(Past) temporal reference in an aspect prominent language[1]

Giuliano ARMENANTE — *University of Potsdam*
Jeanne LECAVELIER — *University of Potsdam*

Abstract. Akan (Kwa, Niger-Congo) deploys three different temporal markers to express pastness: the final vowel lengthening of the verb (LEN), the prefix *a-*, and the particle *ná*. Building on novel fieldwork data, we propose a pronominal analysis for *ná*, viewed as a non-present tense. For *LEN*, we develop a hybrid tense-aspect analysis, with its (past) tense lacking existential closure. By contrast, *a-* denotes a hybrid perfect with a quantificational tense semantics and an underspecified resultative aspect semantics.

Keywords: tense, aspect, Akan.

1. Introduction

This paper provides an in-depth study of how temporal anteriority is encoded in Akan, with a focus on how temporal and event variables enter semantic composition via tense-aspectual markers. At the core of this investigation are three morphemes that convey 'pastness': the sentence particle *ná*, the suffix *LEN* and the prefix *a*. While both *ná* and *LEN* exhibit referential interpretations, these come with a different aspectual profile: imperfective for *ná*, perfective for *LEN*. By contrast, the prefix *a* appears to give rise primarily to resultative readings.

(1) a. **ná** Kofi (re-)di akokɔ.
NA Kofi PROG-eat chicken
With PROG: 'Kofi was eating chicken.'
Without PROG: 'Kofi used to eat chicken.'
b. Kofi di-**ì** akokɔ.
Kofi eat-**LEN** chicken.
'Kofi ate chicken.'
c. Ama **a**-di akokɔ.
Ama **a**-eat chicken
'Ama has eaten chicken.'

Its distribution has led several scholars to characterize *LEN* as a perfective/completive aspect (Osam, 2003, 2008; Lecavelier, 2022), as a past tense (Dolphyne, 1987; Duah and Savić, 2020) or as a hybrid past perfective form (Boadi, 2008). In comparison, *ná* and *a* have only received some sketchy treatment in the literature.

In the remainder of the paper, we will tackle the following questions:

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(i) How does Akan manipulate reference and eventuality times?

(ii) Do tense forms in Akan require a pronominal, quantificational or hybrid analysis?

The paper is structured as follows: In the next section, we offer a concise overview of previous accounts, pointing to a lack of consensus on the status of the three markers and a severe underassessment of their semantic properties. Section 3 presents novel data illustrating the range of interpretations available for each marker. These empirical findings provide the foundation for the formal analysis outlined in section 4. Specifically, we propose that both *ná* and *LEN* denote pronominal tenses. While *ná* functions as a distal deictic tense excluding the utterance time, *LEN* operates as a relative past tense. Beside a different temporal restriction, they further diverge from an aspectual viewpoint: *ná* pairs exclusively with stative/habitual aspect operators, whereas *LEN* additionally spells out a perfective projection. In contrast, *a* allows for a broader range of interpretations, including experiential, resultative and universal readings. We contend that its underlying semantic representation involves an extended now perfect, further combining with either a resultative or a stative viewpoint aspect. Crucially, interpretations arising from resultative viewpoint are semantically underspecified and vary based on the QuD, thus leading to either an experiential or a resultative interpretation. Finally, section 5 concludes with a comprehensive summary of the key findings.

2. Background

In Dolphyne (1987)'s seminal work, the two affixes *a* and *LEN* are classified as perfect aspect and past tense, respectively, with no further characterization. Along the same lines, Duah and Savić (2020) views *LEN* as an aspectually neutral past tense, while *a* locates the event time before the reference time, akin to Reichenbach (1947)'s perfect. Current relevance is first explicitly stated as a meaning component of *a* in Boadi (2008) and Osam (2008). However, the two authors disagree on *LEN*'s status: while Boadi views it as a past tense (with perfective uses), Osam argues that the suffix denotes a completive (or perfective) aspect that depicts the eventuality as a whole. The latter has broader implications for Osam's theory, where Akan is regarded as an aspect-prominent language lacking the canonical tense opposition between present and past. This is replaced by the opposition between future (the prefix *bɛ*) and non-future tense, that is the null form ∅. By contrast, unmarked clauses are treated as present-tensed in Duah and Savić (2020) and Boadi (2008). Boadi further assumes that stative and habitual aspect are expressed through silent morphology. Their position differs from the one taken by Dolphyne (1987), who argues the null form only carries aspectual information. Finally, the particle *ná* has received less attention and has been often simply glossed as a clausal determiner. Boadi (2008) notes that *ná* is lexically ambiguous between a future- and a past-oriented form, whose homophony is regarded as merely coincidental. In contrast to Boadi's view, Osam characterizes *ná* as an imperfective temporal marker, without any specific mention of a temporal restriction. A summary of the these accounts is given in Table 1.

This literature overview, though not exhaustive, brings to light a lack of consensus regarding the semantic status of the three anteriority markers as well as the null form in Akan languages. While these proposals share a common understanding that the prefix *a* denotes a perfect aspect, they do not offer a comprehensive characterization of all its uses. This point is particularly cru-

cial, given recent research indicating that what is commonly referred to as “the perfect" cross-linguistically does not represent a universally distinct category (Chen et al., 2021; Bertrand et al., 2022). Even less clear is the status of *LEN*, which has been defined as a perfective aspect or a past tense. Lastly, we have observed that disagreement also exists concerning the temporal orientation of both unmarked and *ná*-marked clauses. Against this backdrop, the next section offers a more fine-grained empirical investigation of temporality in Akan.

	Null form	***a***	**LEN**	***ná***
Dolphyne (1987)	{HAB, STAT}	PERF	PAST	n/a
Boadi (2008)	{PRES, HAB, STAT}	Res. PERF[2]	(PFV) PAST	PAST/FUT
Osam (2008)	non-future	Res. PERF	PFV	(IPFV) TM [3]
D & S (2020)[4]	PRES	Exp. PERF	PAST	CD

Table 1: Summary: Previous accounts on temporal markers in Akan

3. Data: semantic properties

The data presented in this paper[5] follow the guidelines for semantic fieldwork illustrated in Matthewson (2004). Almost all the data were elicited using acceptability judgment tasks, whereby speakers were asked to judge whether a sentence was true in a given context. The diagnostics we developed draw from recent semantic fieldwork research on past tense and perfect forms (Chen et al., 2021; Bertrand et al., 2022). More specifically, Bertrand et al. (2022) identify four different kinds of *perfect*: a past perfective, a resultative perfect, an experiential perfect and a hybrid form encompassing both resultative and experiential uses.

(i) Referential readings: TAM forms are felicitous in referential contexts if they locate an eventuality at a contextually given time, much like pronouns do.

(2) Context (stative predicate): Last week, you visited Afiba. Since she had gotten the flu, you couldn’t stay long. Today, one of your friends asks you about Afiba. You tell them why you had to cut your visit short:

a. Afiba yare-**è**.
Afiba sick-**LEN**
‘Afiba was/got sick.’

b. #Afiba **a-**yare.
Afiba **a-**sick
‘Afiba has been sick.’

c. **Ná** Afiba yare.
NA Afiba sick
‘Afiba was sick.’

LEN and *ná* are both acceptable in referential contexts as opposed to *a*, with one important caveat: while with *ná* Afiba’s state is merely depicted at the moment of the visit, speakers

[2]The types of perfect labelled here go back to the classification found in Bertrand et al. (2022): we will come back to this point later.
[3]Temporal Marker, with no temporal restriction.
[4]Duah and Savić (2020).
[5]The data presented here are the result of fieldwork elicitation from March 2022 to November 2023 with five native speakers of the Asante Twi dialect of Akan.

view the sick-state modified with *LEN* as likely to have ceased by the utterance time. Note that *ná*-marked sentences with eventive predicates are rejected in past episodic scenarios, as the resulting interpretation is obligatorily habitual.

(3) Context (eventive predicate): Yesterday, there was salmon and beef at the canteen, but Kofi picked salmon. Today, one of your friends asks you about Kofi's choice. You answer:
   a. Kofi di-**ì** salmon.
      Kofi eat-**LEN** salmon
      'Kofi ate salmon.'
   b. #Kofi **a**-di salmon.
      Kofi **a**-eat salmon
      'Kofi has eaten salmon.'
   c. #**Ná** Kofi di salmon.
      NA Kofi eat salmon
      'Kofi used to eat salmon.'

(ii) Experiential readings: Experiential readings are associated with indefinite temporal intervals and are, therefore, compatible with eventualities that occurred at least once before.

(4) Context (stative predicate): One of your friends tells you that they are quite envious of Afiba, who always seems to be in great health and energetic. However, you think that this is quite exaggerated: in fact, even Afiba was sick at some point in the past...
   a. #Afiba yare-**è** (da).
      Afiba sick-**LEN** ever
   b. Afiba **a**-yare (da).
      Afiba **a**-sick ever
   c. #**Ná** Afiba yare (da).
      NA Afiba sick ever
      Intended: 'Afiba was/has been sick (before).'

Compared to referential contexts, judgments are reversed: the prefix *a* is compatible with an experiential reading, whereas both *LEN* and *ná* are not.[6]

(iii) Modification by locating temporal adverbials: Modification by locating temporal adverbials (LTA) is expected to be possible only with clauses containing a referential form. This prediction is borne out.

(5) Context: Speaking of an expensive purchase made in 2016...
   a. Me-tɔ-**ɔ** / #**m'a**-tɔ aponkye aboɔden **wɔ afe 2016**.
      1SG-buy-**LEN** / **1SG.a-**buy goat expensive **at year 2016**
      Intended: 'In 2016 we bought an expensive goat.'
   b. #**Ná** me-tɔ aponkye aboɔden **wɔ afe 2016**.
      NA 1SG-buy goat expensive **at year 2016**
      Intended: 'In 2016 we bought an expensive goat.'
      Comment: It means that we used to buy expensive goats back in 2016, implying that now we only buy cheap ones.

[6]The same findings are replicated with sentences containing an eventive predicate. We do not report the data due to space constraints.

As shown in (5), only *LEN*-inflected predicates can be modified by a locating temporal adverbial[7]. When the predicate is eventive, the particle *ná* produces a habitual interpretation. However, when the predicate is stative, *ná* can be readily modified by LTAs:[8]

(6) Context: In 2010, I inherited my family's wealth after my parents died in a car accident. Unfortunately, I spent it all by 2015.
a. **Wɔ afe 2010 ná** me-yɛ sikanii.
At year 2010 NA 1SG-COP rich
'In 2010 I was rich.'

(iv) Habitual readings: As we have seen so far, when combining with eventive predicates, the particle *ná* yields a habitual interpretation. Interestingly, a number of predicates, predominantly stative in nature, display a systematic ambiguity wherein stative and habitual interpretations intertwine (cf. Boadi (2008)). In certain instances, this distinction is phonologically encoded[9], with the habitual meaning corresponding to a high tone on the verb's final syllable. Importantly, the observed ambiguity extends to *ná*-marked clauses, as the following examples illustrate:

(7) a. **(Ná)** Kofi **dà** há.
NA Kofi sleep.**STAT** here
Without ná: 'Kofi is sleeping here (right now).'
With ná: 'Kofi was sleeping here (then).'
b. **(Ná)** Kofi **dá** há.
NA Kofi sleep.**HAB** here
Without ná: 'Kofi sleeps here.'
With ná: 'Kofi used to sleep here.'

(v) Present and future reference: In the previous section, we saw that *ná* and the null form have been associated by some scholars with temporal reference not strictly confined to past (for *ná*) or present (for the null form). Concerning *ná*, we observe that future interpretations are possible (see (8)), but any reference to the present is categorically excluded (see (9)), even with stative predicates.

(8) Context: Kofi is going to an 'all you can eat' event tonight. He has barely touched any food today, as he plans to stuff himself like a bottomless pit. However, you warn him that he will most likely feel sick tomorrow.
a. **ɔkyena *(ná)** wó-yare.
tomorrow NA 2SG-sick
'You will be sick tomorrow.'

[7]Preposing the adverbial in (5) does not result in any difference.

[8]Let us note here that *ná* most naturally occurs in combination with adverbial clauses, where it correlates with the clausal determiner *nó* heading the embedded clause (see also Osam (2003); Boadi (2008); Duah and Savić (2020), among others). In these cases, the predicate of the matrix clause depicts an ongoing event and, thus, bears the progressive marker *re*, as exemplified below.

(i) ná-clauses modified by adverbial clauses
a. Ama ba-à yɛ **nó**, **ná** Kwame **re-**noa aduane.
Ama come-LEN COP **CD NA** Kwame **PROG-**cook food
'When Ama arrived, Kwame was cooking.'
b. Ama bue-è ɛpono nó **nó**, **ná** Kwame **re-**da.
Ama open-LEN door DEF **CD NA** Kwame **PROG-**sleep
'When Ama opened the door, Kwame was sleeping.'

[9]See Boadi (2008: 35) for a list of predicates with stative/non-stative alternation in Akan.

(9) Context: You look pale and your forehand is burning. I say:
a. **Seisei (*ná)** wó-yare.
now **NA** 2SG-sick
Intended: 'You are sick now.'

As for the null form, neither past nor future reference is applicable (see (8), (10) and (11)), challenging its classification as a non-future tense.

(10) Kofi wu***(-ù) nnora**.
Kofi die-**LEN** **yesterday**
lit. 'Kofi dies(/died) yesterday.'

(11) Context: I was just wondering what Kofi was up to yesterday when you stopped by...
a. ***(ná)** Kofi re-didi **nnora**.
NA Kofi PROG-eat **yesterday**.
lit. 'Kofi is(/was) eating yesterday.'

(vi) Resultative readings: A resultative interpretation obtains for eventualities whose result state holds true of the reference time (i.e., UT for matrix clauses). While for *a*, the result state of the depicted event extends to the utterance time, this is not the case for *LEN*.

(12) Context: It is cold in the room, but the window is closed. You wonder...
a. #wó nà wó **a**-bié mpoma nó anaa?
2SG FOC 2SG **A**-open window DEF Q
'Was it you that opened the window?'
$\rightsquigarrow$ *the window is open now*
b. wó nà wó bié**-è** mpoma nó anaa?
2SG FOC 2SG open**-LEN** window DEF Q
'Was it you that opened the window?'
$\not\rightsquigarrow$ *the window is open now*

Based on the data above, we can conclude that only *a*-marked predicates give rise to a resultative interpretation.[10]

(vii) Universal readings: Universal readings occur when a predicate holds from an earlier time up to the reference time (McCoard, 1978; McCawley, 1971). These usually require an overt adverbial determining the duration or the starting point of the time-span stretching until the RT (Iatridou et al., 2001; Kiparsky, 2002). Following the diagnostics developed in Dahl (2021), the data below test the availability of universal readings with duration-quantifying (e.g., *for two weeks*) and left-boundary indicating (e.g., *since 2020*) adverbials.

(13) Context: Kofi moved to the US three years ago and he still lives there.[11]
a. Kofi a-tena America mfie mmiensa.
Kofi A-live America PL.year three
'Kofi has been living in the US for three years.'

[10] One related open question pertains to whether the result state can be cancelled or is part of the asserted meaning of the sentence. Judgments are not firm and vary depending on scenarios and predicates. For this reason, we leave the issue of cancellability of the result state of *a*-marked predicates for future research.

[11] For reasons of readibility, we omit here target sentences containing *ná*. As expected, these are not compatible with a universal interpretation.

b. #Kofi tena-à America mfie mmiensa.
Kofi live-LEN America PL.year three
'Kofi lived in the US for three years.'
c. #Kofi tena America mfie mmiensa.
Kofi live America PL.year three
lit. 'Kofi lives in the US for three years.'

Following these data, only *a* displays universal readings, akin to the English present perfect. Judgments are replicated for other stative and eventive predicates.[12]

(viii) Narrative progression: TAM forms can also be deployed for narrative progression. Typically, perfective pasts are used to progress a story from an earlier point to a later one (in the past) (cf. Kamp and Rohrer (1983)). In the following, a consultant is presented with an English text to translate into Akan, using their preferred temporal markers. Predicates that temporally follow those in the immediately preceding sentence are boldfaced. By contrast, predicates that do not induce a strict narrative progression are underlined. The consultant consistently chose *LEN* to progress the story.[13] [14]

(14) *Context*: Kofi's mum is quite controlling. She wants to know every single detail in Kofi's daily routine, after he leaves for school in the morning. Kofi makes sure he won't leave out even the smallest detail!
Target text:
a. I **walked** to school. I **entered** the classroom. I **sat** at my desk, I **opened** my backpack, I **took out** the notebook. Then I <u>was hungry</u>. I **pulled out** an apple. It <u>was rotten</u>.
Translation offered:
b. Me nante **kɔ-ɔ̀** sukuu nà **mewura-à** sukuu dan nó mu. Me
1SG walk go-LEN school COORD enter-LEN school class DEF inside. 1SG
tena-à m'akonwa so na **me-bue-è** me bag mu. Me
sit-LEN 1POSS.1SG=seat on COORD 1SG-open-LEN POSS.1SG bag inside 1SG
fa-à me book nà <u>ná</u> <u>ɛkɔm</u> de me. Me **yi-ì** apple
take-LEN POSS.1SG book COORD NA hunger COP 1SG 1SG bring.out-LEN apple
nà <u>ná</u> <u>aporɔ</u>.
COORD NA rotten

(ix) Actuality entailments: Finally, one last property that has been often associated with perfective aspect (PFV) are actuality entailments (AE). As the literature has noted (Bhatt, 1999; Hacquard, 2009), PFV-marked ability modals entail the truth of their prejacent in the actual world. Crucially, the same does not follow when imperfective aspect (IPFV) is used instead. In Akan, actuality entailments only arise with *LEN* and *a*, in combination with the ability modal *tumi*. To express past ability, the particle *ná* must be used instead.

[12]However, in order to avoid ambiguity with an experiential reading, consultants strongly preferred the insertion of the proximal deictic *nie* (="this").
[13]Interestingly, *ná* was chosen instead for the only two (stative) predicates that were co-temporal to the preceding event.
[14]As a follow-up, the consultant was asked to judge a text where the boldfaced TAM forms were replaced with *a*. The text was rejected, with the following feedback: *It would only work if you're describing things as they happen at the moment, for example during a phone call.*

(15) Akua [tumi tɔ**-ɔ** / **a**-tumi a-tɔ] efie, # nanso w-a-n-tɔ.
Akua can buy**-LEN / A-**can CONS-buy house but **3SG-LEN-NEG-buy**
Intended: 'Akua was able to buy a house, but she didn't.'

(16) **Ná** Akua tumi tɔ efie, nanso w-a-n-tɔ.
NA Akua can buy house but **3SG-a-NEG-buy**
'Akua was able to buy a house, but she didn't.'

Interim summary:

	a	**LEN**	***ná***
Referential	x	✓	(stat/hab)
Experiential	✓	?x	x
Modification by LTA	x	✓	(stat/hab)
Habitual	x	x	✓
Future reference	x	x	✓
Resultative	✓	x	x
Universal	✓	x	x
Narrative progression	?	✓	x
Actuality entailment	✓	✓	x

Table 2: Summary: Semantic properties of TAnt markers

In this section, we outlined some relevant semantic properties carried by the three anteriority markers *LEN*, *a* and *ná*. From a temporal perspective, while *LEN* and *ná* are strictly compatible with referential readings, the prefix *a* may express experiential, resultative as well as universal readings. Furthermore, from an aspectual perspective, we observed that, on the one hand, *ná* is generally licensed in imperfective contexts such as stative and habitual, on the other *a* and *LEN* both give rise to actuality entailments, which indicates a perfective aspectual profile. A summary of the findings in this section is presented in table 2.[15]

3.1. Combinatorial restrictions

Before moving to the semantic analysis, as a final note, let's briefly consider the combinatorial restrictions on their co-occurrence displayed by the three markers.

The particle *ná* and the prefix *a* are often found in tandem, yielding a past perfect-like interpretation. By contrast, *LEN* is ruled out in ná-marked clauses, as given below.

(17) Context: Ama is such a great cook. She enjoys nothing more in life than baking for her friends. Last Tuesday we stopped by her place and guess what?
a. **Ná** Ama **a**-noa aduane.
NA Ama a-cook food

[15]The symbol "?x" for *LEN*'s experiential readings represents the fact that, though largely unavailable, these readings were simply dispreferred by some speakers in certain contexts.

'Ama had cooked some food.'
Comment: *By the time you got there she had already cooked (maybe in the morning or so)*.

b. *__Ná__ Ama noa-__à__ aduane.
NA Ama cook-LEN food
Intended: 'Ama had already cooked food.'

In (17), the main predicate is further shifted back in time with respect to the past time denoted by *ná*.

The marker *LEN* is not only restricted to *ná*-less clauses, but it's additionall ruled out whenever the predicate bears already tempo-aspectual marking, be it *a* or any other prefix (see (18)).[16]

(18) Complementary distribution of *LEN* with other TAM affixal morphemes:
a. Afiba (*a-)noa-à aduane.
Afiba A-cook-LEN food
b. Afiba (*re-)noa-à aduane.
Afiba PROG-cook-LEN food
c. Afiba (*bɛ-)noa-à aduane.
Afiba PROSP-cook-LEN food

In contrast to *LEN*, the particle *ná* can not only co-occur with *a*, but also with all the other affixal markers (excluding obviously *LEN*).

Building on these empirical findings, the next section develops a semantic theory for the three markers.

4. The semantics of anteriority markers

Building on the properties and the distribution detailed earlier, this section spells out the semantics of the three anteriority markers in Akan, further exploring how they contribute to the temporal interpretation of matrix clauses.

In what follows, we will argue that:
(i) Firstly, the particle *ná* denotes a distal deictic tense which excludes the utterance time as a possible temporal reference.
(ii) Secondly, the prefix *a* is a hybrid perfect aspect with meaning components that are akin to both resultative and experiential perfects.
(iii) Finally, the suffix *LEN* also involves a hybrid TAM form, in that it conflates past tense and perfective aspect.

Crucially, we will further propose that Akan unmarked predicates do not involve a covert present tense, but simply associate with either a stative or a habitual interpretation via covert aspect operators. A present interpretation, therefore, occurs only in the absence of any covert element introducing temporal reference into the composition.

[16] In fact, all TAM verb morphemes are in complementary distribution with one another.

4.1. Preliminary assumptions and the temporal interpretation of bare clauses

In the brief review in section 2, we saw that the absence of overt TAM marking in Akan languages has been associated with a present (Duah and Savić, 2020; Boadi, 2008), a non-future (Osam, 2008) or a temporally neutral (Dolphyne, 1987) interpretation. Furthermore, most accounts assume that stative/habitual meaning must also be semantically encoded in dedicated covert operators (which may or may not coincide with the covert present). Based on the data presented in section 3, the claim that bare clauses yield non-future or temporally unspecified interpretations must be rejected. In fact, past-oriented contexts strictly require overt TAM marking. As a starting hypothesis, we are going to assume the simplest option: bare clauses are tenseless and the present reference is provided by the default evaluation time, that is the utterance time.[17] Since both bare and *ná*-marked clauses are aspectually imperfective, we assume that this interpretation arises through covert STATive and HABitual oeprators.[18] Leaving habitual meaning aside, a (simplified) semantics for STAT is given in (19):

(19) $[\![\text{STAT}]\!] = \lambda p_{\langle v,t\rangle}.\lambda t_{\langle i\rangle}.\exists e[t \subseteq \tau(e) \,\&\, p(e)]$[19]

Via the semantics in (19), we derive for the sentence in (20) the truth-conditions in (20b) from the LF in (20a):

(20) Afiba yare. ('Afiba is sick.')

a. $[_{CP}$ w@ [λw_0 [t_c $[_{TP\langle i,t\rangle}$ - $[_{AspP\langle i,t\rangle}$ $[_{Asp}$ STAT] $[_{VP\langle v,t\rangle}$ λe_3 $[_{VP}$ Afiba $[_{V'}$ $\text{yare}_{w0,e3}$]]]]]]]]

b. $[\![$ (20a) $]\!] = 1$ iff $\exists e[t_c \subseteq \tau(e)$ & *sick*$(w@)(e)(A)]$
'There is an eventuality e, such that its running time surrounds the context time t_c and e is an eventuality of Afiba being sick in the actual world.'

The composition yielding the truth-conditions in (20b) produces a predicate of times at TP-level (the set of reference times that are surrounded by the running time of the given eventuality). Since no structurally higher element provides a suitable reference time (RT), the system utilizes the EvalT t_c to close off the set of reference times. A present interpretation obtains.

4.2. The semantics of ná

In the light of its referential uses, we argue that the particle *ná* should be treated as a pronominal tense. More specifically, *ná* denotes a deictic distal tense, which locates an event at a specific time that is not the utterance time. In other words, *ná* covers the semantic space left free by the unmarked form.[20] Following the pronominal analysis adopted here (see Partee (1973); Kratzer

[17] We are assuming here a system where propositions are always evaluated with respect to a world and a time of evaluation (EvalT). In matrix clauses, these always coincide with the actual world (here w@) and the utterance time (here t_c), respectively. Clearly, this need not be the case in embedded contexts.

[18] In our system, VPs introduce eventuality arguments saturated by (viewpoint) aspect. Eventualities comprise both states and events.

[19] According to the semantics formulated in (19), STAT maps a predicate of eventualities to a predicate of times, such that these hold of t if for some eventuality e, its running time surrounds t.

[20] In the interest of space, we need to gloss over the syntactic status of *ná*. We refer the reader to Kandybowicz (2015), where the particle's tense nature is defended against an adverbial one.

(1998); Heim (1994), *ná* denotes a temporal interval. This, however, is presuppositionally restricted to times that do not include the context time t_c.

(21) a. $[\![\text{ná}_7]\!]$ defined iff there is a contextually salient time g(7) $[\neg(g(7) \circ t_c)]$
b. When defined, $[\![\text{ná}_7]\!] = g(7)$

In agreement with Kandybowicz (2015), we assume that *ná* occupies the T-head position, thus leading to the following semantic representation for the given sentence.[21]

(22) **Ná** Afiba yare.
NA Afiba sick
'Afiba was/{will be} sick (then).'
a. $[_{CP}$ w@ [λw_0 [t_c $[_{TP\langle i,t\rangle}$ na_7 $[_{AspP\langle i,t\rangle}$ $[_{Asp}$ STAT] $[_{VP\langle v,t\rangle}$ λe_3 $[_{VP}$ Afiba $[_{V'}$ $yare_{w0,e3}$]]]]]]]]

To compute the meaning of the sentence, a covert aspectual operator once more needs to saturate the eventuality argument of the predicate "yare". Since the verb is stative, one logical candidate is STAT.[22] Subsequently, applying the predicate of times denoted by the AspP in (22a) to g(7) yields the following definedness conditions and truth-conditions:

(23) a. $[\![$ (22a) $]\!]$ defined iff there is a contextually salient time g(7) $[\neg(g(7) \circ t_c)]$
b. When defined, $[\![$ (22a) $]\!] = 1$ iff $\exists e[g(7) \subseteq \tau(e)$ & *sick*$(w@)(e)(A)]$ 'There is an eventuality e, such that its running time surrounds g(7) and e is an eventuality of Afiba being sick in the actual world.'

Since the reference time g(7) is only restricted to temporal intervals not including UT, the truth-conditions in (23) are compatible with both past-oriented and future-oriented scenarios.

4.3. The semantics of *LEN*

We saw in section 3 that *LEN*, on the one hand, involves properties that are characteristic of the past tense: it makes reference to (specific) times preceding the local evaluation time and it can be modified by (past-oriented) locating temporal adverbials. On the other hand, it exhibits a perfective aspectual profile in that it actualizes the depicted eventuality (under ability modals) and it is used for narrative progression.

To account for its mixed properties, we propose a hybrid semantics for *LEN*, comprising both a pronominal tense and a perfective aspect. We posit that *LEN* spells out a span comprising two projections: a past-restricted tense pronoun in T and a PFV-like operator in Asp. This analysis combines a pronominal analysis for its tense component and existential analysis for its aspectual part.[23].

Note that *LEN*'s tense component $past_{2,5}$ is a doubly indexed pronoun whose first index is free and picks out the RT, while the second index is bound by the local EvalT (that is t_c in matrix

[21] Since *ná* is not evaluated with respect to an additional temporal interval, no EvalT (i.e., t_c) projects at LF.
[22] Given a suitable HAB-operator, habitual meaning is readily computed in a similar fashion. The fact that, in the absence of a progressive marker, *ná*-marked eventive predicates can only be interpreted habitually naturally follows from the system only admitting STAT and HAB as its covert aspectual operators.
[23] For a similar proposal for Samoan, see Hohaus (2019); Bochnak et al. (2019).

clauses). These semantics allow us to derive the meaning for the sentence in (24) as follows:

(24) Afiba di-ì salmon.
Afiba eat-LEN salmon
'Afiba had salmon.'

(25) $[_{CP}$ w@ [λw$_0$ [t$_c$ [λt$_5$ $[_{TP\langle t\rangle}$ $[_T$ past$_{2,5}$] $[_{AspP\langle i,t\rangle}$ $[_{Asp}$ PFV] $[_{VP\langle v,t\rangle}$ λe$_3$ $[_{VP}$ Afiba $[_{V'}$ {di-salmon}$_{w0,e3}$]]]]]]]]]

(26) a. $[\![$ (25) $]\!]$ defined iff g(2) < t$_c$
b. $[\![$ (25) $]\!]$ = 1 iff $\exists$e[τ(e) $\subseteq$ g(2) & *eat*(w′)(e)(ιx[*salmon(x)*])(A)]
'There is an eventuality e, such that its running time is entirely included in g(2) and e is an eventuality of Afiba eating salmon in the actual world.'

Compared to the LF for the bare clause in (20a), the LF in (25) is not tense-deficient, but introduces the RT into the composition via the pronoun $past_{2,5}$. This receives a value, restricted to times preceding t$_c$, via the assignment function g.

4.4. The semantics of *a*

A satisfactory analysis for *a* should be able to capture the readings that the affixal marker can yield: resultative, experiential and universal. According to the typological classification in Bertrand et al. (2022), perfect forms that exhibit the same properties as Akan *a* are categorized as *hybrid*. Among these, we have the English Present Perfect. Semantic accounts of the English (Present) Perfect can be grouped into three different types (cf. Bhatt and Pancheva (2005)): (i) *Anteriority accounts*, adopting a Reichenbachian analysis (Klein, 1992; Reichenbach, 1947); (ii) *Extended-Now (XN) accounts*, relying on a time span interval extending backwards from the RT (Iatridou et al., 2001; McCawley, 1971; McCoard, 1978; Pancheva, 2003); (iii) *Result state accounts*, appealing to some notion of the result state being relevant/obtaining at the utterance time (Portner, 2003; Moens et al., 1988).

Abstracting away from the technical details of each individual theory, we will propose a pragmatically enriched XN-theory. According to our proposal, the universal-existential distinction is grammatically determined, whereas the contrast between resultative and experiential readings is only contextually resolved.

In line with much previous work (Iatridou et al., 2001; Pancheva, 2003; Rullmann and Matthewson, 2018), we assume that a perfect is hosted within a dedicated projection between tense and viewpoint aspect projections. A resulting structure for the aspect layer is sketched in (27).

(27) $[_{TP}$ *Tense* $[_{AspP}$ PERF/PROSP $[_{ViewP}$ PFV/IPFV [... VP ...]]]]

What is relevant for the current discussion is that the prefix *a* spells out the XN-Perfect heading the AspP. According to the XN-theory, the perfect introduces what Iatridou et al. (2001) have called the "Perfect Time Span" (PTS), that is a temporal interval delimited by the clausal tense (on its right hand) and by an overt adverbial (or else left unspecified) on its left hand. Building on Pancheva (2003: 284), we adopt the semantics for the perfect operator as formulated in (28).

(28) $[\![\text{PERF}]\!](p_{\langle i,t\rangle})(t_{\langle i\rangle}) = 1$ iff $\exists t'[\text{XN}(t',t) \,\&\, p(t')]$
With XN(t′,t) the time span stretching throughout t′ and culminating in t.

According to (28), PERF is a quantificational tense that quantifies over a temporal interval (the PTS). Since in our system VPs denotes properties of eventualities, PERF will have to further combine with a lower viewpoint aspect that closes off the eventuality variable.

4.4.1. Deriving the universal reading

We have seen that *a* can readily produce universal readings when it combines with unbounded predicates (usually statives). One example is repeated below.

(29) Kofi a-tena America firi afe 2019.
Kofi A-live America from year 2019
'Kofi has been living in the US since 2019.' (Universal)

In (29), the adverbial "firi afe 2019" provides the starting point of the PTS, while its end point coincides with the default variable t_c - lacking the sentence an overt superordinate tense (for instance, *ná*). As for its viewpoint aspect, in the current framework the only covert viewpoint aspects are STAT and HAB. Since the one arising is a stative interpretation, we assume that it's the former to feature at LF. The resulting LF is sketched in (30), with the truth-conditions computed in (31).

(30) $[_{CP}\ \text{w@}\ [\lambda w_0\ [t_c\ [.\text{TP}_{\langle i,t\rangle}$ - $[_{AspP\langle i,t\rangle}\ [_{Asp}\ \text{PERF}_{\langle it,it\rangle}]\ [_{ViewP}\ [_{ViewP\langle i,t\rangle}\ [_{View}\ \text{STAT}_{\langle vt,it\rangle}\ ]$
$[_{VP\langle v,t\rangle}\ \lambda e_3\ [_{VP}\ \text{K.}\ [_{V'}\ \{\text{tena-America}\}_{w0,e3}\ ]]]]\ [_{PP}\ \{\text{afe firi 2019}\}.\text{PP}_{\langle i,t\rangle}\ ]]]]]]]$

(31) $[\![(30)]\!] = 1$ iff $\exists t'[\text{XN}(t', t_c)$ & $\textit{Begin}(t', \textit{year}(2019))$
& $\exists e[t' \subseteq \tau(e)$ & $\textit{live}(\text{w@})(e)(\textit{in}(\text{US}))(\text{K})]$
'There is a PTS t′ extending from 2019 until t_c and there is an eventuality e, such that its running time surrounds t′ and e is an eventuality of Kofi living in the US in the actual world.'[24]

4.4.2. Existential readings

To account for the two existential readings - the experiential and the resultative - we propose a unified analysis hinging on the combination of an XN perfect aspect with a resultative viewpoint aspect. The view taken here is similar in spirit to Portner (2003) and differs, for instance, from that of Pancheva (2003). We favour a unified analysis based on the empirical observation that atelic predicates in Akan can yield experiential as well as resultative readings (see (32)).[26]

[24] In order to arrive at the truth-conditions in (31), we am assuming that the left-boundary adverbial PP right-adjoins to ViewP. Setting the technical details aside, the "*Begin*" function[25] introduced by "firi" sets the starting time of the temporal interval modified by the PP.

[26] Another piece of evidence is the fact that Akan, as opposed to several Indo-European languages, exhibits no morphological reflection of the experiential/resultative distinction. In fact, both the progressive marker *re* and the perfective marker *LEN* cannot co-occur with *a*.

(32) Kofi **a**-di salmon.
Kofi **a**-eat salmon
'Kofi has eaten salmon.'
a. *Exp*: ⇝ Kofi knows what salmon tastes like.
b. *Res*: ⇝ Kofi is not hungry.

Existential readings, unlike universal ones, require that the eventuality be completed by RT. To this end, we suggest that in existential contexts PERF combines with a resultative aspect. Drawing from Pancheva (2003)'s foundational work (cf. (Bhatt and Pancheva, 2005: 12)), we refine the semantics of the resultative viewpoint aspect building "current relevance" in its semantics, as is exemplified below.

(33) *Semantics of resultative viewpoint*
a. $[\![\text{RES}]\!](e'_v)(p_{\langle v,t\rangle})(t'_i)(t_i)$ defined iff $Rel_{Ag}(e')(t)$[27]
b. $[\![\text{RES}]\!](e'_v)(p_{\langle v,t\rangle})(t'_i)(t_i) = 1$ iff $\exists e[Result(e',e) \,\&\, t \subseteq \tau(e') \,\&\, \tau(e) \subseteq t' \,\&\, p(e)]$

According to (33), the definedness conditions of *RES* are satisfied if and only if the result state e' bears some relevance to the top-most reference time (t_c in *ná*-less clauses) for the subject. *RES* takes as arguments the result state e', a property of eventualities (the VP), the PTS t' and a second RT t (given by the top-most tense). In turn, *RES* binds the eventuality argument *e* of the main predicate and requires that: (i) the eventuality time be included in the PTS, (ii) the result state include the clausal tense's reference time. In T-less clauses, the top-most RT collapses into the EvalT t_c. As a consequence, the result state must include the t_c. The eventuality time preceding the result state, on the other hand, is located at some point within the PTS. This might be more or less proximal to t_c.

Based on the denotation in (33), upon combining with a result state pronoun and a predicate of eventualities, *RES* returns a property of times. This is a function from times to a predicate of times. The denotation of *PERF* is revised accordingly.

(34) $[\![\text{PERF}_{existential}]\!](p_{\langle i,\langle i,t\rangle\rangle})(t_{\langle i\rangle}) = 1$ iff $\exists t'[XN(t',t) \,\&\, p(t')(t)]$

The relevance function Rel_{Ag} in (33) is relativized to the event's agent and helps identify the result state that is relevant for the current discourse segment. What is considered "relevant" is guided by contextual and pragmatic considerations. In more concrete terms, the relevance function is sensitive to the question under discussion (QuD) (Roberts, 1996; Büring, 2003). Notably, topic situations, and hence topic times[28] (cf. Schwarz (2009); Kratzer (2023); Klein (1994)), can be derived by the QuD in that there needs to be equivalence between the topic situation/time of the QuD and that of its answer. On this view, if the QuD is about the utterance time, the answer cannot be about a prior time.[29]

To better illustrate the interplay of QuD and Rel_{Ag}, consider the following context.

(35) Context: We are coming back from a trip. Afiba looks exhausted and out of breath. You ask what happened.

[27] $Rel_{Ag}(e')(t)$ reads as: "the result state e' is relevant for Ag at t."
[28] Here reference times
[29] Of course, speakers often provide RT-defying answers, which yield well-known (cessation) inferences (Altshuler and Schwarzschild, 2012).

a. Afiba **a**-foro bepɔ.
Afiba A-climb mountain.
'Afiba has climbed a mountain.' (Resultative)

The sentence in (35a) is situated in a context that obtains at the context time. Since the predicate bears *a*-morphology, it depicts a situation whose result state must be evaluated with respect to the context time too. The output is a resultative interpretation. Its LF-structure and meaning are given in (36) and (37), respectively.

(36) $[_{CP}$ w@ $[\lambda w_0$ $[t_c$ $[_{TP\langle i,t\rangle}$ - $[_{AspP\langle i,t\rangle}$ $[_{Asp}$ $PERF_{\langle\langle i,\langle i,t\rangle\rangle,\langle i,t\rangle\rangle}$] $[_{ViewP\langle i,\langle i,t\rangle\rangle}$ $[_{View}$ RES e_4] $[_{VP\langle v,t\rangle}$ λe_3 $[_{VP}$ Afiba $[_{V'}$ {foro-bepɔ}$_{w0,e3}$]]]]]]]]]

(37) a. *Definedness conditions from LF* (36):
$[\![$ CP $]\!]^g$ defined iff Rel_{Afiba}(g(4))
Paraphrase: 'g(4) a contextually relevant eventuality whose agent is Afiba that satisfies the QuD (i.e., an eventuality that involves Afiba looking exhausted at t_c).'

b. When defined, $[\![$ CP $]\!]^g = 1$ iff
$\exists t'[XN(t', t_c)$ & $\exists e[$*Result*(g(4),e) & $t_c \subseteq \tau(g(4))$ & $\tau(e) \subseteq t'$
& *climb*(w@)(e)(ιz[*mountain*(z)])(A)
Paraphrase: 'There is a PTS t', such that t' extends until t_c & there is an eventuality e, such that g(4) is the result state of e & t_c is included in g(4) & e is included in t' & e is an eventuality in the actual world of Afiba climbing the unique z such that z is a mountain.'

According to the definedness conditions computed in (37a), the relevance function selects the contextually salient eventuality, g(4), that satisfies the question under discussion. The QuD is supplied by the context, which refers to a current state of Afiba being tired. Since the sentence denotes the answer to the QuD, the topic time needs to be preserved and, thus, g(4) needs to be relevant for the context time. This leads to a resultative reading. In a way, it is the QuD (and not the grammar) that generates a resultative interpretation.

Consider now an experiential-biasing context.

(38) You are organizing a trip with your friends to a local mountain. Your plan is to do some climbing, but you have no previous experience, so you decide to ask someone who does. You wonder whom you could talk to; your friend says:
a. Afiba **a**-foro bepɔ nó.
Afiba A-climb mountain DEF
'Afiba has climbed the mountain.' (Experiential)

Based on our analysis, the reading the system generates for (38a) is truth-conditionally indistinguishable from the resultative reading in (37). The definedness conditions are however different, since these are affected by the context-dependent QuD.

(39) $[\![$ (38a) $]\!]$ defined iff
Rel_{Afiba}(g(4))
With the relevance function picking out a suitable eventuality g(4) that is compatible with Afiba being a mountain-climber at t_c.

The felicity of the answer in (38a) does not hinge on how long ago Afiba climbed the mountain.

Therefore, no immediateness inference arises in this case. In other words, it is irrelevant when Afiba climbed the mountain. For what it's worth, she might have done it long ago. What matters is that she has acquired some currently relevant knowledge as a result of that. Under this analysis, the experiential reading is viewed as a special instance of a resultative reading, where the result state stretches throughout the experiencer's life, from the time a given event occurred until now.

5. Combinatorial restrictions and open questions

5.1. Complementary distribution between *LEN* and *ná*

The analyses put forward for *ná* and *LEN* suggest a potential overlap in use, in that both markers preferably occur in referential contexts. They, however, show some sort of division of labor in expressing (past) temporal reference, in that *LEN* correlates with episodic, punctual eventualities while *ná* with states or habits. Their specialized use might explain one important empirical finding: the fact that *ná* and *LEN* cannot co-occur. we will suggest that the reason for their mutual exclusive distribution may be ascribed to the fact that both their tense variables occupy the same position as heads of the tense phrase[30].

5.2. Co-occurrence patterns of *a* with *ná* and *LEN*'s exclusion

As previously noted, the hybrid perfect *a* can co-occur only with the distal deictic *ná*, while the past perfective *LEN* is strictly ruled out in sentences containing any tempo-aspectual marker. According to the LF architecture developed here for Akan clauses, in *a*-marked sentences *ná* fills the empty T-head slot, thus providing a topic time other than UT. Recall that *a*-marked clauses modified by *ná* typically give rise to a past perfect-like interpretation.

By contrast, *LEN* cannot surface in *a*-marked sentences. This time, the restriction is due to competition for the same ViewP position. Assuming that the aspectual head PERF can only combine with STAT or RES to derive universal and existential readings, respectively, the ViewP projection cannot further host PFV (that is *LEN*'s aspectual projection). In other words, *LEN* is prohibited from co-occurring with *ná* due to its temporal component, while it's in complementary distribution with *a* due to its aspectual properties.

6. Conclusion

This paper set out to investigate how temporal meaning can be compositionally computed in Akan. To this end, we isolated three main ingredients designated for past meaning: the final vowel lengthening *LEN*, the prefix *a* and the sentence particle *ná*. Building on the diagnostics in Bertrand et al. (2022) we found that *LEN* and *ná* primarily exhibit referential properties, while *a* correlates with existential and universal readings. Importantly, we argued that, in matrix

[30]Why a language should develop distinct specialized tense forms is an interesting theoretical question worth exploring through a diachronic investigation: we leave this enterprise for future research.

contexts, *ná*-clauses are in complementary semantic distribution with bare ones. Specifically, *ná* makes reference to any non-present time, lacking a specific orientation. This led to its treatment as a pronominal tense carrying an anti-UT presupposition and being compatible with imperfective aspect only. In contrast, the two affixes *LEN* and *a* present a higher internal complexity: while LEN exhibits a pronominal relative past tense alongside a perfective aspect, *a* combines an extended now perfect with a viewpoint aspect, which can surface as resultative or stative. Specifically, the resultative viewpoint aspect can contribute to both experiential and resultative interpretations based on the QuD. Conversely, when combined with stative aspect, the extended now perfect is able to generate universal interpretations.

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