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Mind your tones! The role of tonal morphology in Kwa action nominalization

Abstract: In the typology of West African languages, tone has been noted to play crucial grammatical and lexical roles, but its function in word formation has been less systematically explored and remains to be fully understood. Against this backdrop, the present study seeks to examine the form and function of tonal morphology in the formation of action nominals in four Kwa languages spoken in Ghana, namely Akan, Gã, Lɛtɛ, and Esahie, a relatively unexplored language of the Central Tano subgroup. Relying on data from both secondary and primary sources, we argue that tone raising is an important component of Kwa action nominalization, as it is found across different languages and derivational strategies. Specifically, while across the Kwa languages considered, tone raising tends to be an epiphenomenon of phonological conditioning, sometimes tone is the sole component of the nominalization operation or, as in Esahie, it concurs with the affix to the derivation, hence playing a morphological function.

Keywords: Kwa languages, tonal morphology, action nominalization, affixation, synthetic compounding

1. Introduction

Action Nominalizations (ANs)[1] are typically defined as nouns derived from verbs that preserve the event or state meaning denoted by the verbal base. More specifically, as stated by Porzig (1930–31), they are *Namen für Satzinhalte* 'lit., nouns for sentence contents' because they do not only preserve the meaning but also the arguments of the base predicate. ANs are very common in English, which has a rich array of suffixes for their derivation (e.g. *destruct-ion*, *govern-ment*, *dismiss-al*, *accept-ance*, etc.), but their occurrence, far from being limited to English or other Indo-European languages, represents a phenomenon robustly attested cross-linguistically (Koptjevskaja-Tamm 2005). A great deal of infra-linguistic and cross-linguistic variation is found as to the morphosyntactic means of nominalization and their relation to the corresponding sentence, with some

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1 Abbreviations: ᴀɴ(s): Action Nominalization(s); ᴄʟ: Class Marker; ᴅᴇꜰ: Definite marker; ʜ: High tone; ʜᴀʙ: Habitual marker; ɪᴄᴠ: Inherent Complement Verb; ʟ: Low tone; ɴᴍʟᴢ: Nominalizer; ɴᴍʟᴢ$_{inst}$: Instrumental Nominalizer; ᴘʟ: Plural; ᴘʀᴏɢ: Progressive marker; ʀᴇᴅ: Reduplicant; sɢ: Singular; ᴛᴀᴍᴘ: Tense-Aspect-Mood-Polarity; ᴛʙᴜ: Tone Bearing Unit; 1sɢ: First Person Singular.

nominalization constructions displaying more verb-like traits and some others displaying more noun-like traits (Koptjevskaja-Tamm 1993). Also, a single language can make use of various means of nominalization. For instance, English does not only have several suffixes, but also deploys conversion, i.e. zero derivation (e.g., *(to) change > (a) change*), and prosodic means, i.e. stress alternation (e.g., *(to) incrèase > (an) ìncrease*) for the derivation of ANs.

Kwa languages (Niger Congo) are not an exception to this infra- and cross-linguistic variation and different morphological means are deployed for the formation of ANs. Kwa languages are in fact prone to deverbal nominalizations which behave like standard nouns in distribution and inflectional features, and deploy a variety of morphological tools, crucially including affixation, reduplication and compounding (cf. Adams 2001; Ofori 2002; Kambon 2012; Akrofi Ansah 2012a; Appah 2013; Boamah 2016; Campbell 2017; Asante 2018; Broohm 2019a). However, non-segmental strategies also play a pivotal role in these languages, which have a tone (non-stress) based phonological system, and where both tone and processual morphology are deployed in AN construction. In the typology of West African languages, tone has been noted to play crucial grammatical and lexical roles, ranging from tense-aspect-mood-polarity (TAMP) marking to information structure, alignment marking, and the signaling of lexical contrast (cf. Ward 1936; Dolphyne 1988; Akanlig-Pare and Kenstowicz 2003; Akanlig-Pare 2005; Marfo 2005; Schwarz 2009; Genzel and Duah 2015).

Although action nominalization has been fairly described in the Kwa literature (Akan: Obeng 1981; Appah 2005; Adomako 2012; Gã: Korsah 2011; Campbell 2017; Lɛtɛ: Akrofi-Ansah 2012a; Esahie: Broohm 2019a; 2019b), the role of tone in this word-formation operation has yet to receive adequate attention. The present study, therefore, offers a comparative overview of a few Kwa languages, i.e. especially Akan[2] (Central-Tano), Gã (Gã-Dangme), Lɛtɛ (Guan) and Esahie (Central-Tano),[3] and examines the form and function of tonal morphology in the formation of ANs in these languages.[4] We will focus on Esahie, on which very few studies have been conducted thus far, and we will describe the interplay of segmental and prosodic means deployed in AN derivation. Hence, considering that the languages in question still remain relatively under-described, this study, rather than providing a theoretical formalization, offers a panoramic description of AN formation in

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2   We draw examples from all three major dialects of Akan, namely Fante, Akuapim, and Asante.
3   Occasionally, we resort to data from other Kwa languages such as Ewe (Gbe).
4   Following Stewart (1989), we shall collectively refer to all these Kwa languages as *Akanic* languages.

Kwa and the role of tone in this word formation operation. In particular, we aim to show that tone, and specifically tone raising, is a constant derivational means to form ANs across the various Kwa languages considered. Although various cases of tone raising could be explained as an effect of phonological conditioning triggered by a high-toned nominalizing suffix, the morphological role of tone in AN formation is enforced by the investigation of Esahie, which also exhibits tone raising on the last syllable of the base verb, despite the low tone on the nominalizing suffix. Further, cases of zero nominalization also argue in favor of a morphological role of tone: across Kwa, zero derivation is consistently characterized by a tonal change in the base verb, so that nominalization is null at the segmental level, but always marked suprasegmentally.

The paper is organized as follows. In section 2, we start with an overview of AN strategies in Akan, Gã, and Lɛtɛ. The role of tonal morphology in Kwa nominalizations is discussed in section 3. Section 4 focuses on Esahie, whose tonal system and nominalization strategies will be scrutinized. Finally, we will draw conclusions in section 5, by highlighting some general facts that emerge from our contrastive study.

2. Action Nominalization in Kwa

Action nominalization has been given a fair deal of attention in Kwa languages. Indeed, various issues have been discussed in the literature regarding the form and function of ANs from different empirical and theoretical perspectives. Mention could be made of works on Akan (cf. Obeng 1981; Appah [2003] 2005; 2013; 2015; 2017; Adomako 2012; Kambon 2012; Kambon et al. 2015; Kambon et al. 2019), Gã (cf. Adams 2001; Korsah 2011; 2016; Campbell 2017), Ewe (cf. Ofori 2002; Ameka 2006), Lɛtɛ (cf. Akrofi-Ansah 2012a), Lelemi (Boamah 2016), and very recently, Nkami (Asante 2018) and Esahie (Broohm 2019a; 2019b).

It is instructive to note that due to the relative under-description of Kwa languages in general, the focus of most studies has been descriptive rather than theoretical. The goal has primarily been to describe among others the strategies employed in the formation of ANs, the syntactic distribution and the semantic properties of ANs, in the ultimate interest of language documentation. We acknowledge that the present analysis draws inspiration from data and insights from the literature, particularly for Akan (Appah 2005; 2013; Adomako 2012; Kambon 2012), Gã (Korsah 2016; Campbell 2017), and Lɛtɛ (Akrofi Ansah 2009; 2012a).

As to strategies available for the formation of ANs, affixation, reduplication, and compounding constitute the most acknowledged mechanisms (cf. Obeng 1981; Adams 2001; Ofori 2002; Appah 2003; Akrofi Ansah

2012a; Boamah 2016; Asante 2018; Broohm 2019a). For instance, in addition to affixation and compounding, Gã is also noted to employ strategies of "processual" morphology, i.e. vowel lengthening (Campbell 2017).

In recent times, one issue that has been at the forefront of the discussion on action nominalization in Kwa has to do with the relation between compounding and nominalization. Kwa languages, as originally observed by Koptjevaskaja Tamm (1993), deploy a strategy of AN construction that could be defined as "possessive-incorporating": the verb argument structure is realized by means of an (optional) possessive modifier, in the case of the external argument, and a form of incorporation/compounding strategy for the internal argument (as in English *John's/his coffee-making*). Since the realization of the internal argument is often compulsory, this typological characterization of Kwa ANs points to a fascinating interplay between compounding and nominalization, as the former operation invariably feeds into the latter.

Finally, tone also plays a crucial role in AN formation: typically, in the presence of affixation and compounding, there is a change in the tonal melody of the base verb, but interestingly, sometimes, tonal morphology can manifest as the only (non-segmental) strategy of AN in some Kwa languages (Akan: Appah 2005; Adomako 2012; Appah et al. 2017; Lɛtɛ: Akrofi-Ansah 2012a; Gã: Campbell 2017; Esahie: Broohm 2019a; see section 2.2.).

2.1. An overview of AN strategies across Akanic and other Kwa languages

Action nominalization in Kwa typically involves the deverbalization of a verbal stem, but the nominalization operation may take the form of affixation, reduplication, (N-V) compounding and some processual morphology. In comparative terms, affixation is the most productive and cross-linguistically most applicable mechanism for the derivation of ANs in Kwa. In what follows, we provide an overview of how these strategies are employed across these languages.

Affixation. For most Kwa languages, ANs are derived via the attachment of a nominalizing affix to a verbal base. Let us consider the examples from Akan and Gã in Table 1, drawn largely from the literature (Akan: Appah 2003; Adomako 2012; Gã: Campbell 2017).[5]

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5   The examples reported in the table show that ANs may be derived from stative bases, too. In these cases, the nominal preserves the *Aktionsart* characterization of the base. Hence, the term AN should be loosely intended to refer to deverbal nominalizations preserving the eventive or stative meaning of the base predicate.

Tab. 1: Action Nominalization via Affixation.

Language	Dialect[6]	Verbal Base	Action Nominal
Akan		Prefixation	
		bìsà 'ask/consult'	*à-bíꜜsá* '(spiritual) consultation'
	Fante	*kàé* 'remember'	*ǹ-káꜜé* 'remembrance'
	Akuapim	*wú* 'die'	*ò-wú* 'death'
	Asante	*dɔ́* 'weed'	*à-dɔ́* 'act of weeding'
	Asante	*sùrò* 'fear	*è-sùró* 'fear'
			(Appah 2003)
	Asante	*hìá* 'need/want'	*ò-hìá* 'poverty'
	Asante	*táń* 'hate'	*ɔ̀-táꜜń* 'hatred'
	Asante	*pɛ́* 'wish/desire'	*ɔ̀-pɛ́* 'will'
		pàgyà 'lift'	*m̀-pá ꜜgyá* 'upliftment'
		pàtà 'compensate'	*m̀-páꜜtá* 'compensation'
		hyìrà 'bless'	*ǹ-hyìrá* 'blessing'
			(Adomako 2012)
		Suffixation	
	Asante	*yàrè* 'fall sick'	*yàré-ɛ* 'sickness'
	Asante	*sɔ̀rè* 'adore'	*sɔ́rꜜé-ɛ* 'adoration'
	Asante	*fɛ̀rè* 'be shy'	*fɛ́rꜜé-ɛ* 'shyness'
Gã		Prefixation	
		mãlé '(to) lie'	*à-mãlé* '(a) lie'
		Suffixation	
		yè 'eat'	*yé-ꜛhi* 'eating'
		bè '(to) fight'	*bé-ꜛi* '(a) fight'
			(Campbell 2017)
		li 'to mock at someone'	*li-mɔ̃* 'act of mockery'

Processual Morphology. For Gã, in particular, non-property verbs are nominalized by lengthening their final vowel, as illustrated in (1), where the difference between the input verb and the output nominal crucially lies in the length of the terminal vowel.

(1) a. *jù*   'steal'   *jùù*   'act of stealing'
    b. *wɔ*   'sleep'   *wɔɔ*   'act of sleeping'
    c. *jò*   'dance'   *jòò*   'act/style of dancing'   (Campbell 2017: 138)

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6 Note that, for words that have the same form cross-dialectally in Akan, no dialectal information is provided.

However, vowel lengthening as a nominalization operation is not very productive in Kwa.

Reduplication. This strategy is highly productive in the morphological system of Akan (cf. Adomako 2012; Marfo and Osam 2018) and Ewe (cf. Ameka 1999; Ofori 2002). Let us consider the examples in Table 2 adapted from Ofori (2002) and Adomako (2012).

Tab. 2: Action Nominalization via reduplication

Language	Verbal Base	Action Nominal
	Total Reduplication	
Ewe	*xɔ̀* 'redeem'	*xɔ̀~xɔ̀* 'redemption'
	dzò 'fly'	*dzò~dzò* '(act of) flying'
	lɔ̃ 'love'	*lɔ̃~lɔ̃* 'love'
	śi 'to escape'	*śì~śi* 'escape'
	vɔ̃́ 'to be afraid'	*vɔ̀~vɔ̃́* 'fear'
	Partial Reduplication	
	ɓíá 'ask'	*ɓá~ɓíá* 'questioning/question'
	fìà 'mutter'	*fà~fìà* '(act of) muttering'
		(Ofori 2002: 173–179)
Akan (Asante)[7]	*káń* 'read'	*à-kèn~káń* NMLZ-RED-read 'act of reading'
	bám 'embrace'	*à-bèm~bám* NMLZ-RED-embrace '(act of) embracing someone'
		(Adomako 2012: 52)

In Table 2, a verbal root is either partially or totally reduplicated to form an AN. In Ewe, for instance, the nominal *xɔ̀xɔ̀* 'redemption' is formed by reduplicating the verb *xɔ̀* 'redeem'. In Akan too, *abèmbám* '(act of) embracing' is formed from the verb *bám* 'embrace'. The difference between Ewe and Akan is that reduplication alone is enough for nominalization in Ewe, while Akan requires the use of dedicated nominalizers (e.g., the prefix *à-* in Table 2) in addition to reduplication. By implication, while nominalization in Ewe can be viewed as the result of the reduplication operation *per se*, this does not hold for Akan.[8]

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7 See Adomako (2012), Osam et al. (2013), Marfo & Osam (2018) for more on reduplication in Akan.

8 Reduplication involving no affixation in Akan, if any, is a marked case.

Compounding. As noted in section 2, there is an interesting relationship between compounding and nominalization in Kwa. To be precise, compounding operations in Kwa are by default also nominalization operations (Dolphyne 1988; Akrofi Ansah 2012a; Appah 2013; 2015; 2016; Lawer 2017; Broohm 2019a). This is particularly interesting if we consider the nominalization of transitive verbs, which ultimately results in a form of synthetic compounding (see Melloni 2020 for an overview). In the nominalization process, the verb's internal argument becomes the first part of the complex AN synthetic compound (see Koptjevskaja-Tamm 1993 for more on the typology of nominalizations). It appears that the compounding operation is blind to the syntactic category of the input elements. Let us examine the data in Table 3 below.

Tab. 3: Action Nominalization via compounding

Internal structure	Akan (Appah 2016)	Dangme (Lawer 2017)	Lɛtɛ (Akrofi-Ansah 2012a)
	Base VP		
[V+NP]$_{VP}$	*bɔ òsé* make outcry 'jubilate'	*ngɔm yo* receive woman 'marry'	*bùè ń-dámfʋ̀* take PL-friend 'befriend'
	AN Synthetic Compound		
a. [N+V]$_N$ b. [[N+V]+suff]$_N$	*òsé!-bɔ́* outcry-make 'jubilation'	*yo-ngɔm* woman-receive 'marriage'	*ń-dámfʋ̀-bú!é* PL-friend-take 'friendship'

(Broohm 2019a: 239–245)

The first observation to make from Table 3 is, that, notwithstanding the syntactic category of their inputs, their outputs always bear a nominal syntactic category. The second observation involves synthetic compounds of the form [N+V]$_N$ or [[N+V]+suff]$_N$, which instantiate ANs. These compounds have been argued to be derived via a re-ordering of elements within a verb phrase (VP). The compounding (and, by implication, the nominalization) of such phrases may or may not involve overt (segmental) affixes. The Akan synthetic compound *òsé!bɔ́* [outcry-make] 'jubilation', for example, does not involve any overt segmental nominalizing affix. This leads us to introduce the role of tonal morphology in Kwa nominalizations.

3. Tonal morphology in Kwa nominalizations

The last nominalization strategy we deal with involves cases with no overt affixation, often described as *zero-derivation* or *conversion* in the literature on Indo-European languages. However, different from actual cases

of conversion in non-tonal languages, this type of AN is prosodic in that transposition is signaled via tone, a prominent phonological feature of Kwa languages. Hence, rather than attaching a segmental nominalizing affix, this nominalization process relies on the supra-segmental property of tone to derive ANs. Before describing tonal melody in AN formation, section 3.1. will briefly introduce tones in Kwa languages.

3.1. The role of tones in Kwa

In Kwa languages, characterized by the presence of more or less complex tone systems, tone has been noted to play crucial lexical and grammatical roles (cf. Christaller 1933; Boadi 1974; Dolphyne 1988; Dakubu 2002; Marfo 2005; Akrofi- 2003; Schwarz 2009; Frimpong 2009; Obiri-Yeboah 2013; Genzel and Duah 2015; Korsah and Murphy 2019). For the use of tone in signaling lexical and grammatical contrast, consider the following hackneyed Akan examples (Akan has two basic tones: High and Low tones, the former produced with relatively high pitch, the latter with relatively low pitch):

(2) a. *pàpá* 'father'
     b. *pàpà* 'fan'
     c. *pápá* 'good'   (Dolphyne 1988: 52)

In (2), we notice that the form *papa* has three potential meanings, depending on the tone melody it bears. It may be produced with a Low-High melody as in (2a), a Low-Low melody as in (2b), or a High-High melody as in (2c), to encode different meanings. Therefore, the meaning of a phonological word in Kwa languages is not only a function of the sound segments and their sequencing, but also of the pitch patterns associated with them.

Tone can also be used grammatically for TAMP marking. In (3), the difference between the form of the stative verb in habitual or progressive aspect is a matter of tone.

(3) a. *Abɔfra   nó   kòtó   hɔ́   (da   biara)*
         child   DEF   squat.HAB   there day   every
         'The child squats there (everyday).'
     b. *Abɔfra   nó   kòtò   hɔ́*
         child   DEF   squat.PROG there
         'The child is squatting there.'

It is worth noting that the role of tone in TAMP marking in Kwa languages goes beyond signaling the difference between habitual and progressive aspect. Indeed, Dolphyne (1988) contends that in Akan, the grammatical function of tone outweighs the lexical function.

A related issue in Kwa tonology is the question of what phonological unit of a word is the tone-bearing unit (TBU), the mora or the syllable? For Akan, the fact that tone alteration or shift affects the entire syllable and not just a mora has led to a widely accepted view that the syllable, rather than the mora, is the TBU (Stewart 1965; Dolphyne 1988; Abakah 2002; 2005a, 2005b; Kügler 2016).[9] The same holds for many other Kwa languages (Gã: Dakubu 2002; Lɛtɛ: Akrofi-Ansah 2003; 2012b; Esahie: Frimpong 2009; Ewe: Motte 2013; Gua: Obiri-Yeboah 2013; Tutrugbu: Gborsi 2015; Essegbey 2019). Hence, we can safely assume that the syllable is the TBU in the Kwa languages of this study.[10]

Beyond the question of the TBU, another pertinent issue relates to *tone sandhi*.[11] According to Laver (1994: 476), "tone sandhi refers to the allotonic variation in the phonetic realization of tonemes due to contextual effects exercised by neighbouring tonemes." In other words, tones may be altered as a result of their interaction with tones of nearby syllables. Tone sandhi is particularly interesting since Akan, for instance, is a terraced-tone language whose lexical High tones are subject to a lowering process after low tones (Welmers 1959). In terraced-tone languages, this downtrend is triggered in the context of words with a *High-Low-High* (H-L-H) tone sequence. Once there is an underlying /H-L-H/ tonal sequence, its second H tone is realized with a pitch lower than that of the first H tone. This has been termed *downstepping*. We may further distinguish between *automatic downstepping* (downdrift) where the L tone trigger is overt, and *non-automatic downstepping,* where the L tone trigger is covert. Either way, downstepped H tones are marked with a superscript exclamation mark (ˈ). Hence, in the Akan word *páˈpá* 'good', the second H tone is (non-automatically) downstepped. Nevertheless, the downstepped H tone is an allotone of the H tone.

3.2. Tonal strategies

Tone Raising (without affixation).   Consider the Akan and Lɛtɛ nominalizations in Table 4: they are derived solely via a prosodic change in the tonal

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9   Syllables in Kwa come in various shapes: they may be open syllables with a (CV, CVV, CVCV, CCV, V) structure, closed syllables with a (CCVC, CVC, VCC) structure, or may simply be a syllabic consonant (typically /m/ and /n/). The nucleus of the syllable is either a vowel or a syllabic consonant. This implies that vowels and syllabic consonants constitute syllables and two adjacent vowels constitute two distinct syllables. As such, they bear the tone (or tone marking) of the syllable.

10 In this paper, all relevant syllabic TBUs are written in bold.

11 Tone sandhi has also been referred to as *tonal assimilation* (see Abakah 2005b).

melody of the input verb. In order to get the bare form of the verb, which is crucial since we are making a case for tonal nominalization, we use the form of the verb in the imperative mood, which is the bare form for most Akanic languages (cf. Boadi 2008; Akrofi Ansah 2009; Agyemang 2016; Abunya 2018; Sakyi 2019).

Tab. 4: Nominalizing role of tone in Kwa languages.

Language	Verbal Base	Corresponding AN
Akan	*dùà* 'cultivate'	*dùá* 'tree/cultivation'
	kàsà 'speak'	*ká'sâ* 'language/speech'
	sòmà 'send'	*sòmá* 'errand'
	sèrèẁ 'laugh'	*sé'réẃ* 'laughter'
	nàǹtsèẁ 'walk'	*náń'tséẃ* 'walking'
		(Appah 2005: 2)
Lεtε	*gyì* 'eat'	*gyí* 'eating'
	wùò 'descend'	*wú'ó* 'act of descending'
	nà 'walk'	*ná* 'act of walking'
		(Akrofi Ansah 2012a: 7)

From Table 4, we notice that, while the verbs bear a L or L-L tone as in the Lεtε examples *nà* 'walk' and *wùò* 'descend', respectively, or a L-L-L-(L) tone as in the Akan example *sèrèẁ* 'laugh', their corresponding ANs, on the other hand, bear either a high tone as in *ná* '*walking*', a H-H tone as in *wú'ó* 'act of descending' or a H-H-H tone as in *sé'réẃ* 'laughter'. The second H in the ANs *wú'ó* 'act of descending' and *sé'réẃ* 'laughter' are both downstepped. This prosodic derivation of ANs, therefore, manifests itself in the form of *tone raising*, where the tone of the final syllable of the verb is raised from low to high. Undoubtedly, there are cases where all the tones of the verb are raised in the AN, with a leftward high tone spread affecting the whole verb stem (as in *sèrèẁ* 'laugh' vs. *sé'réẃ* 'laughter'). However, since this is not ubiquitous, we would restrict ourselves to posit that the tone of *at least* the ultimate syllable of the base, is raised from a low to a high tone, if it is not underlyingly high.[12]

Tone raising + affixation. It is interesting to note that, even with affixed-derived ANs, as earlier discussed, the tone raising operation is still required in addition to the affixation operation. One would have observed that the

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12 Where the final syllable of the verb is underlyingly high, there is no tone raising.

data earlier presented on affixed-derived ANs captures this fact. In what follows (in Table 5), we present data to illustrate this point.

Tab. 5: AN derivation via Affixation + Tone raising

Language	Dialect	Verbal Base	Action Nominal	
Akan			Prefixation	
		bǐsà 'ask/consult'	*à-*	*à-bǐꜜsá* '(spiritual) consultation'
		prà 'sweep'		*à-prá* 'sweeping'
	Asante	*sùrò* 'fear'	*è-*	*è-sùró* 'fear'
		pàgyà 'lift'	*m̀-*	*m̀-páꜜgyá* 'upliftment'
		pàtà 'compensate'		*m̀-páꜜtá* 'compensation'
		hỳìrà 'bless'		*ǹ-hỳìrá* 'blessing'
			Suffixation	
	Asante	*yàrè* 'to fall sick'	*-ɛ́*	*yàré-ꜜɛ́* 'sickness'
	Asante	*sɔ̀rè* 'adore'		*sɔ́ꜜré-ɛ́* 'adoration'
	Asante	*fɛrè* 'to be shy'		*fɛ́ꜜré-ɛ́* 'shyness'
Gã			Suffixation	
		yè 'eat'	*-lǐ*	*yé-lǐ* 'act of eating'

Table 5 shows ANs formed via (derivational) affixation. We observe that, in addition to the affixation operation, tone raising is still required for a well-formed AN. Hence, beyond the attachment of the nominalizing prefix [**n-**] to the Akan verbal base *hỳìrà* 'bless', the tone of the base is changed from a L-L to a L-H sequence to derive the *ǹhỳìrá* 'blessing'. A similar prosodic change is observed in Gã (affixed-derived) *yé-li* 'act of eating', after attachment of the nominalizing suffix [-**lǐ**]. Action nominalization in this case is morpho-prosodic.[13]

   Tone raising + synthetic compounding. The final class of data we examine involves (AN) synthetic compounds. Here too, in addition to the re-ordering of the elements in the base VP, the tone of the verb in the compound is raised along the lines of the pattern discussed earlier.

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13 It is instructive to note that, as far as nominalizer-triggered tone raising is concerned, there is another suffix [-**mɔ**] in Gã, which has a less consistent prosodic behavior, as pointed out to us by an anonymous reviewer. We are grateful to the reviewer for drawing our attention to this. Further research on the properties of this nominalizer in Gã is needed to understand its prosodic pattern.

Tab. 6: AN-derivation via synthetic compounding + tone raising

	Underlying VP	**Action Nominal**
Akan	*bàà~bàè ànó* RED-open mouth 'to engage in verbal exchanges'	*ànò-bààbá꜀é* mouth-RED-open '(act of) verbal exchanges (Appah 2013: 395)
Lɛtɛ	*bùè èsúmì* do work 'work'	*èsúmí-꜀búé* work-do 'act of working' Akrofi-Ansah (2012: 8)
Gã	*yè òmɔ́* eat rice 'eat rice'	*òmɔ́-꜀yé-li* rice-eat-NMLZ '(act of) eating rice' Korsah (2011: 41)

Consider the examples in Table 6. The Akan and Lɛtɛ examples do not involve any kind of overt affixation; instead, the synthetic compound appears to derive from a re-ordering of elements in a VP, in addition to the usual prosodic change (i.e. tone raising). In the Gã example, however, synthetic compounding involves overt suffixation, coupled with tone raising, with the ante-position of the noun stem playing the role of the verb internal argument, as in (standard) synthetic compounding. The crucial difference between Gã, on the one hand, and Akan and Lɛtɛ, on the other hand, is that, in Gã, AN obligatorily requires both overt affixation and tone raising.

In keeping with what has been observed for other African languages such as Edo (Adéníyì 2010) and Tee (Anyanwu and Omego 2005), the data discussed above, presents evidence in support of the argument that tone plays a crucial role in the formation of (deverbal) nominals. The common pattern arising across the languages considered is a regressive high tone spreading, where the ultimate syllable of the verb (or all syllables) anticipates by assimilation the high tone of the nominalizing suffix. It is instructive to point out that a similar tone raising effect has been observed for Nkami (Guan), another Akanic (Kwa) language, where the attachment of a nominalizing prefix results in a raising in the tones of all TBUs in the base (Asante 2018). However, contrary to the directionality of the tone spreading as earlier discussed, Nkami ANs exhibit a progressive high tone spread, since the trigger operator is a prefix. Consequently, in ANs where there is no overt suffix, the high tone could be analyzed as a residue of a deleted syllable (i.e. a derivational suffix) bearing a high tone: this (floating)[14] high tone could hence take the role of a transpositional nominalizing affix in these cases and,

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14 Following Goldsmith (1991), we define 'floating' the tones that are not linked to a vowel/syllable. They are nonetheless associated to the last syllable of the verb in the suffixation operation, where the inherent low tone of the last syllable of the base verb is substituted by the high tone.

arguably, act as the sole means of nominalization. This is illustrated below
with data from Akan.

	Input	Derivation	Output
(4) a.	*yàrè*	*yàrè-έ*	*yàréέ*
	'be sick'	sick-NMLZ	'sickness'
b.	*dùà*	*dùà-ó*	*dùá*
	'cultivate'	cultivate-NMLZ	'cultivation/tree'

On the one hand, as shown in (4a), the attachment of the nominalizing suffix
-*έ* to the base *yàrè* 'be sick' results in the tone raising in the final TBU of the
base, due to a regressive spread of the high tone of the nominalizing suffix -*έ*
in the derivation of the output *yàréέ* 'sickness'. On the other hand, in (4b),
where there is apparently no overt segmental nominalizing suffix to account
for the tone raising effect exhibited in the output *dùá* 'cultivation/tree', we
posit that a floating high tone associated with a (nominalizing) zero morph
is what triggers the tone raising needed to distinguish the verb *dùà* 'culti-
vate' from the noun *dùá* 'cultivation/tree'. As shown in the derivation, the
nominalizing zero suffix, represented as null '*ǿ*' in (4b), bears a (floating)
high tone. Indeed, the possibility for tones to survive even after the loss or
deletion of the segments (i.e. TBUs) they are originally associated with –
technically called *tonal stability*, forms the basis for the influential analysis
of tones as autonomous segments (Goldsmith 1976, 1990).

4. AN in Esahie

This section will be concerned with another Akanic language, Esahie, which
has been fairly unexplored thus far, especially as far as word formation is
concerned. Most of the data reported here were obtained through the elicited
production of 35 language consultants, selected from across various Esahie
speaking communities, while the prosodic analysis was performed with the
speech analysis software Praat.

The illustration of Esahie AN does not only serve a documentation purpose
but is also very relevant for a better understanding of the role of tone in Kwa
AN formation. As shown in the previous sections, tone may be the only formal
marking of nominalization, but in most cases the alteration of the tone pattern
of the base verb can be explained in terms of a leftward assimilation which
anticipates the high tone of the suffix. High tone spread, however, cannot be
the explanation for the tone raising pattern we systematically find in Esahie
ANs, because the nominalizing suffix bears a low tone. Therefore, Esahie data
speaks in favor of a morphological function of tone in nominalization.

The section is organized in two parts: section 4.1. is a short description of
the language and its tonal system, while a comprehensive assessment of AN
is laid out in section 4.2.

4.1. An introduction to the Esahie language and its tonal system

Esahie (ISO 639-3: sfw) is a Kwa (Niger-Congo) language that belongs to the Northern Bia family of the Central-Tano subgroup (Dolphyne and Dakubu 1988) and is mainly spoken in Southern Ghana and parts of the Ivory Coast.

Like Akan, Esahie is a tonal language that distinguishes between two basic contrastive tones: a high tone (relatively high pitch) marked with an acute accent (´), and a low tone (relatively low pitch) marked with a grave accent (`) (cf. Frimpong 2009). Tone in Esahie plays both lexical and grammatical roles. In its lexical role, tone is used phonemically to show differences in meaning between otherwise identical words. For instance, in Esahie, the words *bo* and *gye* have two meanings depending on their tonal melody (see (5) and (6)). Thus, the meaning of a phonological word in Esahie does not only depend on the sound segments, but also on the pitch patterns they are associated with, similar to the Akan examples in (2).

(5) a. *bó* 'beat'
    b. *bò* 'buttocks'
(6) a. *gyé* 'defecate'
    b. *gyè* 'tooth'   (Broohm 2019b: 127)

In its grammatical role, tone in Esahie can be used to signal or alter the tense, aspect, mood, and polarity of verbs. For example, tone can be employed in distinguishing between the habitual aspect and the progressive aspect of Esahie verbs. Esahie habitual form of verbs is marked by a low tone on monosyllabic stems and L-H tone on the first and second syllables in disyllabic stems respectively, as in (7a) illustrating a monosyllabic verb. On the other hand, the progressive form is marked by a high tone for monosyllabic stems and their pronoun, and H-H-H tonal melody on disyllabic stems and their pronouns (Frimpong 2009), as in (7b) (see (3) for a comparison with Akan).

(7) a. *mé-kɔ̀*
        1SG-go.HAB
        'I go'
    b. *mè-búkyé*
        1SG-open.PROG
        'I open'

In addition to these functions, tone also plays a crucial morphemic role in Esahie nominalization.

4.2. AN formation in Esahie

As seen in section 2, Kwa AN formation makes use of segmental and prosodic patterns, and Esahie too exhibits an array of morphological and

tonal strategies in AN formation which, as we shall see, involves affixation and/or compounding, and systematically resorts to tone raising of the last syllable of the base verb. In this section, we will present an overview of the most common means of AN formation, focusing on the role of tone raising and its interplay with affixation and N-V compounding. Lastly, we will argue in favor of some (limited) cases of zero derivation in Esahie ANs.

Affixation. Esahie ANs are derived from monosyllabic and disyllabic roots through affixation. With the affixation strategy, a nominalizing suffix is attached to the verbal base, typically an unergative verb: the suffix [-*lὲ*] appears to be the most regular and productive nominalizing affix in Esahie and comes with three allomorphs [-*lὲ*], [-*rὲ*] and [-*nὲ*]. While [-*rὲ*] occasionally occurs as a free variant of [-*lὲ*], [-*nὲ*] only appears in contexts where the last vowel in the base verb has a nasality feature. Therefore, the distribution of [-*lὲ*]/[*rὲ*] and [-*nὲ*] is phonologically conditioned. This is illustrated below in (8).

(8)
             [-*lὲ*] when the last vowel of the base is oral as in *dwùdwó-lὲ* 'language'
-lὲ   [-*nὲ*] when the last vowel is nasal/nasalized as in *nĩngĩnĩ-nὲ* 'tickling'
             [-*rὲ*] a free allomorph of [-*lὲ*] as in *wònzέ-rὲ* 'pregnancy'

Now, let us proceed to analyze the internal structure and formation of Esahie ANs.

		Input	Output
(9)	a.	*sũ*	*e-sṹ-nὲ*
		cry	SG-cry-NMLZ
			'(act of) crying'
	b.	*gó*	*e-gó-lὲ*
		dance	SG-dance-NMLZ
			'(act of) dancing'
	c.	n*wãfĩ*	n*wãfĩ-nὲ*
		run	run-NMLZ
			'(act of) running'
	d.	*nàtὲ*	*nàté-lὲ*
		walk	walk-NMLZ
			'(act of) walking'

The prefix *e-/ε-* may be also found with ANs, as in example (9a-b). Contrary to what has been proposed for Akan, where the prefix may be the only segmental marker of nominalization (see Table 5), we argue that this prefix is not a derivational prefix but rather functions as a declension marker. Declension markers appear to have a lexically determined distribution in Esahie: they are often null (zero prefixes) but when they are overt they typically take the form of a vowel and only appear at the beginning of the word

in Esahie, which exhibits a residual declension system signaling number concord within the DP (Broohm 2017).

Tone raising. As observed for the other Kwa languages examined in the previous sections, suffixation is concomitant with a conditioned change in the underlying tonal melody of the base verb. The modification in the tonal melody of the disyllabic base verb is shown in the examples (9c–d), where the prosodic change occurs at least in the ultimate syllable of the disyllabic base(s). The change in tonal melody systematically involves tone raising in all those cases where the last syllable is not underlyingly high.

The tone raising pattern is not exceptional across the Kwa languages here considered, but the Esahie data are more challenging. Different from the other Kwa languages considered thus far, where the suffix bears high tone, the underlying tone of the *-lè* nominalizer is low. Therefore, apparently, there is no independent prosodic explanation that could account for the tone raising pattern in Esahie AN formation. Given that this same suffix (with a similar low tone) is found in other Kwa languages such as Nzema and Gã, we speculate that this suffix in Esahie was, possibly, historically borrowed or inherited from other Kwa languages. The historical account is plausible given that Nzema, in particular, is genetically and areally close to Esahie. Under this view, the *-lè* suffix would constitute a sort of pan Proto-Kwa nominalizing operator. Consider the following examples from Nzema and Gã.

Tab. 7: -lè as Proto-Kwa nominalizing operator

Language	Input	Output
Nzema	*wù* 'die'	*ɛ̀-wù-lè* CL-die-NMLZ 'death'
		Ndako (2011: 114)
Gã	*lĭ* 'to mock at someone'	*lĭ-lè* mock-NMLZ 'act of mockery'

Since the hypothesis of the suffix being historically inherited is in need of further corroborating data, we reserve its verification for future research.

To conclude, it is worth observing that this prosodic pattern is specific of AN formation, as it is not found with other cases of nominalization through suffixation. For instance, it is not attested in instrument nominalizations, as in (10), where the L-H tone suffix has no effect on the tonal melody of the base verb.

(10) zà   n-zà-lèέ
     'hang'   PL-hang-NMLZ_inst
                 'a stick used to stake yam plant [so that it climbs around]'

Compounding and zero derivation. As in the other Kwa languages, action nominalization in Esahie is possessive-incorporating, i.e. the verb internal argument of (most) monotransitive eventive verbs is expressed obligatorily through noun incorporation, by which an AN turns up being realized as a synthetic compound (see section 2.1.; Broohm and Melloni, forthcoming). In these cases, indeed, [N-V] compounding is coupled with a segmental strategy of suffixation through [-*lὲ*] or its allomorphs. Crucially, synthetic compounds are characterized by the same tone raising pattern discussed above for unergative verbs, as shown in Table 8.

Tab. 8: Esahie AN-formation: Synthetic compounding + tone raising

Underlying VP	**AN**
bɔ̀ ndìrè	*ndìrὲ-**bɔ́**-lὲ*
hit weeds	weed-hit-NMLZ
'to weed'	'act of weeding'
*sὲ**kyè** dùmàà*	*dùmàà-sὲ**kyé**-lὲ*
destroy name	name-destroy-NMLZ
'to defame'	'(act of) defamation'
dì awùé	*awùé-**lì**-lὲ*
ICV death	death-ICV-NMLZ
'to murder'	'(act of) murder(-ing)'
hyè εhɔ̀èn	*εhɔ̀èn-**hyé**-lὲ*
ICV hunger	hunger-ICV-NMLZ
'to fast'	'(act of) fasting'
bɔ̀ mbáé	*mbáé-**bɔ́**-lὲ*
ICV prayer	prayer-ICV-NMLZ
'to pray'	'(act of) praying/prayer'

With respect to the other Kwa languages, however, Esahie seems to be more consistent as to the morphological and prosodic patterns employed in AN formation. First of all, suffixation is (mostly) necessary in ANs and is realized by [-*lὲ*]; prefixation with [*è*-] only appears in monosyllabic intransitive verbs and with an inflectional value. Also, contrary to Akan and other Kwa languages, zero suffixation/conversion is never attested with intransitive verbs (cf. examples from Akan in Table 4):

(11) a. *wònzὲ*   'to impregnate'   **wònzέ* (N)
     b. *kùrò*   'to love'   **kùró* (N)

However, cases of zero suffixation may be found when the base is a mono-transitive verb, whose object is expressed as the first member of a [N-V]$_N$ compound, as in (12).

		Output Nominal	Input VP	
(12)	a.	*nyame**sóm*** 'God worship'	*sòm*	*nyame*
			worship	God
	b.	*mogya**frá*** 'blood mixing, incest'	*frà*	*mogya*
			mix	blood
	c.	*eyiagỳ**iná*** 'sunshine'	*gỳinà*	*eyia*
			stand	sun
	d.	*nzɛm-bȋ'**sá*** 'questioning/question'	*bȋsà*	*nzɛm*
			ask	matter

Superficially, the complex forms in (12) may appear as exocentric N-V compounds; however, issues of semantics and tonal melody point to the opportunity of analyzing these forms as instances of ANs, more specifi-cally, as synthetic compounds with a zero suffix. First, the meaning of these formations is eventive or stative, depending on the meaning of the base verb; further, like more 'standard' ANs, polysemy and meaning extensions are very frequent. Therefore, the zero-affixed N-V compounds cover the same semantic spaces as those affixed with *-lɛ̀*.[15] Second, even in the absence of *-lɛ̀*, it should be noticed that the N-V compounds in (12) display the same tone raising pattern attested for the (analogous) suffixed forms in Table 8. Therefore, the existence of an overt affix with a similar function and the tonal features of the compounds in (12) support the hypothesis of a zero-suffixation operation. Hence, while in Esahie zero suffixation (or conversion) is impos-sible with nominalization of intransitive verbs, it has limited productivity with monotransitive verbs. Despite their low productivity, the occurrence of synthetic compounds with a zero affix points to the crucial role of tonal morphology in Esahie nominalization: the high tone on the last verb syllable represents a derivational means for the formation of ANs, and demonstrates the role of tonal morphology as a derivational (specifically, transpositional) operation in Esahie, too, as in the other Kwa languages here considered.

5. Conclusion

Far from being an exhaustive assessment of AN formation in Kwa languages, the present study aimed at highlighting some common patterns across the

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15 Like the English *-ing* and other nominalizing affixes, the Esahie nominalizing affix [*-lɛ*] is semantically multifunctional as it derives both eventive and resultative nominals (Grimshaw 1990).

derivational strategies adopted, and at examining the role of tones and tonal morphology, i.e. an issue not systematically investigated thus far, especially from a crosslinguistic perspective.

We wish to conclude our overview by emphasizing some general facts emerging from the empirical observation of several classes of nominalizations. First, AN involves a common pattern of tonal modification across the Kwa languages considered, despite their different genealogical affiliation and the various (segmental) means of word formation attested - including affixation, compounding and reduplication. Second, segmental and non-segmental morphology seem to go hand in hand in these languages: suffixation triggers a modification of the tonal contour of the base verb and this prosodic alteration follows a common pattern, which we have analyzed as a high tone spread (i.e. tonal extension/assimilation by anticipation) from the nominalizing suffix, bearing a high tone, leftward. This pattern is specifically attested in Akan, Gã and Lɛtɛ. However, although possibly being the result of a prosodic effect, tone apparently has a morphological value in AN formation, being in some cases the sole component of the nominalization operation, as proved by the many cases of 'zero derivation' (especially in Akan and Lɛtɛ), whereby nominalization is only marked suprasegmentally, i.e. by the raised tonal melody of the verb. Third, Esahie is arguably the most interesting case among the languages scrutinized: a L-to-H tone raising is systematically found in ANs notwithstanding the low tone borne by the suffix. Crucially, the high tone on the last verb syllable cannot be understood as an epiphenomenon of prosodic conditioning, i.e. the effect of a leftward tone assimilation by anticipation. Instead, we argued that a (floating) high tone, in association with the suffix, plays a morphemic role in the V-to-N transposition. Finally, cases of true conversion in AN are not found across the Kwa languages considered: (overt) affixes can be missing from an AN but some tonal cue is always present and marks the deverbal derivation as nominal.

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Author contribution

This article is the result of the joint work of the co-authors, whose names are listed alphabetically. For academic purposes, OB takes responsibility for sections 2 and 3; CM takes responsibility for sections 1, 4, 5. OB is responsible for the Esahie data collection and conducted the prosodic analysis with the software Praat.

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