cf. Croft 2001:136). In Chapter 1, the same concepts were referred to as semantic object and semantic subject, respectively. The term A leaves vague whether the semantic subject is an Agent or an Experiencer. And likewise, the term P leaves vague whether the semantic object is a Patient or a Destination. Also, these terms are not specific as to whether these entities are expressed as core or as peripheral arguments.

(1)ˆ **á-jɔ́ʊt**   **ī**   **gén** **kìnì** **ɟwɔ̄k** **á-lʌ̂ʌʌɲ**
PST-find:OV PRP.P PR.3P QUOT disease PST-disappear
'They found that the disease had disappeared.'
à-gôooɲ   **gê**   **já** **pâac** **cjɛ̂ɛ**
SEQP-release:PET PR.3P:NOM PR.1S village finally
'Then, finally, they discharged me (from the hospital) to come to the village.'
[DownWithIllness 549.8-553.2]

The verb form **à-gôooɲ** is based on the root {gɔ̀ɔɲ}[3] 'release'. While the prefix expresses the tense, associated motion is marked exclusively by suprasegmental markers within the stem syllable, in particular the overlong vowel and the Low Fall tone. This is in fact representative of the pattern of exponence of associated motion in Shilluk: vowel length and tone play a central role. Moreover, the stem vowel has the +ATR vowel /o/, rather than -ATR /ɔ/, which is the quality of the underlying lexical root. The change to +ATR, i.e., from /ɔ/ to /o/, signposts that the destination, the village, is also the point of reference, so that the movement is oriented towards this point of reference, i.e., 'discharged to <u>come</u> (to the village)'. This is a 'centripetal' orientation. In contrast, had the speaker wished to express that she had been discharged to <u>go away</u> to the village, in a centrifugal orientation relative to the point of reference, then she would have used a different form, specifically **à-gɔ̂ɔɔɲ**, identical but for the -ATR stem vowel. In this way, Shilluk transitive verbs that underlyingly have a -ATR vowel express the deictic dimensions of centrifugal (also known as itive) and centripetal (also known as ventive) through the vowel of the stem syllable, again without affixation.

Morphological marking for associated motion is found in many languages, among others in Australia (Koch 1984, Wilkins 1991), South America (Guillaume 2016), and Africa (Payne, submitted). Payne (submitted) presents a survey of associated-motion in the Nilotic languages, which is the subgroup of the Nilo-Saharan language family that Shilluk belongs to. Among the languages most closely related to Shilluk, i.e., the West Nilotic languages, associated motion has been reported among others for Dinka (Andersen 1992-1994, 2012), Anywa (Reh 1991, 1996) and Mabaan (Andersen 1999). Within the wider Nilotic group, it has been described among others for the South Nilotic languages Keyo (Mietzner 2007), Datooga (Kießling 2006), and Kupsapiny (Kwachi 2011), and also for the East Nilotic language Maa (Payne 2013).

An important question in relation to the morphological marking of associated motion in Shilluk is what its status is in relation to the

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3   {...} marks the root form of the verb.

morphological paradigm of the transitive verbs as a whole. The only earlier description of associated motion in Shilluk is Remijsen, Miller-Naudé & Gilley (2016). In that study the morphological marking of associated motion is treated on a par with morphological marking for voice. The current description of Shilluk grammar, however, is based on the insight that whereas some dimensions of morphological marking are best interpreted as inflectional, others are better interpreted as derivational (cf. Andersen 1992-1994 on Dinka, Reh on Anywa, Reid 2019 on Nuer). Specifically, we interpret voice as an inflectional phenomenon, along with tense-aspect-modality (TAM) and subject marking. In contrast, we treat the morphological marking for associated motion as derivational, because it is orthogonal to the morphological marking for voice, TAM, and subject. That is, just as the base paradigm of a transitive verb presents inflections for these three functions, the paradigms that expresses associated motion run parallel, in that here as well we find inflection for voice, TAM, and subject. The derivational interpretation of the associated motion paradigms is further supported by the fact that there are verbs that appear in associated motion derivations that do not present a base paradigm. This supports a derivational interpretation, because productivity is a defining characteristic of inflectional morphology, but not of derivational morphology (cf. Haspelmath 1996:47). Another difference with Remijsen, Miller-Naudé & Gilley (2016) is that the analysis presented here covers the complete derivational paradigms, i.e., all combinations of voice, TAM, and subject marking. In this respect, our description is more extensive than the one in Remijsen, Miller-Naudé & Gilley (2016), which covers a small part of the paradigm. Finally, the current study goes further in describing the functions of the associated-motion derivations.

Like the earlier chapters, this one is based a) on the study of narrative text and b) on controlled elicitation. Examples of associated motion found in narratives played an important role in establishing its functions and its morphosyntactic characteristics; controlled elicitation was used in the systematic investigation of the paradigm of morphophonological forms across verb classes and inflections.

A summary of Shilluk phonology can be found in Section 1.3 of Chapter 1, which also explains how we transcribe the phonological forms. Transitive verb stems in Shilluk invariably consist of a single closed syllable, which can be preceded and followed by affixes. Associated motion is marked exclusively by suprasegmental markers on the stem syllable: vowel length, tone, vowel quality and ATR. With respect to vowel length, the language presents a ternary

contrast in the stem syllable, where the vowel can be short, long, or overlong (Remijsen, Ayoker & Jørgensen 2019). As for tone, a total of nine syllable-level specifications are distinctive in the surface phonology (Remijsen & Ayoker 2014). There are three level tonemes: Low (L) /cv̀c/, Mid (M) /cv̄c/, and High (H) /cv́c/; four falling contour tones: Low Fall (LF) /cv̂c/, High Fall (HF) / cv̂́c/, Late Fall (LHF) /cv́c̀/, and High Fall to Mid (HFM) /cv̂́c̄/; and two rising contour tones: Low Rise (LR) /cv̌c/ and High Rise (HR) /cv̌́c/.[4] There are ten vowels, five of them -ATR /ɪ,ɛ,a,ɔ,ʊ/, and five corresponding +ATR vowels /i,e,ʌ,o,u/, respectively (Gilley 1992; Remijsen, Ayoker & Mills 2011).

The chapter is structured as follows. First we discuss the functional and morphosyntactic characteristics of the derivations marking associated motion (Section 2), and then we lay out the morphophonological forms that constitute the paradigms (Section 3). Section 4 offers a brief conclusion.

2. Functional characteristics

Morphological marking for associated motion can mark a range of types of movement, in relation to the event referenced by the verb (Koch 1984). Dimmendaal (2015) emphasizes that it is a characteristic feature of morphological marking of associated motion that two events can be expressed through a single verb. As noted in Guillaume (2016), relevant functional characteristics of morphological marking of associated motion include:

  a) the orientation of the motion relative to a point of reference;
  b) the grammatical role of the moving entity;
  c) the timing of the motion relative to the event expressed by the lexical meaning of the verb.

Of these three, the only one that is morphologically marked in Shilluk is a). That is, when a Shilluk transitive verb is inflected for associated motion, the orientation of the motion relative to a point of reference is either vague, or it is specified. The choice between these options is fully predictable on the basis of the root vowel. If the orientation is specified, then the morphological marking for associated motion expresses whether the orientation is centrifugal

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4   The presence of so many contour-tone categories forces us to transcribe tone ideoynscratically, combining diacritics to distinguish tone categories from one another. Importantly, all transcriptions for tone make reference to the surface-phonological specification for tone of the syllable as a whole. For example, the transcription ŋɔ̂l 'cut:FUG:OV' specifies that there is a late-aligned falling contour over the syllable as a whole; we do not postulate that the high and low components of contours are associated with sub-syllabic constituents.

or centripetal relative to a discourse-specific point of reference. These options are described in Section 2.1. As for b), the entity whose path is referenced by the morphological marking for associated motion can be A, P or another core argument, depending on the semantics of the verb and on the morphosyntactic alignment of core arguments (voice). This will be described in Section 2.2, which also addresses c), the timing of the motion relative to the event referenced by the verb.

Section 2.3 describes the grammatical status of the destination as an argument to the verb. The final two subsections address two related phenomena: relational nouns that go with associated motion marking on the verb (Section 2.4); and defective transitive verbs, which present one or both of the associated motion paradigms but not base paradigm (Section 2.5).

2.1 Associated motion: centrifugal, centripetal, or general associated motion

If a transitive verb has a -ATR root vowel[5], i.e., one of /ɪ,ɛ,a,ɔ,ʊ/, then the verb presents one associated-motion derivation that expresses a centrifugal orientation, and another associated-motion derivation that has a centripetal orientation: the former with the underlying -ATR root vowel quality, the latter with a +ATR vowel. This is illustrated in (2a,b), which shows examples from narratives involving the verb {cwɔ́ɔl} 'call'. In both examples, the verb is marked for associated motion. As seen from these examples, the destination – **ɔ̄ɔt** 'house' in (2a), **kàl** 'compound' in (2b) – is expressed as a core argument. In (2a), the first clause implies that the point of reference – the host, who is referenced pronominally on the verb – is outside with the guest, to the effect that he invites the guest to go away from him to the house. If instead the host had called out from within the house, the verb form would have been **à-cwòool-ɛ́**, i.e., the corresponding centripetal form, which is identical but for the ATR value of the stem vowel. This stem form can be observed in (2b), albeit without a subject-marking suffix. In this example, drawn from a different narrative, the hosts call out from inside the compound to a visitor outside. The verb is in Object voice, which marks the fact that the preverbal argument is P (cf. Chapter 1).

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5   Shilluk transitive verb roots are strictly monosyllabic, so there is just a single root vowel (Chapter 1, Section 2).

(2) a.ˆ **à-cwɔ̀ɔɔl-ɛ́**   **wɛ́el-ɔ̀ ɔ̄ɔt kɑ̃́ɑ̄ gɔ̀   mêek-ɛ́ càak**
     SEQP-call:FUG-3S guest-S house CONJ OBL.3S give-3S milk
     'Then he called the guest to go to the house, and he gave him milk.'
     [KeepTheSecret 305.1-307.7]

   b.ˆ **jí mɑ̃́ʈ-ɔ̀ a ḍɔ́k̄   kàl   / ʊ̀ jí cwôool kàl**
     PR.2S greet-AMB FOC mouth:PRT compound / CONJ PR.2S call:PET:OV compound
     'At the entrance to the compound you call out a greeting, and then you are invited to
     come into the compound.' [TraditionOfWomen 12.4-14.1]

In contrast, if the root vowel is underlyingly +ATR, i.e., one of /i,e,ʌ,o,u/,
then there is just a single derivation for associated motion. This derivation
conveys that the event has motion associated with it, but its orientation is left
vague. This is illustrated in (3). The verb {tòoŋ} 'deviate' has a +ATR root
vowel. Here it appears in the Subject-voice form of the associated-motion
derivation.[6] Associated motion is expressed on the stem syllable, through
tone (Low Fall) and vowel length (overlong). Because the vowel is +ATR
/o/ to begin with, there are no separate forms for centrifugal and centripetal
associated motion. The destination, **kêɲ**ᵁ 'this place', is represented in the
clause as a core argument.

(3)ˆ **dɛ́ bǎa róooʈ-ɔ́ à á-tôooŋ   ján kêɲ**ᵁ
     CONJ NOMP thirst-S FOC PST:turn:AM PR.1S place:CS:DEM
     'So, it was thirst that drove me to this place.' [KeepTheSecret 392.2-394]

For the sake of comparison, the corresponding base paradigm of the verb
{tòoŋ} 'turn' has, in the Past tense, the Subject voice form **á-tòoŋ**, the
Object voice form **á-tɔ́oŋ**, and the Applicative voice form **á-tōooŋ**. The
corresponding past tense associated motion forms are different: the Subject
voice form is **á-tôooŋ**, and the Object / Applicative voice is **á-tóooŋ̀**.

  We gloss this more general associated motion meaning AM, as opposed
to the more specific glosses marking the centrifugal (FUG) and centripetal
(PET) functions. Throughout this paper, a verb form that is morphologically
marked for associated motion will be glossed FUG if the stem vowel is
[-ATR], i.e., /ɪ,ɛ,a,ɔ,ʊ/, because for such verbs there is a corresponding
paradigm with [+ATR] stem vowels, conveying associated motion with a
centripetal orientation. If the stem vowel is [+ATR], i.e., /i,e,ʌ,o,u/, then

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6   In (2b), the Low Fall on **cwôool** marks Object voice; in (3), the same tonal specification
on **á-tôooŋ** marks Subject voice. Importantly, there is no syncretism here: the verbs belong
to different classes: {cwɔ́ɔl} 'call' is a High Fall verb; {tòoŋ} 'turn' is a Low verb. The
morphological characteristics of the marking for associated motion will be described in
Section 3.

associated motion form is glossed either PET or AM. It is glossed AM if the root vowel is [+ATR] to begin with, so that there is only one associated motion paradigm, without specification for the orientation. It is glossed PET if the root vowel is [-ATR], and therefore the [+ATR] marks centripetal orientation.

If the verb root is [-ATR] and there are separate derivational paradigms for associated motion with centrifugal and centripetal orientations, then this orientation is relative to a point of reference, which is typically the location of the speaker or of the agent, whether it is expressed or not. Overall, the choice of orientation makes intuitive sense in the context of the discourse. However, in relation to some events, the use of the associated-motion derivations is counterintuitive. Consider the examples in (4). They are drawn from the same narrative, and relate to the putting on and taking off of an armband. In (4a), where the armband is put on, the centrifugal is used; and in (4b), which references the taking off of the armband, the centripetal is used. Evidently, the person who puts it on or takes it off is not the deictic point of reference here. Instead, it is the environment that is the point of reference relative to which the motion is oriented, that is, the point from which the armband is conceived to follow a path onto A in (4a), and in turn, to which the armband is about to return in (4b).

(4) a. **ká̄ā gɔ̀ bɔ̏ṭ-έ   bàaat-ὲ**
         CONJ OBL.3S slide:FUG-3S upper.arm:PRT-3S
         'And then she slid it (the armband) onto her upper arm.'
         [KeepTheSecret 432.1-433.3]

     b. **cǎm έ   búṭ   a   gjɛ́ɛɛl̄-ɔ̄   wâk**
         ADV PR3S slide:PET:NT FOC armband-S outside
         'She was about to slide off the armband, [...]'
         [KeepTheSecret 441.5-443.6]

The above examples are representative for events relating to the putting on or taking off of clothing or body decoration, and the entering or extracting of entities from containers they do not naturally issue from. Further examples are presented in (5). The illustration in (5a) is drawn from a retelling of The North Wind and the Sun. The verb {lɔ̀ɲ} refers to the taking off or putting on of clothes. Taking off clothes is expressed using the centripetal derivation, as in (5a); putting on clothes is expressed using centrifugal forms. And likewise, in (5b), the pouring of milk out of a gourd is equally expressed using centripetal forms. In each case, the noun **wâk** 'outside' is included as a destination.

(5) a. **ŋàaan   à   têɛk   úgɔ́ɟ̵̄-ē   ú-lûɲ-ɛ́   wʌ̂k**
🔊   person.CS REL strong coat:PRT-3S FUT:change.clothes:PET-3S outside
         'The stronger one (= either the North Wind or the Sun) will take off his (=the
         man's) coat.' [NorthWind&Sun 20.1-22.9]

     b. **kɑ́ā   càak kûɲ-ɛ́   wʌ̂k   kì   īıc   ádàaal-ɔ̀**
🔊   CONJ milk pour:PET-3S outside PRP inside gourd-S
         'And then he poured the milk out of the gourd.' [KeepTheSecret 302.7-304.7]

The counterintuitive use of centrifugal and centripetal derivations in these
sentences cannot be explained in terms of the point of reference being distinct
from the person who puts on or takes off the object: equally in the first person,
the pattern is the same. This is shown in the elicited examples in (6). Note that
the action of sliding off is marked with centripetal orientation (6a), and the
action of sliding on with centrifugal orientation (6b).

(6) a. **gjɛ́ɛɛ̄-ɔ̄   á-bû̵ʈ-á   wʌ̂k**   b. **gjɛ́ɛɛ̄-ɔ̄   á-bɔ̵̂ʈ-á**
🔊   armband-S PST-slide:PET-1S outside   armband-S PST-slide:FUG-1S
         'I slid off the armband.'   🔊   'I slid on the armband.'

Part of the explanation is that the directional noun **wʌ̂k** 'outside' requires the
use of the centripetal derivation. This can be seen from (7), which presents
associated motion forms of the verb {kîɲ} 'shake'. In (7a), the stem vowel
is +ATR /i/, which marks centripetal, whereas in (7b) it is the -ATR vowel
/ɪ/, which marks centrifugal. There is no obvious difference in directionality
here: in both sentences, P (the water) moves away. But in (7a) the destination
is **wʌ̂k** 'outside', which appears to go with the centrifugal derivation
systematically.

(7) a. **pîi   á-kíɲ̀   wʌ̂k**
🔊   water PST-shake.off:PET:OXV outside
         'Somebody shook off the water.'

     b. **pîi   á-kíɲ̀   píɲ**
🔊   water PST-shake.off:FUG:OXV ground
         'Somebody shook the water down / onto the ground.'

On this issue, we find insightful a suggestion from an anonymous reviewer,
who suggests that the counterintuitive pattern (whereby something taken
off or out of something is morphologically marked as centripetal) may have
to do with the emergence out of or into a metaphorically enclosed space.
Emerging from this space, the entity comes into the view of and therefore
towards the speaker / point of reference. This applies to (5b), where liquid
emerges from a container. This emergence could be metaphorically extended,

the reviewer suggests, to include clothing and jewelry, as in the other examples that present counterintuitive uses of marking for associated motion.

The extension from orientation in a spatial sense to a metaphorical sense is also in evidence in the case of the verb {ŋèɛw} 'buy'. In the base paradigm, its meaning is centripetal in a metaphorical sense. In the centrifugal derivation, the meaning changes to 'sell', i.e., the morphological marking for spatial orientation conveys the orientation of transfer between buyer and seller, which does not need to be spatial in nature.

2.2 Whose path?

When a verb is marked for associated motion, the movement towards a destination almost always relates either to P or to A. These two scenarios are illustrated in (8), drawn from narratives by different speakers. In both cases, the verb is inflectionally marked for a 3rd singular A. In (8a), the movement towards a destination describes the path of P, that is, of the water, to the speaker's back. In (8b), in contrast, the path towards the destination is the trajectory of A (Deng) while P (fish), is at the destination to begin with.

(8) a.ˆ **pîii   ɲí kɔ̂ɲ-ɛ́   kòom-āa**
     water HAB pour:FUG-3S back.side:PRT-1S
     'She kept pouring water on me.' [DownWithIllness 440.8-441.8]

     b.ˆ **dēɛŋ mɔ̀ɔk   á-câaam-ɛ́   gɔ́Ī-ē**
     Deng kind.of.fish PST-eat:FUG-3S compound:PRT-3S
     'As for Deng, he went to eat the fish in his compound.' [DengsFish 96.6-98.6]

Whether a verb form marked for an associated-motion derivation expresses the path of A or that of P is often predictable on the basis of the meaning of the verb. We will describe each of these possibilities in turn. First, if the semantics of the verb inherently imply a movement of P, then marking for associated motion refers to the path of P. This includes verbs with meanings like {kɔ̀ɲ} 'pour', {lèɛŋ} 'throw', {ŋjɛ́ɛl} 'roll', and {cɔ̀ɔr} 'push'. These verbs typically take an inanimate P, and the movement is simultaneous with the event expressed by the lexical meaning of the verb. This scenario is illustrated in (8a). This set also includes verbs whose semantics inherently imply a movement of P but where the patient is typically animate or human, such as {òr} 'send', {gɔ̀ɔɲ} 'release', as in (1), {cwɔ́ɔl} 'call', as in (2a,b). Here as well, the movement that is morphologically marked on the verb relates to the path of P, but the movement will typically take place subsequent to the

event referenced by the lexical meaning of the verb. In (2a), for example, the invitation is followed by the movement of P (guest) to the house.

Second, if the event does not inherently imply a movement of P, as in the case of meanings like {càm} 'eat', {mʌ́ʌ̯ʈ} 'greet', and {lôʊɲ} 'pluck', then marking for associated motion typically refers either exclusively to the path of A, as in (8b), or to the path followed by A and P together. In relation to the clause in (8b), for example, the meaning 'As for Deng, he took the fish to his compound to eat it.' is also felicitous. Irrespective of whether the movement relates to A alone or to both A and P together, the movement is prior to the event referenced by the lexical meaning of the verb. To the best of our knowledge, this is consistently the case: if the movement makes reference to A, either exclusively or jointly with the path of P, this movement is prior to the event expressed by the lexical verb.

Importantly, it is because associated motion can convey the path of A that these derivations are fully productive in Shilluk: they are not limited to verbs expressing movement of P (cf. Dimmendaal 2003:94).

Finally, whether associated motion references the path of A or that of P is not rigidly fixed for a given verb: the context also plays a role. This is shown in (9). The verb {ŋɔ̀l} 'cut' does not inherently imply movement of P, and hence, marking of associated motion typically conveys movement of A, or movement of A and P together. This is shown in (9a). However, in (9b), drawn from a narrative, the same construction with {ŋɔ̀l} 'cut' is used in a metaphorical sense, of dividing the landscape as one walks. The context here is that of a choice, between taking a road close to the river, or a road between the fields and the forest. Taking the one near the river, the protagonists 'cut' the fields to the side of the forest, in the sense of grouping them together.

(9)   a.   **jāaʈ ŋɔ́Ī̄   gê   à wâk**
           wood cut:FUG:NT PR3P:NOM FOC forest
           'They go away to cut wood in the forest.'
           (Answer to question: 'Where do they go cut wood?')

      b.ˆ **gɛ́   á-kʌ̀l   jùuu   gʌ̀ʌt   pwō̯ʈ ŋɔ́Ī̄   gê   à wâk**
           PR3P PST-carry road:PRT riverbank field:P cut:FUG:OV PR3P:NOM FOC forest
           'They took the river road, passing (cutting) the fields to the side of the forest.'
           [AcangVillage 334.2-336.5]

Associated motion most often references the path of A or P, but it can refer to a different core argument. Shilluk has three voices, whereby the verb form signposts the semantic role of its argument(s) (cf. Section 3 in Chapter

1). When the applicative voice is used, the topic in the preverbal slot is neither A nor P. This is shown in (10a), where the preverbal slot expresses the semantic role of an instrument as a core argument. Illustration (10b) shows that the applicative voice is also available when the verb is marked for associated motion.[7] In this example, associated motion references the path of the instrument. Also, note that instrument, P, and destination are all three expressed as core arguments.

(10)   a.   **kwèer-ì á-pɫ́uur̄   pwòooṭ-ɔ́**
              hoe-P   PST-clear:XV field-S
              'The hoes were used to clear the field.'

        b.   **kwèer-ì á-púuur̀   pwòooṭ-ɔ́ tɫ́uuŋ-ɔ̄**
              hoe-P   PST-clear:AM:XV field-S   Tonga
              'The hoes were taken to Tonga to clear the field.'

2.3 The expression of the destination

Associated motion is a valence-increasing operation, in the sense that the destination or direction is expressed as a core argument, rather than through a prepositional phrase. However, this core argument is optional. There are in fact three possibilities here. First, the destination may be expressed as a core argument without any morphological marking. This is illustrated in (11) and in most of the earlier illustrations. Syntactically, the destination is positioned to the right of the verb, following any other post-verbal core arguments. For the destination to be expressed in this way, it needs to be inanimate.

(11)ˆ   **já   á-tíŋ̀   mâal**
        PR.1S PST-lift:AM:OXV sky
        'I was lifted up.' [DownWithIllness 93.74-94.4]

Second, the destination may be marked by a function morpheme, most often **jìi/jɪ̆ii** or **rɪ́ɪ**. The morpheme **jìi/jɪ̆ii** is used if the destination or direction is animate. This is illustrated in (12). Hence we gloss it 'a(nimate)d(estination)'. This marker expresses the number of its noun argument through tone and length: it has a long vowel and a Low tone if its argument is singular, and an overlong vowel and a Low Rise tone if its argument is plural. The fact that animacy is critical is shown in (12): both in (12a) and in (12b), the omission of **jìi** renders the clause ungrammatical.

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7   Object Voice and Applicative Voice are syncretic in the associated motion derivations. This will be explained in Section 3.1.

(12) a.ˆ **à-ór-ɛ́**   **ɲíík-ɛ́**   **jìi ɲǎaaw ó-mēn**
SEQP-send:AM-3S children:PERT-3S AD cat   ML-mother:3S
'Then she sent her children to Cat her brother.' [RatAndCat 6.37-8.28]

b. **lòʊ̯ț á-lɛ́ɛɛ̀ɲ**   **jìi gwôk**
stick PST-throw:FUG:OXV AD dog
'Somebody threw the stick towards the dog.'

And, in turn, the addition of **jìi/jǐii** before an inanimate destination such
as **mâal** 'sky' in (11) renders that clause ungrammatical. The only scenario
in which a noun with an inanimate referent can appear with **jìi/jǐii** is if is
interpreted with reference to a community associated with this inanimate
entity. For example, **pâac** 'village' can be used with **jìi** if it refers to the village
community, and likewise **kàl** 'compound' is used with **jìi** in the meaning
'family, kinship group'.

The question presents itself as to whether the destination is still a core
argument when it is marked by **jìi/jǐii**, or rather a peripheral one. In other
words, is **jìi/jǐii** a preposition or a core case marker? This question can be
answered using evidence from the verb morphology, presented in (13).[8] The
Object voice Non-Evidential Past form of a transitive verb carries the suffix
-ɔ in clause-final position. This is shown in (13a). As seen from (13b), this
suffix is equally present if the verb is followed by a peripheral argument.
In this example, the verb is followed by a prepositional phrase, headed by
kì. In contrast, the suffix **-ɔ** is absent when the verb is followed by a core
argument. This is shown in (13c), where the verb is followed by an inanimate
destination: note that there is no suffix -**ɔ** on the verb. Crucially, the suffix is
equally absent when the verb is followed by **jìi/jǐii** introducing an animate
destination (13d). That is, an animate destination marked with **jìi/jǐii** is
treated by the grammar in the same way as an inanimate destination, which is
a core argument unambiguously.

(13) a. **kwā̄n   ó-câaam-ɔ̀**
porridge NEVP-eat:FUG:OXV
'Smb. apparently went to eat porridge.'

b. **kwā̄n   ó-câaam-ɔ̀**   **kì lɛ́w**
porridge NEVP-eat:FUG:OXV PRP summer
'Smb. apparently went to eat porridge in the summer.'

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8   In Chapter 1 the same diagnostic is used to assess the status of the preposition **ɪ̀/ɪ̄**, which
marks agents, causes, and experiencers as peripheral arguments.

c. **kwɛ̄n ɔ́-câaam lwáak**
porridge NEVP-eat:FUG:OXV byre
'Smb. apparently went to the byre to eat porridge.'

d. **kwɛ̄n ɔ́-câaam jìi kùl**
porridge NEVP-eat:FUG:OXV AD Kul
'Smb. apparently went to Kul to eat porridge.'

The other common function morpheme marking the destination of a verb that is morphologically marked for associated motion is **ríı**. It is used when P makes contact with the destination. This is illustrated in (14).

(14)ˆ **ʊ̀ gì ɲí ɟāʌʌŋ-έ ríı gâaar-ɔ̀**
CONJ OBL.3P HAB lean:AM-3S REFL stand-S
'And he leans them (his spears) onto the stand.' [AcangVillage 224.3-225.9]

The contribution of **ríı** is made explicit by the elicited examples in (15). Illustration (15a) conveys that the stick is thrown in the direction of the house, and away from from the point of reference; illustration (15b), with **ríı**, conveys additionally that the stick hits the house.

(15) a. **lʊ̀ʊṱ á-lέɛɛɲ̀ kàl** b. **lʊ̀ʊṱ á-lέɛɛɲ̀ ríı kàl**
stick PST-throw:FUG:OXV fence stick PST-throw:FUG:OXV REFL fence
'Smb. threw the stick to the fence.' 'Smb. threw the stick against the fence.'

As suggested by the gloss, the same morpheme is used with pronouns to express reflexive and reciprocal. This use is illustrated in (16), where **ríı gɔ̀** represents P that is co-referential with A, the latter expressed through subject marking on the verb.

(16)ˆ **gìn-ání ríı gɔ̀ kùm-ɛ̀ kí úgɔ́ṱ mέ lʊ́ʊʊɛ̀**
thing:CS-DEF REFL OBL.3S cover:NEVP-3S PRP cloth REL.S black.CTG
'That thing, it had covered itself with a dark cloth.' [DownWithIllness 42.7-44.5]

Above we argued that **jìi/jǐii** is not a preposition, so that the constituent marked by this morpheme is a core argument rather than a peripheral. The same goes for **ríı**. It is used with transitive verb forms on a par with noun phrase arguments that are not marked in this way. Finally, the destination may be specified with relational nouns, such as **īıc** 'stomach, inside' in (17a) and **ŋāʌʌc** 'behind' in (17b). Such relational nouns head possessive noun phrases, which again constitute core arguments expressing the destination. We will discuss relational nouns further in Section 2.4.

(17) a. **lòʊ̯ á-lɛ́ɛɛ̀ŋ**   **īīc   kàl**
stick PAST-throw:FUG:OV inside fence
'Smb. threw the stick into the fence.'

b. **lòʊ̯ á-lɛ́ɛɛ̀ŋ**   **ŋʌ̄ʌʌc kàl**
stick PAST-throw:FUG:OV behind house
'Smb. threw the stick behind the fence.'

We conclude that, if a clause headed by a verb inflected for associated motion includes an argument expressing the destination, then this destination is consistently expressed as a core argument rather than as a peripheral one.

Third, the destination may be omitted. This is illustrated in (18). In this example, the meaning of the verb {màk} 'catch' combines with centripetal motion to convey the event of the arm getting locked back into the joint. The destination, the shoulder joint, is not stated. This scenario – of the destination being omitted when the transitive verb is marked for associated motion – is much less common than the destination being expressed. That is, even when there is no specific destination, the direction is often stated through nouns with directional meanings, such as **wɑ̂k** 'outside', **píɲ** 'ground', and **mâal** 'sky'.

(18)ˆ **cìŋ-āa   á-mʌ́ʌʌʌ̀K̀   ìì   ɲī-mjʌ̄ʌ**
arm:PRT-1S PST:catch:PET:OV PRP daughter:PRT-mother:PRT-1S
'My sister locked my arm inward (i.e., back into my shoulder joint).'
[DownWithIllness 457.8-458.9]

In summary, the associated motion derivation allows for the expression of the semantic role of a destination, which follows after the verb and other core arguments. This semantic role is expressed as a core argument, i.e., without an adposition. The expression of the destination is optional, and in this respect its status is different from a postverbal core argument that expresses P, which cannot be omitted. The fact that associated motion as a morphosyntactic operation is valence-increasing in Shilluk stands out in a comparative sense: in other Nilotic languages, the valence of a predicate marked for associated motion is either the same as that of the base form, or it displays a decrease in valency (Payne, submitted).

2.4 Associated motion and relational nouns

There are grammaticalized nouns whose functional range includes the expression of a destination or direction, and they require the verb to be in an associated-motion derivation. Illustration (19) presents an example from a narrative. Note that, on the second line, **máaa̱ị** is the centrifugal form of

{mâaṭ} 'drink'. There is no movement here. Instead, the use of associated
motion is required by the use of the relational noun **báaaŋ**ᵘ, which inflects as
a noun, but it is only used in the pertensive, i.e., heading a possessive noun
phrase. Its meaning is grammatical rather than lexical: it expresses the spatial
meaning 'behind' and the temporal meaning 'after'. The latter applies in
(19). Here it appears in the pertensive with plural possessor, which is **báaaŋ**.
Syntactically, **báaaŋ gέn** 'after them' constitutes a core argument, and it is the
valence-increasing nature of the centrifugal derivation that allows for this.

(19)ˆ **mâaṭ á-rjēɛw   mɔ̀k̀   kàa rúm   kí   cám**
    drink CARD-second IDP.P:DEM SUB finish:2S PRP eat:INF.A
    'Take these two (pills) when you finish eating.

    káā mɔ̄k̄ kì nì   kí mɔ̄k̄ kì nì   gέ   máaaṭ̀   ìi jín báaaŋ   gén
    CONJ IDP.P PRP DEM PRP IDP.P PRP DEM PR.3P drink:FUG:OV PRP PR.2S behind:PRT.P PR.3P
    And these ones and these ones, you take them after those.' [DownWithIllness 378.9-383.7]

When **báaaŋ**ᵘ is used with its spatial meaning, i.e., 'behind', then it expresses
the semantic role of a destination / direction. Its nominal nature fits with the
valency of a verb in the associated-motion derivations, which allows for the
expression of this particular semantic role as a core argument. Used with its
temporal meaning, i.e., 'after', the morphosyntactic properties of the verb and
the clause are the same. This shows that the functional scope of the associated
motion derivations may extend from the realm of space to that of time.

    Another relational noun which triggers the use of the associated-motion
derivation is **kòoom-ɔ̀**. This noun has a lexical meaning 'back (body part)',
but when it heads a possessive noun phrase it also expresses two grammatical
meanings: the deictic meaning, 'in a downwards direction, over' and the
meaning of reason 'because of'. Its spatial use is illustrated in (20a), where
{ŋjɛ́ɛl} is in the centrifugal form, and **kòom-ì nâam** expresses the destination.
Its other meaning, i.e., the expression of a reason, is illustrated in (20b).

(20) a. **kúuur-ɔ̀ á-ŋjêɛɛl   kòom-ì   nâam**
        ball-S   PST-roll:FUG:OXV downward-PRT river
        'Somebody rolled the ball down to the riverbank.'

    b. **bʊ̆ʊl á-nʌ́ʌʌk̀   kòom-ì   djèɛɛl-ὲ**
        Bol PST-kill:AM:OXV downward-PRT goat-3S
        'Somebody killed Bol because of his goat.'

Even though **báaaŋ**ᵘ in (19) and **kòom-ì** in (20b) do not express a destination,
they still trigger the use of the associated-motion derivation of the verb.
Crucially, they are behaving syntactically like nouns, and their argument is
morphosyntactically a possessor. This fits with the fact that associated-motion

is a valency-increasing operation, which adds an optional core argument. The noun **kòoom-ɔ̀** has a lexical meaning, of a body part, alongside its grammaticalised relational meaning; in contrast, **bǎaaŋ̄ᵘ** only has a relational meaning, and hence it does not appear in the base form.[9]

On a tangent, the analogous extension from a directional movement in the realm of space to one in time is not limited to the derivation for associated motion. Illustration (21) presents two clauses in which lexical verbs that more often express a movement are used with temporal reference: ambitransitive {wʌ̀ʈ�} 'reach' and intransitive {bìi} 'come'. The latter verb is part of a serialization, in which it contributes aspectual meaning.

(21)ˆ **kàa á-wʌ̄ʈ̄ī   ɟ̀ì   lέw,   kǎ̄ā ʊ̀-bɛ́eeñ-ɔ̄ έ   ʊ̀-pʌʌʌt-ɔ̀**
SUB PST-reach:XV people dry.season CONJ IMPF-come PR3S IMPF-untie
'When people reached the dry season, then it (my body) came out of paralysis
(lit.: 'came to untying itself [from a paralyzing seizure]').'
[DownWithIllness 118-120.1]

2.5 Defective paradigms

On the whole, transitive verbs whose referent event inherently express movement in relation to P, such as {lɛ̀εŋ} 'throw' and {kɔ̀ɲ} 'pour', can also be used in the base paradigm, without morphological marking for associated motion. In that case, the clause does not express the orientation of this movement. However, there are also transitive verbs which have one or both of the associated-motion derivations, but no base inflectional paradigm. Because they do not have a base paradigm, we interpret these verbs as defective. Some examples of such verbs are listed in Table 1. The full set of derivations that are available for a transitive verb consists of centrifugal, centripetal, iterative, benefactive, ambitransitive and antipassive. As seen from Table 1, most defective verbs appear in several of these; but there are some like {cʊ̀ʊʊʈ} 'make worse', which only appear in the associated-motion derivations.

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9   The base form is one of the forms of the inflectional paradigms of nouns. Its definition is morphosyntactic: among others, this is the form that is used when the noun is not accompanied by a modifier. Note that morphological complexity is not used in its definition: the base form may be monomorphemic, as in the case of **lòʊʈ** 'stick', or it may be complex, as in the case of **ʈ̣âaaŋ-ɔ́** 'stalk-s', which carries a suffix marking singular. The inflectional paradigm is described in detail in Chapter 2.

Table 1. Examples of verbs that appear in one or both of the associated motion derivations, while lacking the base paradigm.[10]

Semantic dimension	Subject Voice Past	Meaning	Available derivation(s)
Movement	dwâaaj	'fetch'	Centrifugal, centripetal, benefactive, ambitransitive
Movement	cjêeek	'close'	Associated motion, iterative, benefactive, ambitransitive, antipassive
Movement	bʌ̀ʌʌn	'cross'	Associated motion, iterative
Movement	dwɔ̀ɔɔk	'return (smth.)'	Centrifugal, centripetal, benefactive
Movement	ɲìɪɪk	'move (smth.) aside'	Centrifugal, centripetal, ambitransitive
Inception/telicity	bâaak	'start fermenting'	Associated motion, iterative, benefactive, ambitransitive, antipassive
Inception/telicity	cʊ̀ʊʊt̪	'make worse'	Associated motion

In some of these, the lexical semantics inherently involve movement; in others, they inherently involve inception or telicity. This is illustrated by the example in (22), from Remijsen, Miller-Naudé & Gilley (2016). This kind of functional extension of associated motion to telicity is not uncommon (Dimmendaal 2003:96). In this context it is worthwhile to note that, in many Nilotic languages that present morphological marking for associated motion, this operation also plays a role in the expression of aspect and pluractionality (Payne, submited).

(22) **mɔ̂k-ɔ̀   á-báaak̀**
alcohol-s PST-ferment:FUG
'The alcohol reached fermentation.'

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10 Whether a verb in Table 1 has centrifugal and centripetal derivations rather than a single derivation with the more general function of associated motion depends on the ATR value of the vowel (cf. Section 2.1)

3. The morphophonological forms of the associated motion derivations

As explained in Section 2.1, transitive verbs have at least one associated-motion derivation. If the root vowel is +ATR, then the function of this derivation can best be described as directional, i.e., conveying a movement towards some destination, without a specific orientation relative to a point of reference. If the root vowel is –ATR, in contrast, then this associated motion derivation has a centrifugal orientation, and there is a second associated motion derivation with centripetal orientation. In this section, we first describe the morphophonological forms of the associated motion derivation that has either centrifugal orientation (for –ATR roots) or the more general function of associated motion without a specified orientation (for +ATR roots) (Section 3.1). After that we lay out how the forms of the centripetal derivation are predictable on the basis of the former (Section 3.2).

Throughout this section we will make reference to classes of transitive verbs, and to the morphosyntactic operations that are part of the inflectional paradigm of the associated motion derivations: voice, tense-aspect-modality (TAM), and subject marking. In these respects, the associated motion derivations are structured in parallel to the base paradigm. Descriptive analyses of the system of transitive verb classes and of the morphosyntactic operations marking voice, TAM and subject are to be found in Chapter 1.

Many of the examples of associated motion in this section do not include an explicit destination. In this context, we remind the reader that morphological marking for associated motion marks movement towards a destination, whether this destination is specified or not (cf. Section 2.3). This is further illustrated in (23).[11] Illustration (23a) shows a clause with a verb in the centrifugal derivation. The destination is expressed as a core argument. Illustration (23b) shows that it is grammatical for the destination to be omitted in this sentence. As indicated by the translation, the sentence still conveys associated motion with centrifugal orientation. We show this to make clear that, even without the explicit expression of the destination, the illustrations below illustrate the morphophonology of the associated motion derivations adequately.

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11 Here and elsewhere in this chapter, underlining marks focus. In (23a,b), focus on P follows from the verb being in Subject voice, which implies contrastive focus on the object that follows the verb. This phenomenon is described in Section 3.2.2 of Chapter 1.

(23) a. **ábác á-lêɛɛŋ   lòʊt̪ gʌ̀ʌt**
🔊   Abac PST-throw:FUG stick riverbank
      'Abac threw <u>the stick</u> away to the riverbank.'

  b. **ábác á-lêɛɛŋ   lòʊt̪**
🔊   Abac PST-throw:FUG stick
      'Abac threw <u>the stick</u> away.'

3.1 Centrifugal / general associated motion

In this section we lay out the derivational paradigm that conveys centrifugal or general associated motion. Table 2 shows the different configurations of voice and subject marking that exist in this derivation, contrasting the situation with that of the base paradigm, which was described in Chapter 1. The Subject voice part of the paradigm is described in Section 3.1.1; Object / Applicative voice part in Section 3.1.2; Object voice with subject marking in Section 3.1.3; and Applicative with subject marking in Section 3.1.4.

Table 2. Overview of the distinct morphological forms for voice and subject marking in the centrifugal / general associated motion derivation, alongside the corresponding forms in the base paradigm. Each morphological form is illustrated by the verb {càm} 'eat', in the Past tense. Subject marking is illustrated by the 1st singular form.

	Subject marking	Subject voice	Object voice	Applicative voice
Base paradigm	No subject marking	á-càm	á-c�́m	á-cāaam
	With subject marking		á-càaam-á	á-cāaam-á
Centrifugal	No subject marking	á-câaam	á-cáaam̀	
	With subject marking		á-câaam-á	á-cáaam-á

Note that, whereas the base paradigm presents distinct morphological forms for three voices when there is no subject marking involved – Subject voice, Object voice, Applicative voice – the centrifugal derivation presents only two: Subject voice on the one hand, and Object voice and Applicative voice on the other. With subject marking, in contrast, the situation is parallel: the base paradigm and the centrifugal derivation both present a subject-marked form used when the preverbal argument is P, i.e., Object voice with subject marking, and a different subject-marked form that is used when the preverbal argument represents a different semantic role and P follows the subject-marked verb, i.e., Applicative with subject marking. However, as we will see in Section 3.1.4, in the centrifugal derivation the difference between

Applicative with subject marking vs. Object voice with subject marking is limited to the Past tense.

3.1.1 Subject voice

The Subject voice forms of the centrifugal paradigm are summarized in Table 3, by tense-aspect-modality (TAM) and verb class. There are four factor levels of TAM in this voice: Past, No Tense, Future, and Non-Evidential Past. As for the verb classes[12], there are no differences in tonal specification between Low classes and Low Fall classes; it is only the High Fall class which diverges from both of the former. Note that all classes that display a morphological length alternation have an overlong vowel in all levels of TAM. In other words, unless the verb is Fixed Short, the stem vowel is overlong. This is representative for the associated-motion derivations as a whole, i.e., across voices and irrespective of subject marking.

Table 3: The Subject voice forms of the centrifugal / general associated motion derivation, by TAM and verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lɛ̀ɛŋ} 'throw', {mâaṭ} 'drink', {mǎal} 'praise'. TAM levels marked with * require syntactic licensing (cf. Section 6 of Chapter 1).

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Past	á-ŋɔ̂l	á-lêŋ	á-câaam	á-mʌ̂ʌʌl	á-lêɛɛŋ	á-mâaaṭ	á-màaal
NEVP*	ŋɔ̂l	lêŋ	câaam	mʌ̂ʌʌl	lêɛɛŋ	mâaaṭ	màaal
NoTns*	ŋɔ́l	lɛ́ŋ	cáaam	mʌ́ʌʌl	lɛ́ɛɛŋ	máaaṭ	mǎaal
Future	ú-ŋɔ́l	ú-lɛ́ŋ	ú-cáaam	ú-mʌ́ʌʌl	ú-lɛ́ɛɛŋ	ú-máaaṭ	ú-mǎaal

In the remainder of this section we will illustrate these forms using full-sentence illustrations. To begin with, consider the Subject voice forms of {lɛ̀ɛŋ}, a member of the Long Low class. These are displayed in (24). The Past (24a) and Future (24d) TAM forms are marked by prefixes **á-** and **ú-**, respectively, just as in the base paradigm. The Non-Evidential Past and the No Tense forms do not carry prefixes, and these forms require syntactic licensing.[13] In (24b) and (24c), this requirement is fulfilled by the focus

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12 The system of transitive verb classes is described in Section 2 of Chapter 1.

13 Most verb forms that do not carry a TAM prefix require another element within the clause to supply the aspectual setting. We refer to this as syntactic licensing. This phenomenon is

marker, which can appear once per clause. The underlining marks focus on P. This follows from the fact that, just as in the base paradigm, the use of Subject voice is pragmatically marked. It is used when A is the topic and P is focused. This is explained in Section 3.2.2 of Chapter 1.

(24) a. **ábác á-lêɛɛŋ   lòʊt̪**
 Abac PST-throw:FUG stick
 'Abac threw <u>the stick</u> away.'

 b. **ábác lêɛɛŋ   a   lòʊt̪**
 Abac throw:FUG:NEVP FOC stick
 'Abac apparently threw <u>the stick</u> away.'

 c. **ábác lέɛɛŋ   a   lòʊt̪**
 Abac throw:FUG:NT FOC stick
 'Abac is throwing <u>the stick</u> away.'

 d. **ábác ó-lέɛɛŋ   lòʊt̪**
 Abac FUT-drink:FUG stick
 'Abac will throw <u>the stick</u> away.'

As seen from the examples in (24), the stem syllable of the root {lèɛŋ} has the Low Fall in Past and Non-Evidential Past, and the High tone in No Tense and Future. The same alternation in the specification for tone of the stem syllable as a function of TAM – Low Fall in Past and Non-Evidential Past; High tone in No Tense and Future – is found for all Low and Low Fall verbs. This means that the difference in lexical specification between Low and Low Fall verbs is neutralized in this derivation. This state of affairs actually applies to both of the associated motion derivations as a whole.

On a tangent, the focus marker does not have a specification for tone when it follows immediately after the verb stem – in fact, this allomorph is the only Shilluk form we postulate to lack a specification for tone. Instead, it copies the end target of the tonal specification of the preceding syllable. This interpretation is supported by the data in (24b,c). In (24b), the sequence **lêɛɛŋ a** is realized [**lêɛɛŋ à**]; in (24c), **lέɛɛŋ a** is realized [**lέɛɛŋ á**]. This suggests that the focus marker copies the tonal target of the preceding stem syllable if it has a level tone, and the end target if the preceding stem syllable has a contour tone.

There is on transitive verb class that diverges from the others in terms of the tonal specification in the associated-motion derivations: the High Fall verbs. For this class, the patterning together of levels of TAM – Past and Non-

described in Section 6 of Chapter 1.

Evidential Past on the one hand; No Tense and Future on the other – is the same, but the tones involved are different. This is illustrated in (25), using {mɛ́al} 'praise'. As seen from these examples, the members of this class have a Low tone in Past (25a) and Non-Evidential Past (25b), and a High Rise in No Tense (25c) and Future (25d).

(25)　a.　**dɛ̄ɛŋ á-màaal　　ábác**
　　　　Deng PST-praise:FUG Abac
　　　　'Deng went away to praise <u>Abac</u>.'

　　　b.　**dɛ̄ɛŋ màaal　　　a　ábác**
　　　　Deng praise:FUG:NEVP FOC Abac
　　　　'Deng apparently went away to praise <u>Abac</u>.'

　　　c.　**dɛ̄ɛŋ mǎaal　　a　ábác**
　　　　Deng praise:FUG:NT FOC Abac
　　　　'Deng is going away to praise <u>Abac</u>.'

　　　d.　**dɛ̄ɛŋ ɔ́-mǎaal　　ábác**
　　　　Deng FUT-praise:FUG Abac
　　　　'Deng will go away to praise <u>Abac</u>.'

The data in (25b,c) provide further evidence for the toneless nature of the focus marker when it follows the verb stem. In (25b), the sequence **màaal a** is realized [**màaal à**]; in (25c), **mǎaal a** is realized [**mǎaal á**].

　　In most situations, the tonal specification of Shilluk words is easy to ascertain on the basis of the auditory impression and the f0 trace. But it is not so easy to distinguish between the Low Rise / ˇ / and the High Rise / ˇ /. For the sake of accountability, illustration (26) presents additional examples that are critical to the choice between these alternatives. The verb is High Fall {lɔ́ʊɲ} 'take turns', elicited in Subject voice No Tense form. By eliciting it with Low-toned and Mid-toned preceding contexts, we can evaluate the competing hypotheses, i.e., does the stem carry a Low Rise or a High Rise. Note how, in embedded sound of (26a), the melody rises from the Low-toned focus marker **à** to the verb stem. And in (26b), where the melody of the preverbal noun is Mid, f0 remains at the same level at the beginning of the verb stem. Crucially, there is no salient dip in pitch, which is what we would expect if the verb stem had a Low Rise. This supports the hypothesis that the Subject voice No Tense and Future forms of the High Fall verb class have a High Rise on the stem.

(26)　a.　**dɛ̄ɛŋ à　lǒʊɲ　　　ṭāal**
　　　　Deng FOC take.turns:FUG:NT cook:INF.A
　　　　'<u>Deng</u> went away to take turns <u>cooking</u>.'

b. **dɛ̄ɛŋ lǒʊʊɲ   a ṭāal**
Deng take.turns:FUG:NT FOC cook:INF.A
'Deng went away to take turns <u>cooking</u>.'

Across verb classes, the tonal alternations between Past and Non-Evidential Past on the one hand vs. No Tense and Future on the other hand are noteworthy for their morphophonological step size. The High Fall verbs alternate between Low and High Rise, respectively; and the other classes between Low Fall and High. Elsewhere in Shilluk morphology, processes involve smaller steps. For example, in the base paradigm, a Low in the Past alternates with a High Fall to Mid in the No Tense form (**á-càm** 'PST-eat' vs. **cá̄m̄** 'eat:NT'), and with a Mid in the Applicative voice (**á-càm** 'PST-eat' vs. **á-cāaam** 'PST-eat:XV'). And similarly, in noun paradigms a Low Fall can alternate regularly with a High Fall to Mid (**gwôk** 'dog' vs. **gwɔ́ook̄ᵘ** 'dog:PRT'), and the alternation only becomes High-toned when the pertensive is inflected further for a plural possessor (**gwóook** 'dog:PRT:P'). Against this background, the tonal alternations observed in the Subject voice of the spatial paradigm are relatively big.

3.1.2 Object / Applicative voice

As noted in the introduction to Section 3.1, the voice system marks a ternary morphological contrast in the base paradigm, but only a binary one in the centrifugal / general associated motion derivation (cf. Table 2). This is shown in (27). The morphological difference between Object voice and Applicative voice in the base paradigm is illustrated in (27a,b). Note that, in (27a), where the preverbal argument is P, the verb form is **á-cá̂m**, which is the object voice form (ov). And if the preverbal argument is neither A nor P, the verb form is different: **á-cāaam** (27b), which is the applicative voice form (xv). In the centrifugal / general associated motion paradigm, in contrast, the corresponding difference in the semantic role of the preverbal argument is not marked by a difference in morphological form. This is shown in (27c,d), which differ in the semantic role of the preverbal argument in parallel with the base-paradigm forms in (27a,b). Crucially, the verb form in (27c), with P in the preverbal slot, i.e., **á-cáaam̀**, is the same as in (27d), where the preverbal slot holds an instrument. Hence, this inflection is glossed OXV.

(27) a. **kwān   á-cá̂m**
porridge PST-eat:OV
'Smb. threw the stick.'

b. **pâal á-cāaam kwɪ̄n**
spoon PST-eat:XV porridge
'Smb. used the spoon to eat porridge.'

c. **kwɪ̄n á-cáaam̀ gʌ̀ʌt**
porridge PST-eat:FUG:OXV riverbank
'Smb. went to the riverbank to eat porridge.'

d. **pâal á-cáaam̀ kwɪ̄n gʌ̀ʌt**
spoon PST-eat:FUG:OXV porridge riverbank
'Smb. took the spoon to the riverbank to go eat porridge.'

As seen from the example in (27d), the use of the associated motion derivation allows for the expression of three semantic roles as core constituents, specifically when the preverbal slot (topic) is filled by an argument expressing a semantic role other than agent or patient. In (27d), the semantic role that is expressed as an additional core argument is the instrument. P follows immediately after the verb, and the destination can be expressed as a core argument after that. As noted above, the form of the verb is the same as in (27c), where the preverbal argument is P, and where only two core arguments are expressed (patient and destination). The A argument cannot be expressed as a core argument when the verb is in Object / Applicative voice. Instead, it would need to be expressed using a prepositional phrase headed by **ɪ̀ɪ** (sg.) / **ɪ̄ɪ** (pl.). It is the same when in the base paradigm, both if the verb is in Object voice and if it is Applicative voice (see Section 3.3.4 in Chapter 1).

Table 4 presents an overview of Object / Applicative voice forms in the centrifugal / general associated motion derivation. As noted in relation to the Subject voice forms (Section 3.1.1), if the verb presents a morphological alternation in vowel length, then the stem vowel is overlong. This explains why, aside from the Fixed Short classes in Table 4, all the verb forms have an overlong stem vowel. Similar to the situation in the base paradigm, Object / Applicative voice presents three levels of TAM that are not available in Subject voice: Imperfective, Sequential past and Conditional.

Table 4: The Object / Applicative voice forms of the centrifugal / general associated motion derivation, by TAM and verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mâl} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mɑ́al} 'praise'. The * marks the need for syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Past	á-ŋɔ́l̀	á-léŋ̀	á-cáaam̀	á-mʌ́ʌʌl̀	á-léɛɛŋ̀	á-máaaṭ	á-mâaal
NoTns*	ŋɔ́l̀	léŋ̀	cáaam̀	mʌ́ʌʌl̀	léɛɛŋ̀	máaaṭ	mâaal
Future	ɔ́-ŋɔ́l̀	ɔ́-léŋ̀	ɔ́-cáaam̀	ɔ́-mʌ́ʌʌl̀	ɔ́-léɛɛŋ̀	ɔ́-máaaṭ	ɔ́-mâaal
NEVP	ɔ́-ŋɔ̂l-ɔ̀	ɔ́-lêŋ-ɔ̀	ɔ́-câaam-ɔ̀	ɔ́-mʌ̂ʌʌl-ɔ̀	ɔ́-lêɛɛŋ-ɔ̀	ɔ́-mâaaṭ-ɔ̀	ɔ́-màaal-ɔ̀
Impf (OV)	ɔ̀-ŋɔ̂l-ɔ̀	ɔ̀-lêŋ-ɔ̀	ɔ̀-câaam-ɔ̀	ɔ̀-mʌ̂ʌʌl-ɔ̀	ɔ̀-lêɛɛŋ-ɔ̀	ɔ̀-mâaaṭ-ɔ̀	ɔ̀-màaal-ɔ̀
Seq. Past	à-ŋɔ́l̀	à-léŋ̀	à-cáaam̀	à-mʌ́ʌʌl̀	à-léɛɛŋ̀	à-máaaṭ	à-mâaal
Conditional	ò-ŋɔ́l̀	ò-léŋ̀	ò-cáaam̀	ò-mʌ́ʌʌl̀	ò-léɛɛŋ̀	ò-máaaṭ	ò-mâaal

The Past, No Tense and Future levels of TAM have the same stem form. These three inflections diverge only in terms of their prefixes: **á-** for the Past, **ɔ́-** for the Future, and no prefix for the No Tense. In the case of all verb classes other than High Fall, the tone on the stem is the Late Fall in these three inflections. This is illustrated in (28), using the Long Low verb {lèɛŋ} 'throw'; the corresponding base-paradigm Object voice forms are **á-lɛ́ɛŋ** (Past), **lɛ́ɛŋ** (No Tense), and **ɔ́-lɛ́ɛŋ** (Future). The No Tense form requires syntactic licensing; in the example the focus marker fulfills this requirement. Playing the embedded sound examples, the reader can ascertain that the pitch of the vowel /a/ before the verb is crucial to disambiguate the Past (28a) vs. No Tense (28b) sentences.

(28)   a.   **lòʊṭ á-léɛɛŋ̀   gʌ̀ʌt**
          stick PST-throw:FUG:OXV riverbank
          'Smb. threw the stick (away) to the riverbank.'

       b.   **lòʊṭ à   léɛɛŋ̀   gʌ̀ʌt**
          stick FOC throw:FUG:OXV:NT riverbank
          'Smb. throws <u>the stick</u> (away) to the riverbank.'

       c.   **lòʊṭ ɔ́-léɛɛŋ̀   gʌ̀ʌt**
          stick FUT-throw:FUG:OXV riverbank
          'Smb. will throw the stick (away) to the riverbank.'

The requirement for the No Tense form to be licensed syntactically can be satisfied in other ways, for example by marking focus on the destination, as in (29).

(29) **lòʊ̯ṭ léɛɛ̀ŋ   a   gɪ̀ʌt**
[🔊] stick throw:FUG:OXV FOC riverbank
      'Smb. is throwing the stick to <u>the riverbank</u>.'

The stem form is different in the Non-Evidential Past. Here we find the same
tone on the stem as in the Subject voice, which in the case of a Low verb like
{lèɛŋ} 'throw' is the Low Fall. This form also takes a High-toned prefix **ʊ́-**. It
is illustrated in (30). The suffix **-ɔ** is present when there is no following core
argument, as in (30a); it is absent when there is one (30b).[14]

(30) a. **lòʊ̯ṭ ʊ́-lêɛɛŋ-ɔ̀**
[🔊]   stick NEVP-throw:FUG:OXV
          'Smb. apparently threw the stick away.'

      b. **lòʊ̯ṭ ʊ́-lêɛɛŋ   gɪ̀ʌt**
[🔊]   stick NEVP-throw:FUG:OXV riverbank
          'Smb. apparently threw the stick to the river bank.'

When the preverbal slot is filled by an argument other than A or P, then the
verb is immediately followed by P. This is illustrated in (31). In this scenario,
the Non-Evidential Past Object voice form appears without the **-ɔ** suffix,
because it is followed by a core argument (cf. Section 2.3).

(31) **gîn-ání   ʊ́-lêɛɛŋ   lòʊ̯ṭ gɪ̀ʌt**
[🔊] thing:CS-DEF NEVP-throw:FUG:OXV stick riverbank
      'Smb. apparently used the thing to throw the stick to the river bank.'

In the base paradigm, Object voice presents an additional TAM form, as
compared with Subject voice and Applicative voice: the Imperfective.
This form is illustrated in (32a). The same inflection is available in the
centrifugal / general associated motion derivation, as shown in (32b). In
form, this inflection is very similar to the Non-Evidential Past. It equally
includes the suffix **-ɔ**, the presence of which is sensitive to the presence or
absence of a following core argument. The only difference is that in the
Imperfective the tone on the prefix is Low rather than High, i.e., **ʊ̀-**. Just as
in the base paradigm, this level of TAM is incompatible with focus marking
(see Section 5.5 of Chapter 1). In the associated-motion derivations, where
Object voice and Applicative voice are not morphologically distinct, TAM
marking for Imperfective combines only with P as the preverbal topic.

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14 This phenomenon came up in Section 2.2, where it was used to distinguish between core
and peripheral arguments.

Also, the Imperfective form of the associated-motion derivations expresses directionality, but the destination cannot be added as a core argument.

(32) a. **lòʊ̪ ò-lɛ̀ɛɛŋ-ɔ̀**
    stick IMPF-throw:OV
    'Smb. is throwing the stick.'

    b. **lòʊ̪ ò-lêɛɛŋ-ɔ̀**
    stick IMPF-throw:FUG:OXV
    'Smb. is throwing the stick away.'

Finally, there are the Sequential Past and Conditional forms, which are used with the verb in clause initial position. They are illustrated in (33a) and (33b), respectively. Note that there is no preverbal argument. Nonetheless, they are formed using the same stem form as the one that is used with Object / Applicative voice. This is similar to the situation in the base paradigm, where the Sequential Past and the the Conditional involve the same stem form as the Applicative voice. The functions of these TAM forms are the same as in the base paradigm; they are described in Section 5 of Chapter 1.

(33) a. **à-léɛɛŋ̀   lòʊ̪ gʌ̀ʌt**
    SEQP-throw:fug:OXV stick riverbank
    'Then smb. threw the stick to the riverbank.'

    b. **ò-léɛɛŋ̀   lòʊ̪ gʌ̀ʌt**
    COND-throw:FUG:OXV stick riverbank
    'If smb. threw the stick to the riverbank.'

In relation to the Subject voice forms, we noted that there is no difference between the Low classes and the Low Fall classes, while the High Fall class does diverge in terms of specification for tone. It is the same in Object voice: a Low Fall verb like {mâa̪} 'drink' has the same specifications for tone on the stem syllable as {lɛ̀ɛŋ} 'throw' in the above examples: a Late Fall in the Past, No Tense, Future, Sequential Past and Conditional forms, and the Low Fall in Non-Evidential Past and Imperfective. However, members of the High Fall class present a different specification for tone on the stem syllable. This is illustrated in (34). Note how the High Fall verb {mɑ́al} 'praise' has the Low Fall on the stem in Past (34a), No Tense (34b) and Future (34c); and the Low in Non-Evidential Past (34d).

(34) a. **ábác á-mâaal**
    Abac PST-praise:FUG:OXV
    'Smb. went away to praise Abac.'

    b. **ábác à   mâaal**
    Abac FOC praise:FUG:OXV:NT
    'Smb. is going away to praise <u>Abac</u>.'

    c. **ábác ó-mâaal**
    Abac FUT-praise:FUG:OXV
    'Smb. will go away to praise Abac.'

    d. **ábác ó-màaal-ɔ̀**
    Abac NEVP-praise:FUG:OXV
    'Smb. apparently went away to praise Abac.'

It is a general characteristic of the Low Fall to assimilate to a preceding Low tone target. In this context, its realisation is very similar to that of a Low tone. Hence the example in (34b) does not by itself provide adequate support for the hypothesis that the No Tense form has a Low Fall. When the stem syllable is immediately preceded by a High tone, in contrast, the falling melody is salient. This is shown in (35), where the syntactic licensing is fulfilled through focus associated with the argument that follows the verb, which expresses the semantic role of the destination, and a High-toned P immediately precedes the verb. Here the melody over the stem is saliently falling.

(35) **ábác mâaal   a   gʌ̀ʌt**
Abac praise:FUG:OXV:NT FOC riverbank
'Smb. is going <u>to the riverbank</u> to praise Abac.'

In the Non-Evidential Past and Imperfective Object voice forms of the associated motion derivations of verbs that belong to the Low or the Low Fall classes, the morphologically specified tone on the stem syllable is the Low Fall (Table 4). For the Low Fall classes, this coincides with its lexical specification, so that there is syncretism between the base-paradigm forms and the associated-motion forms. Consider for example the Low Fall verb {mâaṭ} 'drink'. The Object voice Non-Evidential Past form **ɔ́-mâaaṭ-ɔ̀** and the Object voice Imperfective form **ɔ̀-mâaaṭ-ɔ̀** are the same in the base paradigm vs. the centrifugal derivation. The hypothesis that these forms are syncretic has been confirmed through a small perception experiment, reported in Remijsen, Miller-Naudé & Gilley (2016). Three speakers were presented with recordings of Non-Evidential Past and Imperfective forms from the base paradigm, and with the same TAM forms from the centrifugal derivation. In the latter, no destination was included. There were three Low verbs and three Low Fall verbs. The speakers had to determine whether the event referred to by the sentence involved motion. The correct classification score was 87 percent for the stimuli involving Low verbs (39 judgments in total). In response the stimuli involving Low Fall verbs, the score was only 59 percent (57 judgments in total), i.e., close to chance-level. The discrepancy between these scores supports the hypothesis that the Low Fall verbs display syncretism between the base-paradigm vs. the associated-motion derivation, specifically in relation to the Object voice Non-Evidential Past and Imperfective forms.

3.1.3 Subject marking with Object voice
Just as when the verb is in the base paradigm, there are two formal types of subject marking in the centrifugal / general associated motion derivation: one

that is inflectional, and another that is syntactic. The difference is shown in (36), which illustrates both of these using the High Fall verb {mɑ́al} 'praise'. The example in (36a) illustrates inflectional subject marking, while (36b) illustrates syntactic subject marking. The sentences in (36c) and (36d) show the corresponding Subject voice and Object voice constructions, for the sake of comparison. To begin with, note that A is expressed pronominally in all four of the sentences. But it is only in (36a) that it is expressed as a bound pronoun, the suffix **-á**. Such inflectional subject marking is available for 1st, 2nd, and 3rd singular subjects. We will outline its morphophonological characteristics in detail in Section 3.1.3.1. In contrast, if the focus marker **a** is associated with the pronominally marked subject, then this **a** comes in between the full form of the personal pronoun and the verb stem, as in (36b). In this construction, the personal pronoun is case-marked (nominative). This is syntactic subject marking, which is described in Section 3.1.3.2. In the Object voice (36d), the A argument is expressed in a prepositional phrase, just as in the base paradigm (see Section 3.3.2 in Chapter 1).

(36)   a.   **ábác á-màaal-á**   b.   **ábác á-màaal**   **a**   **jân**
             Abac PST-praise:FUG-1S   Abac PST-praise:FUG FOC PR.1S:NOM
             'I went away to praise Abac.'   'I̲ went away to praise Abac.'

           c.   **já**   **á-màaal**   **ábác**   d.   **ábác á-mâaal**   **ìɪ**   **ján**
             PR.1S PST-praise:FUG Abac   Abac PST-praise:FUG:OXV PRP PR.1S
             'I went away to praise A̲b̲a̲c̲.'   'I went away to praise Abac.'

In the plural, there is no inflectional subject marking. That is, the construction in (37), which is like the one in (36b), i.e., with a case-marked subject pronoun after the verb, is used with intervening focus marker and without it.

(37)   **ábác á-màaal**   **(a) gên**
       Abac PST-praise:FUG FOC PR.3P:NOM
       'They / t̲h̲e̲y̲ went away to praise Abac.'

Both in the case of inflectional subject marking (36a) and in the case of syntactic subject marking (36b), the order of the syntactic constistuents is the same as in the Object voice construction in (36d): P (Abac) preceeds the verb. In terms of their form, in contrast, the subject-marked forms are based on the Subject voice form. This can also be seen from (36) above. Note that both the inflectionally subject marked form in (36a) and the syntactically subject marked form in (36b) have the same specification for tone on the verb as the Subject voice form in (36c), i.e., a Low tone, whereas the Object voice form in (36d) has a Low Fall.

　　　The formal relation between the subject-marked forms and the Subject voice form is demonstrated systematically in Table 5. As explained in Section 3.1.1, the Subject voice forms differ in tonal specification between Past and Non-Evidential Past on the one hand, vs. No Tense and Future on the other. This is shown in the first row of Table 5, which contrasts Past vs. No Tense forms in Subject voice. Then note that, in the 1st singular forms with inflectional subject marking, there is likewise a difference in tonal specification on the stem between these two tenses. And the same goes for the 3rd plural forms with syntactic subject marking. Moreover, the specification for tone in the subject-marked form is either the same or very similar to that of the corresponding Subject voice form in the same tense. In contrast, the Object voice (OV) stem forms do not differ between Past and No Tense.

Table 5: Subject voice (SV), Object voice (OV), and 1st singular and 3rd plural subject-marked forms, in Past and No Tense forms of the centrifugal / general associated motion paradigm, by verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mɛ́al} 'praise'.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
SV, Past	á-ŋɔ̂l	á-lêŋ	á-câaam	á-mʌ̂ʌʌl	á-lêɛɛŋ	á-mâaaṭ	á-màaal
SV, NoTns*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṭ	mɛ̆aal
1st sg., Past	á-ŋɔ̂l-á	á-lêŋ-á	á-câaam-á	á-mʌ̂ʌʌl-á	á-lêɛɛŋ-á	á-mâaaṭ-á	á-màaal-á
1st sg., NoTns	ŋɔ́l-á	léŋ-á	cáaam-á	mʌ́ʌʌl-á	léɛɛŋ-á	máaaṭ-á	mɛ̆aal-á
3rd pl., Past	á-ŋɔ̂l gên	á-lêŋ gên	á-câaam gên	á-mʌ̂ʌʌl gên	á-lêɛɛŋ gên	á-mâaaṭ gên	á-màaal gèn
3rd pl., NoTns	ŋɔ́l̄ gên	léŋ̄ gên	cáaam̄ gên	mʌ́ʌʌl̄ gên	léɛɛŋ̄ gên	mɛ́aaṭ̄ gên	māaal gèn
OV, Past	á-ŋɔ̀l̀	á-léŋ̀	á-cáaam̀	á-mʌ́ʌʌl̀	á-léɛɛŋ̀	á-máaaṭ̀	á-mâaal
OV, NoTns	ŋɔ́l̀	léŋ̀	cáaam̀	mʌ́ʌʌl̀	léɛɛŋ̀	máaaṭ̀	mâaal

Inflectional subject marking is described in Section 3.1.3.1, and syntactic subject marking in Section 3.1.3.2.

3.1.3.1 Inflectional subject marking

Inflectional subject marking is available for 1st, 2nd and 3rd singular, in Past, No Tense and Future; in the Non-Evidential Past, there only is syntactic subject marking. As explained in Section 3.1.3, the stem forms differ in tonal specification between Past tense on the one hand and No Tense and Future on

the other, in step with a comparable alternation in the Subject voice forms (cf. Table 5). This is illustrated by the full-sentence examples in (38), using the Long Low verb {lɛ̀ɛŋ} 'throw'. Note that the stem syllable has a Low Fall in Past (38a), and a High in No Tense (38b) and Future (38c).

(38) a. **lòʊ̪ á-lêɛɛŋ-á**
stick PST-throw:FUG-1S
'I threw the stick away.'

b. **lòʊ̪ à lɛ́ɛɛŋ-á**
stick FOC throw:FUG:NT-1S
'I am throwing <u>the stick</u> away.'

c. **lòʊ̪ ú-lɛ́ɛɛŋ-á**
stick FUT-throw:FUG-1S
'I will throw the stick away.'

Below we describe each of these in turn, first the Past tense forms, and then the No Tense and Future tense forms. Table 6 displays the inflectionally subject marked forms in the Past tense. The Subject voice form is included for comparison. In the 1st and 3rd person, the subject marked forms can be formally derived by adding a High-toned suffix to the stem form that is found in Subject voice. In the 2nd singular, there is no suffix. Here the stem syllable carries a High Rise in all classes other than the High Fall verbs, and Low Rise in the latter. These specifications can be analysed compositionally as the outcome of the specification of the Subject voice form plus a High tone marking the 2nd singular. That is, á-CV̌(VV)C can be compositionally derived from á-CV̂(VV)C + ´, and á-CV̌VVC from á-CV̀VVC + ´.

Table 6: Inflectional subject marking in the Past tense of the centrifugal / general associated motion derivation, by verb class and person. The Subject voice is included for the sake of comparison. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lɛ̀ɛŋ} 'throw', {mâaṭ} 'drink', and {mɛ́al} 'praise'.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.	á-ŋɔ̂l-á	á-lêŋ-á	á-câaam-á	á-mʌ̂ʌʌl-á	á-lêɛɛŋ-á	á-mâaaṭ-á	á-màaal-á
2nd sg.	á-ŋɔ̌l	á-lɛ̌ŋ	á-cǎaam	á-mʌ̌ʌʌl	á-lɛ̌ɛɛŋ	á-mǎaaṭ	á-mǎaal
3rd sg.	á-ŋɔ̂l-ɛ́	á-lêŋ-ɛ́	á-câaam-ɛ́	á-mʌ̂ʌʌl-ɛ́	á-lêɛɛŋ-ɛ́	á-mâaaṭ-ɛ́	á-màaal-ɛ́
Subj. Voice	á-ŋɔ̂l	á-lêŋ	á-câaam	á-mʌ̂ʌʌl	á-lêɛɛŋ	á-mâaaṭ	á-màaal

The No Tense and Future tense forms are illustrated in Table 7. Just as in the Past, the specification for tone on the stem syllable is the same as in the Subject voice form. The Future tense forms differ from the above No Tense forms in one respect only: they carry the prefix **ú-**.

Table 7. Inflectional subject marking in the No Tense, by verb class and person. The Subject voice is included for the sake of comparison. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lὲɛŋ} 'throw', {mâaṯ} 'drink', and {mɛ́al} 'praise'. The * marks the need for syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.*	ŋɔ́l-á	léŋ-á	cáaam-á	mʌ́ʌʌl-á	lέɛɛŋ-á	máaaṯ-á	māaal-á
2nd sg.*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	lέɛɛŋ	máaaṯ	mǎaal
3rd sg.*	ŋɔ́l-έ	léŋ-έ	cáaam-έ	mʌ́ʌʌl-έ	lέɛɛŋ-έ	máaaṯ-έ	māaal-έ
Subj. Voice	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	lέɛɛŋ	máaaṯ	mǎaal

Tables 6,7 show that the 2nd singular forms do not involve a suffix. However, there is one environment in which a suffix does show up, revealing the pronominal origin of the suffixless 2nd singular form. This happens when the subject-marked verb is followed by the focus marker **à**, associated with the following argument. The data are presented in (39). The sentences in (39a,c,e) show inflectional subject marking in 1st, 2nd, and 3rd singular, respectively. Note that the 2nd singular, in (39c) is marked stem-internally, i.e., without a suffix. When the following destination is marked for focus, the focus marker cliticizes to the preceding verb form. In the 1st and 3rd singular forms (39b,f), this lengthens the suffix vowel, which is also affected in tone, as the focus marker contributes a Low tone target. In the 2nd singular (39d), the addition of this clitic surprisingly leads to the excrescence of a 2nd singular marker **-í**, which integrates with the focus marker in the same way as in 1st and 3rd singular: overriding the vowel quality of the focus marker, and combining with its tonal specification, that is, High plus Low yielding a High Fall.

(39) a. **kùl à   māaal-á   gʌ̀ʌt**
          Kul FOC praise:FUG:NT:1S riverbank
          'I go to the river to praise <u>Kul</u>.'

      b. **kùl mǎaal-ɛ́a   gʌ̀ʌt**
          /**kùl mǎaal-á=à   gʌ̀ʌt**/
          Kul praise:FUG:NT-1S=FOC riverbank
          'I go <u>to the river</u> to praise Kul.'

c. **kùl à**   **mǎaal**   **gàʌt**
Kul FOC praise:FUG:NT:2S riverbank
'You go to the river to praise <u>Kul</u>.'

d. **kùl mǎaal-íı**   **gàʌt**
/**kùl mǎaal-í = à**   **gàʌt**/
Kul praise:FUG:NT-2S = FOC riverbank
'You go <u>to the river</u> to praise Kul.'

e. **kùl à**   **māaal-ɛ́**   **gàʌt**
Kul FOC praise:FUG:NT:3S riverbank
'He goes to the river to praise <u>Kul</u>.'

f. **kùl mǎaal-ɛ́ɛ**   **gàʌt**
/**kùl mǎaal-ɛ́ = à**   **gàʌt**/
Kul praise:FUG:NT-3S = FOC riverbank
'He goes <u>to the river</u> to praise Kul.'

It is worthwhile to note that while the focus marker in (39b,d,f) is functionally associated with the constituent to the right, the destination, it integrates phonologically with the constituent to the left, the verb. This phenomenon is widespread across the world's languages (Himmelmann 2014). Another point of interest is the fact that the focus marker is Low-toned in (39b,d,f), whereas it is toneless and copies the final tone target of the stem syllable of the verb when the verb is not inflectionally marked for subject (cf. Section 3.1.1). In this respect, inflectional subject marking is not fully integrated within the verb stem.

As a final point, we note a complication, in that inflectional subject marking involves the stem form observed with the Past tense prefix in certain situations where one would expect to find the stem form of the No Tense and Future levels of TAM. Consider the verb {ŋâap} 'hang', which belongs to the Long Low Fall class. In the centrifugal derivation, the forms inflected for a 3rd singular subject are **á-ŋâaap-ɛ́** for the Past, **ŋáaap-ɛ́** for the No Tense, and **ó-ŋáaap-ɛ́** for the Future (cf Tables 6,7). Note, however, the situation in illustration (40), which is drawn from a narrative. Given that there is no tense-marking prefix, one would expect to find the verb form to be **ŋáaap-ɛ́**, i.e., the No Tense form. A comparable example can be found in (14).

(40)ˆ **ù**   **gɔ̀**   **ɲí**   **ŋâaap-ɛ́**   **ríı**   **gâaar-ɔ̀** **kì** **dī**   **pâac**
CONJ OBL.3S HAB hang:FUG-3S REFL holder-S PRP middle village
'And he hangs it onto the wooden stand in the middle of the village.'
[AcangVillage 236.5-238.5]

The issue here is that conjunctions **ù** and **kɛ́ɛ̄** interact with the form of the verb. In clauses headed by subject-marked verb forms, these conjunctions go with verb forms that have the same stem form as in the Past tense, but without the prefix **á-**. This is not specific to the associated-motion derivations; it is the same in the base paradigm (see Chapter 1, page 63). The difference is illustrated further by the elicited examples in (41), where we leave out the habitual marker **ɲí** as it is irrelevant. The sentence in (41a) displays the

No Tense form. In the absence of a TAM-prefix, this clause requires syntactic licensing, which is fulfilled by the focus marker on the P in the preverbal slot. The sentence in (41b) has the conjunction **k�áā**, which just like **ʊ̀** goes with the same stem form of the verb under subject marking as the past tense. It does not require focus marking, indicating that **kɁáā** fulfills the requirement for clauses whose verbs does not carry a TAM prefix to be syntactically licensed (see Section 6 in Chapter 1). Crucially, the verb in (41b) does not display the stem form of the No Tense form, but the one of the Past tense.

(41) a. **gɔ̀n   à   *ŋâaap-ɛ́ / ŋáaap-ɛ́ ríɪ   gâaar-ɔ̀**
     OBL.3S FOC hang:FUG:NT-3S   REFL stand-S
     'He hangs <u>it</u> onto the wooden stand.'

   b. **kɁáā gɔ̀   ŋâaap-ɛ́ / *ŋáaap-ɛ́ ríɪ   gâaar-ɔ̀**
     CONJ OBL.3S hang:FUG-3S   REFL stand-S
     'Then he hangs it onto the wooden stand.'

3.1.3.2 Syntactic subject marking

As explained in the introduction to Section 3.1.3, if the pronominal subject marker is plural, or if the pronominal subject marker is marked for focus, then subject marking is syntactic in nature. Here the verb stem is either identical or very similar to the Subject voice form of the verb, and the verb is followed by the case-marked personal pronoun. Illustration (42) contrasts a clause with syntactic subject marking (42a) with a clause headed by a verb in Subject voice (42b). Note that the verb form is the same, and the presence vs. absence of case marking on the personal pronoun following the verb is critical to the difference in syntactic alignment: with nominative case marking on the pronoun following the verb, the preverbal argument is interpreted as P (42a); without it, the preverbal constituent is interpreted as A (42b).

(42) a. **ábác á-màaal   gên**   b. **ábác á-màaal   gén**
     Abac PST-praise:FUG PR.3P:NOM   Abac PST-praise:FUG PR.3P
     'They went to praise Abac.'   'Abac went to praise <u>them</u>.'

An alternative analysis of forms like **á-màaal gên** is that the pronominal element is phonologically integrated with the verb, i.e., **á-màaal-gên**. This analysis can be rejected on the basis of evidence from focus marking. The focus marker **a** can intervene between the verb and the pronominal plural A (43a), just as it does between the verb and pronominal plural P (43b). Because the focus marker follows the verb, any pronoun following the focus marker is therefore also not part of the verb.

(43) a. **ábác á-màaal   a   gên**
🔊 Abac PST-praise:FUG FOC PR.3P:NOM
‘<u>They</u> went to praise Abac.’

b. **ábác á-màaal   a   gén**
🔊 Abac PST-praise:FUG:SV FOC PR.3P
‘Abac went to praise <u>them</u>.’

The full set of pronouns, with and without nominative case marking, is presented in Table 8. Case-marking is purely tonal. The case-marked forms have a Low Fall, apart from the 1st plural inclusive, which has a Mid or a Low Fall. In any other context, all of the pronouns are High-toned.

Table 8: The Shilluk personal pronouns, with and without nominative case marking.

	Without case marking	With nominative case marking
1st sg.	ján	jân
2nd sg.	jín	jîn
3rd sg.	ɛ́n	ɛ̂n
1st pl. incl.	wáa	wâa, wāa
1st pl. excl.	wɔ̀n	wɔ̂n
2nd pl.	wún	wûn
3rd pl.	gén	gên

As explained in Section 3.1.1, the Subject voice forms differ between Past and Non-Evidential Past on the one hand and No Tense and Future tense on the other (Table 3). With syntactic subject marking, the forms are largely but not completely the same as in Subject voice. Specifically, in Past tense and in Non-Evidential Past there is no difference at all between the Subject voice form and corresponding form with syntactic subject marking. This is illustrated for the Past tense in (42,43) above, and in relation to the Non-Evidential Past in (44). This illustration shows syntactic subject marking in (44a), and the corresponding Subject voice form in (44b). There is no inflectional subject marking in the Non-Evidential Past, i.e., subject marking is syntactic with or without focus marking.

(44) a. **ábác màaal   ên   gàʌt**
🔊 Abac praise:FUG:NEVP PR.3S:NOM riverbank
‘He/she apparently went to the riverbank to praise Abac.’

b. **ábác à   màaal   ɛ́n   gàʌt**
🔊 Abac FOC praise:FUG:NEVP PR.3S riverbank
‘<u>Abac</u> apparently went to the riverbank praise to him/her.’

The construction in (44a) is also noteworthy in that there is no syntactic licenser, which is required in most contexts if the verb does not carry a TAM prefix. This state of affairs mirrors the situation in the base paradigm. There as well, the combination of Non-Evidential Past with syntactic subject marking does not require syntactic licensing (see Section 6 in Chapter 1).

However, whereas the syntactically subject-marked Past and Non Evidential Past forms are identical to the corresponding Subject voice forms, the syntactically subject-marked No Tense and Future tense forms are not. In the Subject voice No Tense and Future tense forms, classes other than High Fall class have the High tone on the stem, and the High Fall verbs have the High Rise. With syntactic subject marking in No Tense and Future tense, in contrast, classes other than High Fall class have the High Fall to Mid, and the High Fall verbs have the Mid. The forms are contrasted in Table 9. At issue is the end target of the tonal specification on the stem syllable. The Subject voice forms all end in a high target, i.e., they have either a High Rise (High Fall class) or a High (other classes); the corresponding forms with syntactic subject marking all end in a Mid tone, i.e., they have either Mid or High Fall to Mid, respectively.

Table 9: Subject voice (SV) vs. Syntactic subject marking (SSM), in the No Tense and Future forms of the centrifugal / general associated motion derivation, by verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṯ} 'drink', and {mʌ́al} 'praise'.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
NT, SV	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṯ	mǎaal
NT, SSM	ŋɔ́l̄	lɛ́ŋ̄	cáaam̄	mʌ́ʌʌl̄	lɛ́ɛɛŋ̄	máaaṯ	māaal
Fut, SV	ó-ŋɔ́l	ó-léŋ	ó-cáaam	ó-mʌ́ʌʌl	ó-léɛɛŋ	ó-máaaṯ	ó-mǎaal
Fut, SSM	ó-ŋɔ́l̄	ó-lɛ́ŋ̄	ó-cáaam̄	ó-mʌ́ʌʌl̄	ó-lɛ́ɛɛŋ̄	ó-máaaṯ	ó-māaal

This difference is illustrated below using full-sentence examples, for the High Fall class in (45,46), and for the other classes in (47). Illustration (45) contrasts syntactic subject marking (45a) with Subject voice (45b). In (45a), the A argument is the 1st plural inclusive pronoun, marked for nominative case through the Low Fall tone. The sound example in (45a) displays level pitch from the verb stem to this pronoun. In (45b), the Subject voice verb stem is equally followed by a Low Fall, now on a noun, but here the sound example displays rising pitch on the verb stem. In this way, the sound

examples present evidence showing that, in Future tense, the stem form of the verb with syntactic subject marking is not the same as the stem form of the corresponding Subject voice.

(45) a. **ábác ó-māaal   wâa**
          Abac FUT-praise:FUG PR.1P.INC:NOM
          'We will go to praise Abac.'

      b. **ábác ó-mǎaal   pâac**
          Abac FUT-praise:FUG village
          'Abac will go to praise the village.'

The difference is clearer still when the verb is followed by a focus marker, as in (46). This illustration presents the same sentences as in (45), except for the addition of the focus marker **a**. In this position, the focus marker is toneless,[15] and the final tone target of the preceding verb stem spreads onto it. The sound examples shows that, in the subject-marked clause (46a), the pitch of this **a** is at the same level as that of the preceding stem, i.e., [ā], whereas in the Subject voice construction (46b) it is higher than the verb stem, i.e., [á].

(46) a. [**ábác ó-māaal   ā   wâa**]
          ábác ó-māaal   a   wâa
          Abac FUT-praise:FUG FOC PR.1P.INC:NOM
          '<u>We</u> will go praise Abac.'

      b. [**ábác ó-mǎaal   á   pâac**]
          ábác ó-mǎaal   a   pâac
          Abac FUT-praise:FUG FOC village
          'Abac will go praise the village.'

The same point is illustrated in (47) for other verb classes. The verb {lèɛŋ 'throw' belongs to the Long Low class. The verbs are in Future tense, and, as in (45,46), the surrounding words are matched for tonal specification. In (47a), where there is subject marking, the pitch goes down over the verb stem. In conrast, in (47b), where the verb is in Subject voice, pitch is high level on the verb stem. The examples in (47c,d) show the same phenomena clearer still, as the focus marker **a** copies the end target of the tonal specification of the verb, yielding [ā] in (47c) but [á] in (47d).

(47) a. **bjél ó-lɛ́ɛɛŋ   wâa**
          grain FUT-throw:FUG PR.1P.INC:NOM
          'We will throw the grain away.'

      b. **twɔ́ɔŋ ó-lɛ́ɛɛŋ   pât**
          Twong FUT-throw:FUG spoons
          'Twong will throw <u>the porridge</u> away.'

      c. [**bjél ó-lɛ́ɛɛŋ   ā   wâa**]
          bjél ó-lɛ́ɛɛŋ   a   wâa
          grain FUT-throw:FUG FOC PR.1P.INC:NOM
          '<u>We</u> will throw the grain away.'

15 The focus marker is Low toned **à** in most environments. It is toneless only when it follows immediately after a verb stem that is not inflectionally marked for subject.

    d.   [**twɔ́ɔŋ ú-léɛɛŋ**   **á**   **pʌ̂t**]
        twɔ́ɔŋ ú-léɛɛŋ   **a**   **pʌ̂t**
        Twong FUT-throw:FUG FOC spoons
        'Twong will throw <u>the spoons</u> away.'

3.1.4 Subject-marked with applicative voice

In this section, we describe subject marking when the syntactic alignment is applicative, i.e., with the preverbal slot filled by an argument other than being A or P. Just as with subject marking with Object voice, A is expressed either as a bound pronoun, i.e., inflectionally (Section 3.1.4.1), or as a case-marked full-form pronoun that is separable from the verb, i.e., syntactically (Section 3.1.4.2). P is obligatorily expressed following the pronominal subject. As for the destination, its expression as a core argument is optional, as is mostly the case when the verb is in an associated motion derivation.[16]

3.1.4.1 Inflectional subject marking

Just as is the case in relation to subject marking with Object voice (Section 3.1.3), inflectional subject marking with Applicative voice is available only if a) the subject is 1st, 2nd and 3rd singular, and b) the pronominal element is not marked for focus. Its use is illustrated by the full-sentence examples in (48). As seen from these examples, the stem form is the same for Past tense (48a), No Tense (48b),[17] and Future (48c).

(48)   a. **gîn-ání**   **á-léɛɛŋ-á**   **lɔ̀ʊ̪t gʌ̀ʌt**
            thing:CS-DEF PST-throw:FUG:XV-1S stick riverbank
            'I used the thing to throw the stick to the river bank.'

        b. **gîn-ání**   **à**   **léɛɛŋ-á**   **lɔ̀ʊ̪t gʌ̀ʌt**
            thing:CS-DEF FOC throw:FUG:XV-1S stick riverbank
            'I am using <u>the thing</u> to throw the stick to the river bank.'

        c. **gîn-ání**   **ú-léɛɛŋ-á**   **lɔ̀ʊ̪t gʌ̀ʌt**
            thing:CS-DEF FUT-throw:FUG:XV-1S stick riverbank
            'I will use the thing to throw the stick to the river bank.'

Table 10 lays out the subject-marked Applicative voice forms in the Past tense. Just as in the Object / Applicative voice, i.e., when there is no subject marking, the Past, Future, No Tense, Sequential Past, and Conditional levels of TAM differ only in terms of the prefix: there is no prefix in the No Tense form,

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16 Except for when the verb is in the Imperfective (see Section 3.1.2).

17 The No Tense form requires syntactic licensing.

á- in the case of Past, **ó-** in the case of Future, **à-** in the case of Sequential Past, and **ò-** in the case of Conditional. In the No Tense and Future tense, the verb forms are identical to the corresponding subject-marked Object voice forms. It is only in the Past tense, with the prefix **á-,** that the inflectional forms for subject marking with Object voice and subject marking with Applicative voice differ from one another.[18]

Table 10. Subject marking with Applicative voice in Past tense, by verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {m̂l} 'roast', {lɛ̀ɛŋ} 'throw', {mâaʈ} 'drink', and {mɛ́al} 'praise'. The Applicative voice form is included for the sake of comparison.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.	á-ŋɔ́l-á	á-léŋ-á	á-cáaam-á	á-mʌ́ʌʌl-ɛ́	á-lɛ́ɛɛŋ-á	á-máaaʈ-á	á-māaal-á
2nd sg.	á-ŋɔ́l	á-léŋ	á-cáaam	á-mʌ́ʌʌl	á-lɛ́ɛɛŋ	á-máaaʈ	á-mǎaal
3rd sg.	á-ŋɔ́l-ɛ́	á-léŋ-ɛ́	á-cáaam-ɛ́	á-mʌ́ʌʌl-á	á-lɛ́ɛɛŋ-ɛ́	á-máaaʈ-ɛ́	á-māaal-ɛ́
Applic Voice	á-ŋɔ̂l̀	á-léŋ̀	á-cáaam̀	á-mʌ́ʌʌl̀	á-lɛ́ɛɛŋ̀	á-máaaʈ̀	á-mâaal

As seen from Table 10, the High Fall class stands out. These forms have a Mid or a High Rise on the stem. This is illustrated for the 1st and 2nd singular using the full-sentence examples in (49). The High Rise in the 2nd singular (49b) can be interpreted in compositional terms, as the outcome of the Mid and the High tone, which can be observed on separate syllables in the 1st singular (49a).

(49) a. **gîn   à   māaal-á   kùl gʌ̀ʌt**
          thing:CS:DEM FOC praise:FUG:XV-1S Kul riverbank
          'I am using <u>this thing</u> to go to the riverbank to praise Kul.'

    b. **gîn   à   mǎaal   kùl gʌ̀ʌt**
          thing:CS:DEM FOC praise:FUG:XV:2S Kul riverbank
          'You are using <u>this thing</u> to go to the riverbank to praise Kul.'

3.1.4.2 Syntactic subject marking
Syntactic subject marking involves the full form of the personal pronoun, case-marked through tone (cf. Section 3.1.3.2). It is used if the pronominal

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18 As for the Sequential Past and the Conditional, these levels of TAM are not available for subject marking with Object voice.

subject marker is a) plural, or b) singular and at the same time separated from the verb by the focus marker. The same stem form is used in Past, Future, No Tense, Sequential Past, and Conditional. This is illustrated in (50) for {lɛ̀ɛŋ} 'throw' using Past (50a), No Tense (50b) and Future (50c).[19]

(50) a. **gîn-ání á-lɛ́ɛɛ�at wâa lʊ̀ʊt̪ gʌʌt**
thing:CS-DEF PST-throw:FUG:XV PR.1P.INC:NOM stick riverbank
'We used the thing to throw the stick to the river bank.'

 b. **gîn-ání lɛ́ɛɛŋ wâa lʊ̀ʊt̪ gʌ̀ʌt**
thing:CS-DEF throw:FUG:XV PR.1P.INC:NOM stick riverbank
'We are using the thing to throw the stick to the river bank.'

 c. **gîn-ání ʊ́-lɛ́ɛɛŋ wâa lʊ̀ʊt̪ gʌʌt**
thing:CS-DEF FUT-throw:FUG:XV PR.1P.INC:NOM stick riverbank
'We will use the thing to throw the stick to the river bank.'

The stem form is not the same as in the Object / Applicative voice. This Object / Applicative voice form is shown in (51) below for the sake of comparison. Note that it has a Late Fall, whereas the stem of the corresponding syntactically subject-marked Applicative voice form has a High Fall to Mid.

(51) **gîn-ání á-lɛ́ɛɛ̀ŋ lʊ̀ʊt̪ gʌʌt**
thing:CS-DEF PST-praise:FUG:OXV stick riverbank
'Smb. used the thing to throw the stick to the river bank.'

As elsewhere, the interpretation that this pattern of subject marking is syntactic rather than inflectional is motivated by the fact that subject-pronominal element can be separated from the verb by the focus marker. This is shown in (52), which is to be compared with (50a) above, to which it is identical but for the addition of the focus marker.

(52) **gîn-ání á-lɛ́ɛɛŋ a wâa lʊ̀ʊt̪ gʌʌt**
thing:CSDEF PST-throw:FUG:XV FOC PR.1P.INC:NOM stick riverbank
'We used the thing to throw the stick to the river bank.'

Table 11 shows the stem form that is used in Applicative subject marking, in the No Tense level of TAM. The Non-Evidential Past aside, other levels of TAM are identical, but with a prefix: **á-** in the case of Past, **ʊ́-** in the case of Future, **à-** in the case of Sequential Past, and **ʊ̀-** in the case of Conditional.

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19 Unexpectedly, the No Tense form does not require syntactic licensing in this sentence. A possible explanation is that the event is interpreted as having habitual or continuing aspect (cf. Section 6 of Chapter 1).

Table 11. The Applicative voice forms, with syntactic subject marking, in No Tense. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṯ} 'drink', and {mɑ̂ɑl} 'praise'. The Object / Applicative voice form is included for the sake of comparison.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Applic Voice, subj. marked NT	ŋɔ́l̄	lɛ́ŋ	cɑ́aam̄	mʌ́ʌʌl̄	lɛ́ɛɛŋ	mɑ́aaṯ	māaal
Obj/Appl Voice	ŋɔ́l̀	lɛ́ŋ̀	cɑ́aam̀	mʌ́ʌʌl̀	lɛ́ɛɛŋ̀	mɑ́aaṯ̀	mâaal

In the Non-Evidential Past, there only is syntactic subject marking, even in the singular without focus marking. The specification for tone is different here: it is the same as in Subject voice. This is illustrated in (53), which contrasts the subject marked applicative forms in Non-Evidential Past (53a) vs. No Tense (53b). Note that, in the sound example linked to (53a), there is a salient fall in melody over the verb form **lêɛɛŋ**, after which the melody on **wâa** is more level. In (53b), in contrast, the melody on **lɛ́ɛɛŋ** displays a shallower drop, after which there follows a more pronounced drop on **wâa**, from mid to low. Finally, (53c) illustrates the fact that in the Non-Evidential Past, there is no inflectional subject marking: the same syntactic construction is used when the pronominal subject marker is singular.

(53) a. **gîn-ání lêɛɛŋ wâa l�òʋṯ**
thing:CS-DEF throw:FUG:XV:NEVP FOC PR.1P.INC:NOM stick
'We allegedly used this thing to throw the stick away.'

b. **gîn-ání lɛ́ɛɛŋ wâa lòʋṯ**
thing:CS-DEF throw:FUG:XV:NT PR.1P.INC:NOM stick
'We use this thing to throw the stick away.'

c. **gîn-ání lêɛɛŋ jân lòʋṯ**
thing:CS-DEF throw:FUG:XV:NEVP PR.1S:NOM stick
'I allegedly used this thing to throw the stick away.'

Only one verb class stands out in syntactic subject marking with Applicative voice, just as elsewhere in the centrifugal derivation: the High Fall verbs. In TAM forms other than the Non-Evidential Past, there is a Mid tone, which is again different from the specification in Object / Applicative voice. This is shown in (54a), which displays the No Tense form. In the Non-Evidential Past (54b), the stem form is identical to the Subject voice form.

(54)   a.   **gîn-ání   māaal   a   gên   kùl**
       thing:CS-DEF praise:FUG:XV:NT FOC PR.3P:NOM Kul
       'They are using the thing to go praise Kul.'

       b.   **gîn-ání   màaal   gên   kùl**
       thing:CS-DEF praise:FUG:XV:NEVP PR.3P:NOM Kul
       'They allegedly used the thing to go praise Kul.'

3.1.5 Infinitive nominalisation

The centrifugal / general associated motion derivation also includes an infinitive nominalization. It is comparable with the patient-oriented infinitive nominalization of the base paradigm, in the sense that, when used in a possessive construction, the possessor term corresponds to the P argument of the source verb, which typically expresses the patient (cf. Section 7.6 in Chapter 1). For example, **mʌ̂ʌʌ̪-ɪ̀ ábác** unambiguously refers to the event 'going to greet Abac', i.e., with the possessor **ábác** representing P of the event; it cannot mean 'going to greet by Abac', where **ábác** is the A of the event. An example from a narrative is given in (55). The verb {òr} is Fixed Short, hence it does not lengthen morphologically in the associated motion derivations. The infinitive nominalization has a Low Fall. The fact that this derivation is at issue is supported by the presence of **jìi**, which marks animate destinations (cf. Section 2.3).

(55)ˆ   **ʊ̀   wɔ́   á-cɛ́k   kɪ́=à   ôr   jìi-īi ɪ̀ mɛ́j-wɔ́n**
       CONJ PR1P.EXC PST-AUX:OV PRP=FOC send:FUG:INF AD-2S PRP mother-1P.EXC
       'And our mother has sent us to you.' [RatAndCat 34.7-36.9]

Table 12 illustrates the forms in the infinitive nominalization by verb class. This nominalisation displays the long grade of the stem, and the same specification for tone as in Non-Evidential Past forms, i.e., Low in the case of the High Fall verb, and Low Fall for members of other classes. The only difference is that it has a suffix **-ɔ**, which the Non-Evidential Past does not. However, this suffix is absent when the verb is followed by a core argument, as in (55).

Table 12. The infinitive nominalisation. Each class is represented by one verb. The Subject voice Non-Evidential Past form is included for the sake of comparison. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mɛ́al} 'praise'.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Inf. nom.	ŋɔ̀l-ɔ̀	lêŋ-ɔ̀	câaam-ɔ̀	mʌ̂ʌʌl-ɔ̀	lêɛɛŋ-ɔ̀	mâaaṭ-ɔ̀	màaal-ɔ̀
SV, NEVP	ŋɔ̀l	lêŋ	câaam	mʌ̂ʌʌl	lêɛɛŋ	mâaaṭ	màaal

This infinitive nominalisation end in **-ɔ**, which is only found on singulars. Non-derived nouns ending in **-ɔ** invariably have the short grade of the stem vowel in the inflected forms. That is, the vowel in the inflected forms is either short or long (cf. Section 3.2 in Chapter 2). This is illustrated in (56a), which shows the base form and the pertensive of such a noun. Note that the overlong vowel in the base form (**bɔ̀ɔɔṭ-ɔ̀**) alternates with the long vowel in the pertensive (**bɔ̀ɔṭ-ì**). The same length alternation is found in the patient-oriented infinitive nominalisation of the base paradigm, illustrated in (56b). In contrast, the infinitive nominalisation of the centrifugal / general associated motion derivation has an overlong stem vowel across its inflections, unless the verb is a member of a Fixed Short class[20]. This can be seen in (56c): note that the vowel remains overlong in the pertensive. In summary, if the infinitive nominalization of the centrifugal / general associated motion derivation vowel has an overlong in the base form, then the stem vowel is overlong in all inflections. The examples in (56a) and (56b) show that this sets these nominalisations apart from the infinitive nominalization of the base paradigm and also from regular suffixed nouns.

(56) a. **bɔ̀ɔɔṭ-ɔ̀**
          craftsman-S
          'Craftsman.'

      b. **bɔ̀ɔṭ-ì   pâac**
          craftsman-PRT village
          'Craftsman of the village.'

      c. **lèɛŋ-ɔ̀**
          throw-INF
          'Throwing.'

      d. **lèɛŋ-ì   lòʊṭ**
          throw:INF-PRT stick
          'Throwing of the stick.'

      e. **lêɛɛŋ-ɔ̀**
          throw:FUG-INF
          'Throwing away.'

      f. **lêɛɛŋ-ì   lòʊṭ**
          throw:FUG:INF-PRT stick
          'Throwing away of the stick.'

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20 The system of verb classes of transitive verbs in described in Section 2 of Chapter 1.

3.2 The centripetal paradigm

The centripetal derivation is only available if the root vowel of a transitive verb is –ATR, i.e., one of /ɪ,ɛ,a,ɔ,ʊ/ (cf. Section 2.1). In that case, the centrifugal / general associated motion derivation conveys a centrifugal orientation. In terms of the structure of the paradigm, the centripetal derivation presents exactly the same inflections as the centrifugal / general associated motion derivation. That is, it displays inflections for voice, subject marking and TAM, plus an infinitive nominalization. In form, the centripetal derivation differs from the centrifugal derivation exclusively in terms of the stem vowel. In the centripetal derivation, the root vowel changes to +ATR, and if it is short and half-open in vowel height, it additionally raises to become a high vowel. What follows is a description of these two morphophonological processes, i.e., ATR and vowel height.

First, if the vowel is overlong, the centripetal derivation is marked – relative to the corresponding centrifugal form – by a change in the ATR value of the stem vowel. This is shown in Table 13. The verbs displayed here represent each of the five -ATR vowels in the nucleus of the root syllable. Shown are the Object / Applicative voice Past tense forms. Note that they differ only in terms of the ATR value of the stem vowel: /ɪ,ɛ,a,ɔ,ʊ/ change to /i,e,ʌ,o,u/, respectively.

Table 13. Five verbs that display morphological lengthening, in the Object / Applicative voice form of the centrifugal and centripetal derivations.

Root vowel	Centrifugal, OXV Past		Centripetal, OXV Past		Root
/ɪ/	**á-mɪ́ɪɪ̀m**	🔊	**á-míiìm**	🔊	{mîm} 'pierce'
/ʊ/	**á-jʊ́ʊʊ̀t**	🔊	**á-júuùt**	🔊	{jôʊt} 'find'
/ɛ/	**á-pɛ́ɛɛ̀t**	🔊	**á-péeèt**	🔊	{pɛ̀ɛt} 'cut open to dry (re. fish)'
/ɔ/	**á-gɔ́ɔɔ̀c**	🔊	**á-góoòc**	🔊	{gɔ̀ɔc} 'hit'
/a/	**á-máaàk**	🔊	**á-mʌ́ʌʌ̀k**	🔊	{màk} 'catch'

Fixed Short verbs have a short vowel throughout their paradigm. Most of them have a half-open -ATR root vowel, i.e., either /ɛ/ or /ɔ/. For these verbs, the formation of the centripetal involves a raising of vowel height. That is, rather than just a change to +ATR, i.e. from /ɛ/ to /e/ and from /ɔ/ to /o/,

the vowel raises as well, so that short /ɛ/ in centrifugal changes to /i/ in centripetal, and likewise from /ɔ/ to /u/. This is shown in Table 14.

Table 14. Four verbs that are Fixed Short and have a half-open -ATR vowel, in the Object / Applicative voice form of centrifugal and centripetal derivations.

Root vowel	Centrifugal, OXV Past		Centripetal, OXV Past		Root
/ɛ/	**á-léŋ̀**	🔊	**á-líŋ̀**	🔊	{lêŋ} 'drum'
	ŋwéꝁ	🔊	**ŋwíꝁ**	🔊	{ŋwèk} 'carve (into wood)'
/ɔ/	**á-ŋɔ̀l̀**	🔊	**á-ŋúl̀**	🔊	{ŋɔ̀l} 'cut'
	á-lɔ́ɲ̀	🔊	**á-lúɲ̀**	🔊	{lɔ̀ɲ} 'change clothes'

Now we turn to Fixed Short verbs with other –ATR vowels, i.e., the closed vowels /ɪ,ʊ/.[21] We know of no Fixed Short verbs with the vowel /ʊ/. As for Fixed Short roots with /ɪ/, this stem shape is rare. Our lexicographic dataset includes {kɪ̂ɲ} 'shake off', {ŋɪ̀c} 'recognise', {dɪ̀c} 'press', and {twɪ̀c} 'tighten', all four of which present centrifugal and centripetal forms. This is illustrated in Table 15: the stem vowel is /ɪ/ when the verbs conveys centrifugal orientation, and /i/ when it conveys centripetal orientation. Intriguingly, all four of the lexical roots at issue – {kɪ̂ɲ, ŋɪ̀c, dɪ̀c, twɪ̀c} – have a palatal coda, i.e., a place of articulation that is conducive to the raising of the vowel.

Table 15. Two verbs that are Fixed Short and have the root vowel /ɪ/, in the Object / Applicative voice form of centrifugal and centripetal derivations.

Centrifugal, OV Past		Centripetal, OV Past		Root
á-dɪ́ĉ	🔊	**á-díĉ**	🔊	{dɪ̀c} 'press'
á-ŋɪ́ĉ	🔊	**a-ŋíĉ**	🔊	{ŋɪ̀c} 'recognize'

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21 The fifth –ATR vowel, i.e., /a/, is not found in Fixed Short verbs, because verbs with short /a/ root vowel belong to the Short with Grade classes, rather than to Fixed Short classes. Hence a verb like {càm} 'eat' has the stem /caaam/ in the centrifugal (e.g. **á-cáaàm** 'PST-eat:FUG:OV') and the stem /cʌʌʌm/ in the centripetal (e.g. e.g. **á-cʌ́ʌʌm̀** 'PST-eat:PET:OV').

In summary, the centripetal derivation readily yields the +ATR mid-height vowel /e,o/ on overlong vowels, but not on short vowels. This state of affairs can be explained with reference to the Shilluk vowel inventory. Cross-linguistically, a system with 10 monophthong vowels is at the top end of complexity. In Shilluk just as in other such systems, nine vowels are spread along the edge of the vowel space, and the tenth vowel is central (Becker-Kristal 2010:190; Remijsen, Ayoker & Mills 2011:116). The phonetic distance between categories is smallest in the upper half of the vowel space, i.e., /i/ vs. /ɪ/ vs. /e/, and likewise at the back, i.e., /u/ vs. /ʊ/ vs. /o/. Vowel length is an important factor in this context, because greater duration allows the speaker to get further to the periphery of the vowel space, where the differences in vowel quality are more salient. In this context, the lexical distribution of root vowels makes sense, as does the observed interaction between vowel length and morphophonological alternation in vowel quality/ ATR. The half-open +ATR vowels /e,o/ do not occur lexically in Fixed Short transitive roots (while they do in Long roots), and the morphophonological process that would result in these vowels presents additional conditioning, so that they are avoided, through raising to /i,u/, respectively. As for the closed –ATR vowels /ɪ,ʊ/, the latter is only attested in Long classes, and the former is very rare (only with palatal coda). In this context, it is worthwhile to note that when a morphophonological processes would result in /ɪ/ or /ʊ/ on a short vowel, they lower to the corresponding half-open –ATR vowels, /ɛ/ and /ʊ/, respectively. For example, the ambitransitive derivation may shorten the length of the stem vowel. The defective paradigm {ɲìɪɪk} 'move to the side', as in **á-ɲîɪɪk** 'PST-move.to.side:FUG', has ambitransitive **á-ɲèkì** PST-move. to.side:AMB:FUG:' and **á-ɲîɲì** PST-move.to.side:AMB:PET'. A similar pressure on the vowel system as a function of vowel length is in evidence in Dinka, where /ɛ/ and /a/ are not in contrast when the vowel is short, even though they are when the vowel is long or overlong (Andersen 1987).

The pattern of vocalic alternation described here, affecting ATR and additionally vowel height, if the vowel is short, is not limited to the morphological marking of associated motion. In the morphology of transitive verbs, it is also part of the marking of two other derivations: antipassive and benefactive. This is illustrated in (57a-d) for {lèɛŋ} 'throw'. Note how the antipassive (57c) and the benefactive (57d) display the same vocalic alternation as the centripetal (57b): underlying /ɛ/ changes to /e/. And in the case of {lêŋ} 'drum' (57e-h), which is a Fixed Short verb with a half-open

vowel, the antipassive (57g) and the benefactive (57h) additionally raise in vowel height, yielding /i/, again just as in the centripetal (57f).[22]

(57)   a.   **á-lɛ́ɛŋ**
            PST-throw:OV

       b.   **á-léeeǹ**
            PST-throw:PET:OV

       c.   **á-lèeeŋ**
            PST-throw:ATP

       d.   **á-léeŋ-ì**
            PST-throw:BNF:OV

       e.   **á-lɛ́ŋ**
            PST-drum:OV

       f.   **á-líŋ̀**
            PST-drum:PET:OV

       g.   **á-lìŋ**
            PST-drum:ATP

       h.   **á-líŋ-ì**
            PST-drum:BNF:OV

Elsewhere in the grammar, a change from −ATR to +ATR is part of the derivation of verbs from adjectives, a process which additionally involves suffixation and the nasalization of any plosive stem coda. It is illustrated in (58a,b). As seen from (58c,d), here again the change in ATR is accompanied by raising, if the vowel is short.

(58)   a.   **tɛ̂ɛk**   'strong'

       b.   **á-tèeŋ-ì**   'become strong'

       c.   **mɛ̂t**   'sweet'

       d.   **á-mìnì**   'become sweet, happy'

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22 The benefactive and antipassive do diverge in segmental composition from the centripetal in relation to semivowels in complex onsets, whereby an initial consonant is followed by /w/ or /j/. These appear in the centripetal, but not in benefactive and antipassive. Consider e.g. {gwɔ̂k} 'work', which has centripetal **á-gwóooǹ** 'PST-work:PET:OV', but benefactive **á-gook-ì** 'PST-work:PET:OV' and antipassive **á-gòook** 'PST-work:ATP'.

4. Conclusion

The main function of the associated-motion derivations is to convey that the referent event involves motion, of either P or A. These derivations also have a bearing on valency: the destination can be left vague, or it can be expressed, in which case it a core argument. Because the destination is expressed as a core argument, associated motion is a valency-increasing operation in Shilluk.[23] The use of the centrifugal / general associated motion derivations extends in the domain of time, in that it can express inception or telicity.

In terms of the morphological form, the associated motion derivations run parallel to the base paradigm: the same functions of TAM, voice and subject marking are marked evidence in both, albeit with a greater degree of syncretism in the associated motion derivations than in the base paradigm. First, when there is no subject marking, Object voice and Applicative voice are not distinguished in the associated motion derivations. This is shown in Table 16, repeated from Table 2. Note that, in the centrifugal derivation, the verb form **á-cáaam̀** is used when the internal argument is used both with Object voice and with Applicative voice.

Table 16. Overview of the distinct morphological forms for voice and subject marking in the centrifugal derivation, alongside the corresponding forms in the base paradigm. Each morphological form is illustrated by the verb {càm} 'eat', in the Past tense. Subject marking is illustrated by the 1st singular form.

	Subject marking	Subject voice	Object voice	Applicative voice
Base paradigm	No subject marking	á-càm	á-cấm	á-cāaam
	With subject marking		á-càaam-á	á-cāaam-á
Centrifugal	No subject marking	á-câaam	á-cáaam̀	
	With subject marking		á-câaam-á	á-cáaam-á

Second, in the associated motion derivations, the subject-marked forms diverge between subject marking with Object voice and subject marking with Applicative voice in the Past tense only, whereas in the base paradigm, they differ from one another in all TAM levels other than the Non-evidential Past. This is illustrated in Table 17. Note how, in the No Tense form, there is no difference between general and the applicative-voice subject marked forms

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23   Except for the Imperfective, in which case associated motion does not allow for the expression of the destination.

in the centrifugal derivation. In the base paradigm, in contrast, the forms are distinct.

Table 17. Inflectional subject marking for 1st person singular in Past and in No Tense, in the centrifugal / general associated motion derivation, alongside the corresponding forms in the base paradigm. Each morphological form is illustrated by the verb {càm} 'eat'.

	TAM	Object voice	Applicative voice
Base paradigm	Past	á-càaam-á	á-cāaam-á
	No tense	cáaam̀-à	cāaam-á
Centrifugal	Past	á-câaam-á	á-cáaam-á
	No tense	cáaam-á	cáaam-á

Acknowledgements

Abbreviations

The following abbreviations are used in the glosses.

AD	Animate destination	ML	Male offspring
AM	Associated motion (no orientation)	NOMP	Noun predicate
AMB	Ambitransitive	NOM	Nominative
ATP	Antipassive	NEVP	Non-evidential past
AUX	Auxiliary verb	NT	No tense
BNF	Benefactive	OBL	Oblique pronoun
CARD	Cardinal	OV	Object voice
COND	Conditional	OXV	Object / Applic. voice
CONJ	Conjunction	P	Plural
CS	Construct state	PET	Centripetal orientation
DEM	Demonstrative	PR	Personal pronoun
DEF	Definiteness	PRP	Preposition
EXC	Exclusive	PRT	Pertensive
FOC	Focus	PST	Past
FUG	Centrifugal orientation	QUOT	Quotative
FUT	Future	REFL	Reflexive
HAB	Habitual	REL	Relativizer
IDP	Independent pronoun	S	Singular
IMPF	Imperfective	SEQP	Sequential past
INC	Inclusive	SUB	Subordination marker
INF	Infinitive	XV	Applicative voice
INF.A	Agentive infinitive		

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Appendix A. Paradigm tables

Table A.1: The Subject voice forms of the centrifugal / spatial derivation, by TAM and verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', {mɛ́al} 'praise'. TAM levels with * require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Past	á-ŋɔ̂l	á-lêŋ	á-câaam	á-mʌ̂ʌʌl	á-lêɛɛŋ	á-mâaaṭ	á-màaal
NEVP*	ŋɔ̂l	lêŋ	câaam	mʌ̂ʌʌl	lêɛɛŋ	mâaaṭ	màaal
NoTns*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṭ	mǎaal
Future	ú-ŋɔ́l	ú-léŋ	ú-cáaam	ú-mʌ́ʌʌl	ú-léɛɛŋ	ú-máaaṭ	ú-mǎaal

Table A.2: The Object / Applicative voice forms of the centrifugal / spatial derivation, by TAM and verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', {mɛ́al} 'praise'. TAM levels with * require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Past	á-ŋɔ̂Ì	á-léɲ̀	á-cáaaɱ̀	á-mʌ́ʌʌÌ	á-léɛɛɲ̀	á-máaaṭ̀	á-mâaal
NoTns*	ŋɔ̂Ì	léɲ̀	cáaaɱ̀	mʌ́ʌʌÌ	léɛɛɲ̀	máaaṭ̀	mâaal
Future	ú-ŋɔ̂Ì	ú-léɲ̀	ú-cáaaɱ̀	ú-mʌ́ʌʌÌ	ú-léɛɛɲ̀	ú-máaaṭ̀	ú-mâaal
NEVP	ú-ŋɔ̂l-ɔ̀	ú-lêŋ-ɔ̀	ú-câaam-ɔ̀	ú-mʌ̂ʌʌl-ɔ̀	ú-lêɛɛŋ-ɔ̀	ú-mâaaṭ-ɔ̀	ú-màaal-ɔ̀
Impf (OV)	ò-ŋɔ̂l-ɔ̀	ò-lêŋ-ɔ̀	ò-câaam-ɔ̀	ò-mʌ̂ʌʌl-ɔ̀	ò-lêɛɛŋ-ɔ̀	ò-mâaaṭ-ɔ̀	ò-màaal-ɔ̀
Seq. Past	à-ŋɔ̂Ì	à-léɲ̀	à-cáaaɱ̀	à-mʌ́ʌʌÌ	à-léɛɛɲ̀	à-máaaṭ̀	à-mâaal
Conditional	ò-ŋɔ̂Ì	ò-léɲ̀	ò-cáaaɱ̀	ò-mʌ́ʌʌÌ	ò-léɛɛŋ̀	ò-máaaṭ̀	ò-mâaal

Table A.3: Inflectional subject marking with Object voice in the Past tense of the centrifugal / spatial derivation, by verb class and person. The Subject voice is included for the sake of comparison. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mɛ́al} 'praise'.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.	á-ŋɔ̂l-á	á-lêŋ-á	á-câaam-á	á-mʌ̂ʌʌl-á	á-lêɛɛŋ-á	á-mâaaṭ-á	á-màaal-á
2nd sg.	á-ŋɔ̌l	á-lě̂ŋ	á-cǎaam	á-mʌ̌ʌʌl	á-lě̂ɛɛŋ	á-mǎaaṭ	á-mǎaal
3rd sg.	á-ŋɔ̂l-ɛ́	á-lêŋ-ɛ́	á-câaam-ɛ́	á-mʌ̂ʌʌl-ɛ́	á-lêɛɛŋ-ɛ́	á-mâaaṭ-ɛ́	á-màaal-ɛ́
Subj. Voice	á-ŋɔ̂l	á-lêŋ	á-câaam	á-mʌ̂ʌʌl	á-lêɛɛŋ	á-mâaaṭ	á-màaal

Table A.4: Inflectional subject marking with Object voice in the No Tense, by verb class and person. The Subject voice form is included for the sake of comparison. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mʌ́al} 'praise'. The Future tense forms are identical but for the addition of the prefix ó-. The * marks that the forms require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.*	ŋɔ́l-á	léŋ-á	cáaam-á	mʌ̂ʌʌl-á	léɛɛŋ-á	máaaṭ-á	māaal-á
2nd sg.*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṭ	mǎaal
3rd sg.*	ŋɔ́l-ɛ́	léŋ-ɛ́	cáaam-ɛ́	mʌ́ʌʌl-ɛ́	léɛɛŋ-ɛ́	máaaṭ-ɛ́	māaal-ɛ́
Subj. Voice*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṭ	mǎaal

Table A.5: Subject voice (SV) vs. Syntactic subject marking (SSM), in the No Tense form of the centrifugal / spatial paradigm, by verb class. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mʌ́al} 'praise'. The * marks that the forms require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
NT, SV*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṭ	mǎaal
NT, SSM*	ŋɔ̄́l̄	lé̄ŋ̄	cáaam̄	mʌ̂́ʌʌl̄	lé̄ɛɛŋ̄	máaaṭ	māaal

Table A.6. The subject-marked Applicative voice forms, in No Tense. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lèɛŋ} 'throw', {mâaṭ} 'drink', and {mʌ́al} 'praise'. The * marks that the forms require syntactic licensing. Past, Future, Sequential Past, and Conditional are identical but for the addition of prefixes ó-, but they do not require syntactic licensing. The Applicative voice form is included for the sake of comparison.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.*	ŋɔ́l-á	léŋ-á	cáaam-á	mʌ́ʌʌl-ɛ́	léɛɛŋ-á	máaaṭ-á	māaal-á
2nd sg.*	ŋɔ́l	léŋ	cáaam	mʌ́ʌʌl	léɛɛŋ	máaaṭ	mǎaal
3rd sg.*	ŋɔ́l-ɛ́	léŋ-ɛ́	cáaam-ɛ́	mʌ́ʌʌl-á	léɛɛŋ-ɛ́	máaaṭ-ɛ́	māaal-ɛ́
Appl. Voice*	ŋɔ̀l	lé̀ŋ	cáaam̀	mʌ́ʌʌl̀	léɛɛ̀ŋ	máaaṭ̀	mâaal

Table A.7: The Applicative voice forms with syntactic subject marking, in No Tense. Each class is represented by one verb: {ŋɔ̀l} 'cut', {lêŋ} 'drum', {càm} 'eat', {mʌ̂l} 'roast', {lɛ̀ɛŋ} 'throw', {mâaṯ} 'drink', and {mɑ́ɑl} 'praise'. The * marks that the forms require syntactic licensing. The Object / Applicative voice form is included for the sake of comparison.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Appl. v, subj. marked, NT*	ŋɔ́l̄	lɛ́ŋ̄	cáaam̄	mʌ́ʌʌl̄	lɛ́ɛɛŋ	mɑ́aaṯ̄	māaal
Obj/Appl v., NT*	ŋɔ́l̀	lɛ́ŋ̀	cáaam̀	mʌ́ʌʌl̀	lɛ́ɛɛŋ̀	máaaṯ̀	mâaal

Appendix B. Paradigm tables, schematic

The tables in this Appendix parallel those in Appendix A above. They offer a schematic representation of the affixal and stem-internal changes involved in inflectional marking in the spatial / centrifugal paradigm. Overlength is represented ::, and the tones in the stem syllable are represented as follows: L – Low; M – Mid; H – High; HF – High Fall; LF – Low Fall; HFM – High Fall to Mid; LHF – Late High Fall; LR – Low Rise; HR – High Rise.

Table B.1. Schematic representations of the Subject voice forms of the spatial / centrifugal derivation, by TAM and verb class. For each class in each inflection, the table shows affixes, stem tone and morphological lengthening. TAM levels with * require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Past	á- LF	á- LF	á- LF ::	á- LF ::	á- LF ::	á- LF ::	á- L ::
NEvP*	LF	LF	LF ::	LF ::	LF ::	LF ::	L ::
NoTns*	H	H	H ::	H ::	H ::	H ::	HR ::
Future	ó- H ::	ó- H ::	ó- H ::	ó- H ::	ó- H ::	ó- H ::	ó- HR ::

Table B.2. Schematic representations of the Object / Applicative voice forms of the spatial / centrifugal derivation, by TAM (rows), and verb class (columns). For each class in each inflection, the table shows affixes, stem tone and morphological lengthening. TAM levels with * require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
No Tense	LHF	LHF	LHF ::	LHF ::	LHF ::	LHF ::	HF
Past	á- LHF	á- LHF	á- LHF ::	á- LHF ::	á- LHF ::	á- LHF ::	á- LF ::
Future	ó- LHF	ó- LHF	ó- LHF ::	ó- LHF ::	ó- LHF ::	ó- LHF ::	ó- LF ::
Non-Ev. Past	ó- LF -ɔ̀	ó- LF-ɔ̀	ó- LF::-ɔ̀	ó- LF :: -ɔ̀	ó- LF::-ɔ̀	ó- LF :: -ɔ̀	ó- L :: -ɔ́
Imperfective	ʊ̀- LF -ɔ̀	ʊ̀- LF -ɔ̀	ʊ̀- LF::-ɔ̀	ʊ̀- LF :: -ɔ̀	ʊ̀- LF::-ɔ̀	ʊ̀- LF :: -ɔ̀	ʊ̀- L :: -ɔ́
Seq. Past	à- LHF	à- LHF	à- LHF ::	à- LHF ::	à- LHF ::	à- LHF ::	à- LF ::
Conditional	ʊ̀- LHF	ʊ̀- LHF	ʊ̀- LHF ::	ʊ̀- LHF ::	ʊ̀- LHF ::	ʊ̀- LHF ::	ʊ̀- LF ::

Table B.3. Schematic representations of inflectional subject marking in Past tense of the spatial / centrifugal derivation, by person (row) and verb class (columns). The Subject voice form is included for reference.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.	á- LF -á	á- LF -á	á- LF :: -á	á- LF :: -á	á- LF :: -á	á- LF :: -á	á- L :: -á
2nd sg.	á- HR	á- HR	á- HR ::	á- HR ::	á- HR ::	á- HR ::	á- LR
3rd sg.	á- LF -έ	á- LF -έ	á- LF :: -έ	á- LF :: -έ	á- LF :: -έ	á- LF :: -έ	á-L :: -έ
Subj. Voice	á- LF	á- LF	á- LF ::	á- LF ::	á- LF ::	á- LF ::	á- LF :

Table B.4. Schematic representations of inflectional subject marking in the No Tense of the spatial / centrifugal derivation, by person (row) and verb class (columns). The Subject voice form is included for reference. The * marks that the forms require syntactic licensing. The Future tense forms are identical but for the addition of the prefix ú-, but they do not require syntactic licensing.

NO TENSE	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.*	H -á	H -á	H :: -á	H :: -á	H :: -á	H :: -á	M :: -á
2nd sg.*	H	H	H ::	H ::	H ::	H ::	HR ::
3rd sg.*	H -έ	H -έ	H :: -έ	H :: -έ	H :: -έ	H :: -έ	M :: -έ
Subj. v.*	H	H	H ::	H ::	H ::	H ::	HR ::

Table B.5: Schematic representation of Subject voice (SV) vs. Syntactic subject marking (SSM), in the No Tense form of the spatial / centrifugal paradigm, by verb class. The * marks that the forms require syntactic licensing.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
NT, SV*	H	H	H ::	H ::	H ::	H ::	HR ::
NT, SSM*	HFM	HFM	HFM ::	HFM ::	HFM ::	HFM ::	M ::

Table B.6. Schematic representations of the subject-marked Applicative voice forms, in No Tense. The * marks that the forms require syntactic licensing. Past, Future, Sequential Past, and Conditional are identical but for the addition of prefixes (á-, ú-, à-, and ù-, respectively), but they do not require syntactic licensing. The Applicative voice form is included for the sake of comparison.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
1st sg.*	H -á	H -á	H :: -á	H :: -á	H :: -á	H :: -á	M :: -á
2nd sg.*	H	H	H ::	H ::	H ::	H ::	HR ::
3rd sg.*	H -ɛ́	H -ɛ́	H :: -ɛ́	H :: -ɛ́	H :: -ɛ́	H :: -ɛ́	M -ɛ́
Appl. Voice*	LHF	LHF	LHF ::	LHF ::	LHF ::	LHF ::	LF ::

Table B.7: Schematic representations of the Applicative voice forms with syntactic subject marking, in No Tense. The * marks that the forms require syntactic licensing. The Object / Applicative voice form is included for the sake of comparison.

	Fixed Short Low	Fixed Short Fall	Short with Grade Low	Short with Grade Fall	Long Low	Long Low Fall	Long High Fall
Appl. v, subj. marked, NT*	HFM	HFM	HFM ::	HFM ::	HFM ::	HFM ::	M ::
Obj/Appl v., NT*	LHF	LHF	LHF ::	LHF ::	LHF ::	LHF ::	LF ::