Tonal reflexes of successive-cyclic movement in Asante Twi

Claim: We provide new data showing that Asante Twi/Akan (Niger Congo: Ghana) exhibits systematic tonal changes on verbs and complementizers in the presence of A̅-movement. We argue that a phase head (v or C) through which movement has taken place is realized as a floating tone that has the effect of overwriting any other tones in an adjacent word. Thus, Akan provides a rare case of morphological reflexes of successive-cyclic on both v and C providing evidence for the phase status of these heads.

Data: In Asante Twi, underlying low tones of verbs surface as a sequence of high tones in constructions involving A̅-movement (focus/wh-fronting (1), relative clauses (2)). In the following examples, any low tones in the verb (unmarked here) become high if crossed by an A̅-dependency (*kita* ⇒ *kítá*). Similarly, the HL contour of the complementizer sɛ̂ turns to L when crossed by a moving operator (sɛ̂ ⇒ sɛ).

(1) a. Esi **nim** [$_{CP}$ sɛ̂] Kofi **kaé** [$_{CP}$ sɛ̂] Amma **kita** bayéɾɛ́]]
Esi know COMP Kofi remember COMP Ama hold yam
'Esi knows that Kofi remembers that Ama is holding a yam.'

b. [$_{CP}$ Déɛ́n$_i$ na Esi **nɪ́m** [$_{CP}$ sɛ] Kofi **káé** [$_{CP}$ sɛ] Amma **kítá** t$_i$ nó]]] ?
what FOC Esi know COMP Kofi remember COMP Ama hold CD
'What does Esi know that Kofi remembers that Ama is holding?'

c. [$_{CP}$ Bayéɾɛ́$_i$ na Esi **nɪ́m** [$_{CP}$ sɛ] Kofi **nɪ́m** [$_{CP}$ sɛ] Amma **kítá** t$_i$]]
yam FOC Esi know COMP Kofi remember COMP Ama like
'It is yam that Kofi knows that Ama likes.'

(2) a. Me-nim [$_{CP}$ sɛ̂ óbíárá á-**te** [$_{CP}$ sɛ̂] Kofi á-**ka** [$_{CP}$ sɛ̂] ɔ-**dɔ**
1sg-know COMP everybody PERF-hear COMP Kofi PERF-say COMP 3SG-love
ɔbáá nó]]]
woman DEF
'I know that everybody has heard that Kofi has said that he loves the woman.'

b. Me-hu-u [$_{DP}$ ɔbáá nó$_i$ [$_{CP}$ áa óbíárá á-**té** [$_{CP}$ sɛ] Kofi á-**ká** [$_{CP}$
1SG-see woman DEF REL everybody hear.PAST COMP Kofi PERF-say
sɛ] ɔ-**dɔ́** nó$_i$ nó]]]].
COMP 3SG-FUT-love 3SG.RP CD
'I saw the woman whom everybody has heard that Kofi has said that he loves (her).'

It has gone previously unnoticed that these processes affect every verb/complementizer in a long-distance dependency, strongly suggesting that this is an effect of movement.

Analysis: An analysis of the tonal change in Akan verbs is given in Marfo (2005), who assumes that tonal changes in the verb are the result of a H tone associated with the focus marker *na*. The data in (1)-(2) are problematic since: (i) H-tone insertion on verbs is not specific to *na*-constructions, (ii) the complementizer changes remain unexplained, (iii) long-distance extraction data show that the process affects every verb across a long-distance dependency. Instead, we propose that these H tones are a reflex of successive-movement marked on the head of a phase (*v*P) through which operator movement has taken place. Standardly, A̅-movement is assumed to proceed through the edge (specifier) of each phase head. Following Georgi's (2014) approach to movement reflexes, we assume that the v and C heads bear an unvalued operator feature [OP:] that can be valued in a Spec-Head configuration with an operator. In a long-distance A̅-dependency, movement proceeds successive-cyclically through Spec-*v*P and -CP in each clause, the operator will be valued:

(3) a. [$_{vP}$ $v_{[OP:□]}$ [$_{VP}$ V wh]]]

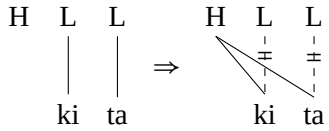
b. [$_{vP}$ wh [$_{v'}$ $v_{[OP:+OP]}$ [$_{VP}$ V ⟨wh⟩]]]

c. [$_{vP}$ wh [$_{v'}$ $v_{[OP:+OP]}$ [$_{VP}$ V [$_{CP}$ ⟨wh⟩ [$_{C'}$ C ... [$_{vP}$ ⟨wh⟩ [$_{v'}$ $v_{[OP:+OP]}$ [$_{VP}$ ...]]]]]]]

d. [$_{FocP}$ wh [$_{Foc'}$ na ... [$_{vP}$ ⟨wh⟩ [$_{v'}$ $v_{[OP:+OP]}$ [$_{VP}$ V [$_{CP}$ ⟨wh⟩ [$_{C'}$ C ... [$_{vP}$ ⟨wh⟩ [$_{v'}$ ...]]]]]]]]

We assume that there are two distinct Vocabulary Items for v in Asante Twi: a null realization of v (4a), and a more specific variant for v with a valued operator feature (4b). The latter is realized as a floating H tone. When v and V are combined, the floating tone triggers overwriting of all tones in that word (4).

(4) *VIs for v in Asante Twi*:
   a. $[v] \leftrightarrow$ Ø
   b. $[v$, OP:+OP$] \leftrightarrow$ $^{\text{H-}}$

(5) 

There are a number of ways of implementing this formally. For example, the floating H tone could be subject to an alignment constraint requiring that it be realized at the edge of a prosodic word. An alternative would be to follow Trommer's (2011) approach to tonal overwriting in Jumjum and adopt a H tone circumfix. Regarding the change on the complementizer, we assume that the HL complementizer realizes C heads with unvalued operator features, and the low toned VI is inserted for complementizers with a valued operator feature. In addition, there is a distinction between the kinds of affixes affected by H tone insertion on the verb. Whereas aspectual prefixes are affected (6), tense affixes are not (7):

(6) a. Baá re-seré hwáń?
   Baah PROG-laugh who
   b. Hwáń na Baá **ré-sé**ré nó?
   who FOC Baah PROG-laugh 3SG
   'Who is Baah laughing at?'

(7) a. Kofi boá-a Afiá
   Kofi help-PAST Afia
   'Kofi helped Afia'
   b. Kofi na ɔ-b**ó**á-**a** Afiá
   Kofi FOC 3SG-help-PAST Afia
   'It is Kofi who helped Afia'

Note that this follows from assumption that affixes are combined bottom-up (starting with the verbal root) in post-syntax coupled with the structure of the Twi clausal spine in (8) independently proposed by Kandybowicz (2015). Thus, v combines with Asp+$\sqrt{root}$ and spreads throughout this complex as in (6). With tense affixes (7), v only combines with the root, triggers spreading here and tense affixes are fused later and thus come too late to be affected by H-tone spreading.

(8) [$_{\text{TP}}$ T [$_{v\text{P}}$ v [$_{\text{AspP}}$ Asp [$_{\sqrt{\text{P}}}$ $\sqrt{root}$]]]]

Extensions: Reflexes of movement are also found in adverbial clauses where no overt operator movement has taken place (9). This provides evidence for empty operator movement in adverbial as assumed by Geis (1970), Haegeman (2007), Zentz (2014) since a moving empty operator would trigger the expected reflex on the verb. Furthermore, this reflex of movement is found in predicate doubling constructions suggesting that this construction involve movement (e.g. Aboh 2006) rather than base-generation (e.g. Cable 2004).

(9) a. Kofi re-bisá nó
   Kofi PROG-ask him
   'Kofi is asking him.'
   b. Kofi rébísá nó ná ...
   Kofi PROG-ask him when
   'while Kofi was asking him'

(10) Boá na Kofi rébóá Ámá
   help FOC Kofi PROG-help Ama
   'Kofi is HELPING Ama.'

Summary: In sum, this paper provides new evidence for tonal reflexes of successive-cyclic movement in Asante Twi. These findings have both empirical and theoretical consequences. In general, tonal reflexes of movement have been rarely discussed in the literature (Clements et. al 1983 for Kikuyu, Zentz 2014 for Akɔɔse are notable exceptions), so this fills an important empirical gap. In addition, this particular pattern is striking since tonal changes occur on exactly those heads (v, C) that are assumed to be phase heads. Thus, this analysis has important consequences for both theories of locality (viz. the size of phases) as well as the syntax-phonology interface in general (i.e. that tone can realize abstract syntactic properties such as the presence of movement in a given clause).