

# The Prosodic Licensing of *Wh*- In-situ: Evidence from Krachi and Wasa

Jason Kandybowicz and Harold Torrence

## 1. Introduction

*Wh*- in-situ is a pervasive feature of Tano interrogative syntax (Torrence and Kandybowicz 2012, Kandybowicz and Torrence 2013, Torrence and Kandybowicz to appear), yet the Tano languages differ from one another in subtle ways with respect to the distribution of in-situ interrogative expressions. For instance, Krachi, a North Guang Tano language (Williamson and Blench 2000), allows all *wh*- expressions apart from ‘why’ to appear in main clauses. Wasa, a Central Tano language of the Akan group (Williamson and Blench op. cit.), similarly tolerates *wh*- in-situ in main clauses, but draws the line at subject interrogatives and ‘why’ expressions. In embedded domains, Krachi and Wasa differ significantly. Krachi permits *wh*- in-situ in embedded complement clauses. Wasa disallows embedded in-situ interrogatives.

What accounts for this variation? In this article, we argue that prosodic licensing is a crucial dimension regulating the distribution of *wh*- in-situ in the Tano languages. While considerations at the syntax-semantics interface surely play an equally prominent role in the licensing of certain in-situ interrogatives both in Tano and cross-linguistically, we restrict our attention to cases where syntactic and semantic considerations appear immaterial in the licensing of *wh*- in-situ. Our claim is that *wh*- items apart from subject interrogatives and ‘why’, expressions which are seemingly licensed semantically, are subject to a prosodic licensing condition requiring them to be internal to an Intonational Phrase upon spell-out of the containing C phase. Under this analysis, the ability of a *wh*- item to appear in an in-situ position correlates with the prosodic status of its immediately containing clause. We show that embedded complement clauses are prosodically mapped as Intonational Phrases at spell-out in Krachi, but not in Wasa. Consequently, embedded *wh*- in-situ (of the relevant class of interrogatives) is licensed in Krachi, but blocked in Wasa. In this way, the variation described above reduces to a difference in how narrow syntactic structures are externalized at PF by way of prosodic mapping.

The article is organized as follows. Section two concretizes the variation in Tano *wh*- in-situ patterns described above by establishing the basic syntactic facts. Section three motivates a prosodic approach to deriving the variable distribution of *wh*- in-situ in Tano by calling into question the adequacy of a purely syntactic/semantic analysis. In section four, we present our analysis, grounding our claims in the observable prosodic differences dividing one class of Tano languages from the other with respect to the status of embedded clauses. Section five concludes the article with a summary and brief closing remarks.

---

\* Jason Kandybowicz, University of Kansas, [kandybowicz@ku.edu](mailto:kandybowicz@ku.edu). Harold Torrence, University of Kansas, [torrence@ku.edu](mailto:torrence@ku.edu). This project would have been impossible were it not for the many careful and patient native speaker consultants in Ghana and the USA who provided the data on which this article is based: Peter Afful Selassie Ahorlu, Seth Arthur, Emmanuel Baidoo, Simon Fofie, Cecelia Gyameah, Kweku Mark Nsekou-Denteh, David Opoku and Peter Owusu-Opoku. We also extend our thanks to Prof. Kofi Agyekum, Prof. Akosua Anyidoho, Mr. Kwame Opoku and Mrs. Mary Opoku for their logistical support. For helpful feedback, we thank Michael Diercks, Michael Marlo, Sharon Rose, Lisa Selkirk, Tonjes Veenstra, and the audience of ACAL 44 at Georgetown University where this material was presented.

## 2. The distributional variation of *wh-* in-situ in Tano

This article examines the distribution and prosodic licensing of in-situ interrogative expressions in two non-island domains: main clauses and embedded complement clauses. Future work will expand on these results by extending coverage to other embedded domains, such as non-complement clauses (of which there are several varieties in each language). For now, we limit ourselves to just these two domains for reasons of space and analytical manageability.

### 2.1. The distribution of *wh-* in-situ in Krachi

With the exception of *nání* ‘why’ (1d), which must be focused and appear peripherally (1e) (Kandybowicz and Torrence 2011), all main clause *wh-* expressions in Krachi may surface clause-internally. This is shown below<sup>1</sup>.

- (1) a. Nse ε-mo bwatéo?  
who PST-kill chicken  
‘Who slaughtered the chicken?’
- b. ɔʃíw ε-mo ne?  
woman PST-kill what  
‘What did the woman slaughter?’
- c. ɔʃíw ε-mo bwatéo nfré/kemeké/nene?  
woman PST-kill chicken where/when/how  
‘Where/when/how did the woman slaughter the chicken?’
- d. \*ɔʃíw ε-mo bwatéo nání?  
woman PST-kill chicken why
- e. Nání jí ɔʃíw ε-mo bwatéo?  
why FOC woman PST-kill chicken  
‘Why (for what reason) did the woman slaughter the chicken?’

The same *wh-* expressions that are permitted clause-internally in matrix contexts are permissible in embedded complement clauses as well, as shown in (2). Once again, in-situ *nání* ‘why’ is restricted.

- (2) a. Kofi ε-ɖɪra [fé nse ε-mo bwatéo]?  
Kofi PST-say COMP who PST-kill chicken  
‘Who did Kofi say slaughtered the chicken?’
- b. Kofi ε-ɖɪra [fé ɔʃíw ε-mo ne]?  
Kofi PST-say COMP woman PST-kill what  
‘What did Kofi say that the woman slaughtered?’
- c. Kofi ε-ɖɪra [fé ɔʃíw ε-mo bwatéo nfré/kemeké/nene]?  
Kofi PST-say COMP woman PST-kill chicken where/when/how  
‘Where/when/how did Kofi say that the woman slaughtered the chicken?’

---

<sup>1</sup> Although an orthographic system has been developed for Krachi, we have been unable to obtain a copy of this work. Consequently, we use IPA to write our Krachi examples, using accent diacritics to represent Krachi’s two surface level tones (Snider 1990). The acute accent is used to mark High tones. Low tones are unmarked. For Wasa, we use a modified (non-IPA) version of the Akan script, as we have been unable to locate materials written in the language.

- d. \*Kofi ε-ɔ́ira [fé ɔ́fíw ε-mo bwatéo nání]?  
 Kofi PST-say COMP woman PST-kill chicken why

## 2.2. The distribution of *wh-* in-situ in Wasa

With respect to the distribution of *wh-* in-situ in main clauses, we find both subject–object asymmetries and ‘why’–non-‘why’ adjunct asymmetries. The data below reveal that subject interrogatives (3a) and ‘why’ adverbials (3e) may not surface clause-internally (they must be focused (3b,f)), but other *wh-* items may.

- (3) a. \*Hwae saaye?  
 who dance.PST
- b. Hwae na saaye?  
 who FOC dance.PST  
 ‘Who danced?’
- c. Berema no kum den?  
 man the kill.PST what  
 ‘What did the man slaughter?’
- d. Berema no kum akoko no ehífa/mmerɛ ben/sen?  
 man the kill.PST chicken the where/time which/how  
 ‘Where/when/how did the man slaughter the chicken?’
- e. \*Berema no kum akoko no adienti?  
 man the kill.PST chicken the why
- f. Adienti na berema no kum akoko no?  
 why FOC man the kill.PST chicken the  
 ‘Why did the man slaughter the chicken?’

With respect to its distribution in embedded complement clauses, Wasa bans all interrogatives from appearing in embedded contexts in non-echo questions. The data in (4) highlight the fact that *wh-* items that are available clause-internally in root contexts (3c-d) are disallowed in clausal complements.

- (4) a. \*Wo dwene [se berema no kum edien]?  
 2<sup>ND</sup>.SG think COMP man the kill.PST what
- b. \*Wo dwene [se berema no kum akoko no ehífa/mmerɛ ben/sen]?  
 2<sup>ND</sup>.SG think COMP man the kill.PST chicken the where/time which/how

## 2.3. Restricting the article’s empirical scope

To briefly recap, Krachi and Wasa both allow *wh-* in-situ in main clauses, but restrict ‘why’ from appearing clause-internally. Additionally, Wasa restricts in-situ subject interrogatives. The bulk of the variation, however, takes place in the embedded domain. All *wh-* items that may independently appear in-situ in main clauses may also appear in-situ in complement clauses in Krachi. Wasa, on the other hand, systematically excludes *wh-* in-situ in embedded complement clauses. The table below summarizes.

Table 1. Distribution of *wh*- in-situ in Krachi and Wasa

	KRACHI	WASA
SUBJECT <i>wh</i> - IN-SITU (MAIN CLAUSES)	✓	×
NON-SUBJECT <i>wh</i> - IN-SITU (MAIN CLAUSES)	✓	✓
‘why’ IN-SITU (MAIN & EMBEDDED CLAUSES)	×	×
<i>wh</i> - IN-SITU (EMBEDDED CLAUSES)	✓	×

In the remainder of this article, we will focus our inquiry on deriving the variable distribution of non-subject and non-‘why’ in-situ interrogatives. Our reason for this is that a growing body of research has converged on the conclusion that restrictions on the distribution of in-situ subject *wh*- items and ‘why’ interrogatives are cross-linguistically robust and plausibly syntactic/semantic in nature (see Green and Jaggard 2003, Potsdam 2006, and Sabel and Zeller 2006, among others, for approaches to restrictions on in-situ subject interrogatives and Reinhart 1998, Rizzi 2001, Shlonsky and Soare 2011, and Torrence and Kandybowicz to appear for accounts of the prohibition on ‘why’ in-situ). This raises the question of whether restrictions on the distributions of other in-situ *wh*- items can be grounded in syntactic/semantic considerations. In the next section, we consider whether such forces are at play, but conclude that the factors licensing/restricting non-subject and non-‘why’ in-situ interrogatives cannot be purely syntactic/semantic in nature. As a result, we pursue the possibility that prosodic considerations play a role in licensing non-subject and non-‘why’ in-situ interrogatives.

### 3. Motivating a prosodic approach to in-situ interrogative licensing

Excluding subjects and ‘why’ expressions, both languages under investigation permit *wh*- in-situ in root clauses. Because embedded domains introduce restrictions on the acceptability of *wh*- in-situ in Tano, we must probe these contexts to uncover the conditions that license in-situ interrogatives. In this section, we consider one influential approach to the licensing of (embedded) in-situ interrogative items that appeals to the syntax-semantics interface. We show, however, that this analysis makes incorrect predictions with respect to Tano embedded interrogative syntax, motivating a non-syntactic/semantic approach to embedded in-situ *wh*- licensing.

The syntactic/semantic approach to in-situ *wh*- licensing we are referring to is actually a family of proposals, each differing slightly in their technical implementation, but sharing the core idea that in-situ *wh*- items are semantically licensed via the formation of a syntactic dependency between the item and a Q operator (Cheng 1991, Beck 1996, Hagstrom 1998, Pesetsky 2000, Cable 2010, among others). For some, this dependency is achieved via binding; for others, it is mediated by the Agree operation. Either way, a language will tolerate *wh*- in-situ if two conditions are met: one, the language has a dedicated Q operator (whether overt or null) and two, *wh*- is accessible to Q. Applied to the languages currently under investigation, the approach would offer the following analysis of in-situ *wh*- distribution. To account for the fact that both languages admit *wh*- in-situ (at least in matrix clauses), it must be the case that both have Q particles. And to account for the asymmetrical distribution of *wh*- in-situ in embedded clauses, it would have to be the case that embedded *wh*- is accessible to Q in Krachi (facilitating embedded *wh*- in-situ), but not in Wasa (thereby blocking embedded *wh*- in-situ).

As for the first claim, there is sufficient evidence that both languages have Q particles, whether overt or null. Evidence for null Q particles comes from the existence of (naked) partial *wh*- movement (see (6) and footnote 2 below), which invokes a silent matrix Q operator to mark the scope of the moved embedded interrogative. Evidence for overt Q comes in the form of clause-final particles deployed in the formation of polar questions in both languages. This is illustrated below for Krachi.

- (5) ɔfíw ε-mo bwatéo e:?  
 woman PST-kill chicken Q  
 ‘Did the woman slaughter the chicken?’

As for the second claim (i.e. that embedded *wh-* is accessible to Q in Krachi, but not in Wasa), a prediction is made. If Q is unable to non-locally bind/agree with an embedded *wh-* item in Wasa, then Wasa should not allow partial *wh-* movement to a position below embedded C<sup>0</sup> because otherwise, the matrix scope of the partially moved *wh-* item would be unaccounted for. This prediction fails to hold in Wasa. Despite restricting the appearance of in-situ interrogatives in embedded complement clauses, partial *wh-* movement is robust in the language<sup>2</sup>. All Wasa *wh-* items may undergo partial movement, regardless of thematic status.

- (6) a. Wo dwene [sɛ berɛma ben na o-kum akoko no]?  
 2<sup>ND</sup>.SG think COMP man which FOC 3<sup>RD</sup>.SG-kill.PST chicken the  
 ‘Which man do you think slaughtered the chicken?’
- b. Wo dwene [sɛ ɛdien(ti) na berɛma no kumiye]?  
 2<sup>ND</sup>.SG think COMP what FOC man the kill.PST  
 ‘What do you think that the man slaughtered?’
- c. Wo dwene [sɛ ɛhífa/adienti na berɛma no kum akoko no]?  
 2<sup>ND</sup>.SG think COMP where/why FOC man the kill.PST chicken the  
 ‘Where/why do you think that the man slaughtered the chicken?’

Note that Wasa partial *wh-* movement is “naked” in the sense of Fanselow’s (2006) typological characterization – the partially moved interrogative is unaccompanied by an overt Q particle in the clause where it takes scope (i.e. the root clause). The availability of partial *wh-* movement in spite of the absence of embedded *wh-* in-situ is unexpected for another reason. According to Fanselow’s (2006) Generalization S2, if a construction is grammatical with naked partial movement, it can also be constructed with the *wh-* phrase in-situ. Wasa, therefore, represents a clear counterexample to Fanselow’s Generalization, as it allows naked partial movement of any interrogative item, yet prohibits those items from surfacing clause-internally in the embedded domain.

Returning to the implications of the syntactic/semantic approach’s failed prediction in the case of embedded *wh-* licensing in Wasa, because the partially moved *wh-* item takes matrix scope, as revealed by the interpretations in (6), matrix Q must somehow non-locally bind/agree with the moved embedded interrogative in the spell-out domain of the embedded C phase. But if this dependency is available under partial movement, why is it not available when an interrogative remains in-situ? The syntactic/semantic approach provides no satisfying answer to this analytical dilemma, leading to the reasonable conclusion that in actuality, embedded in-situ interrogatives are in fact bound by matrix Q in the language. We conclude, therefore, that the principle force at work licensing non-subject/non-‘why’ embedded in-situ interrogatives cannot be purely syntactic/semantic in nature and that consequently, approaching the problem from the decidedly opposite direction (i.e. from a prosodic perspective) is at least reasonably justified.

## 4. Prosodic analysis of Tano in-situ interrogatives

### 4.1. Framework of assumptions

Our analysis of the Tano in-situ interrogative distributional pattern is guided by the following theoretical assumptions. We assume the existence of the Prosodic Hierarchy (Selkirk 1984, Nespor and

<sup>2</sup> Partial *wh-* movement with a null matrix Q is also robustly attested in Krachi (see Torrence and Kandybowicz to appear for full paradigms). However, since the co-existence of partial movement and embedded *wh-* in-situ in Krachi is fully consistent with the syntactic/semantic approach sketched above, it will not be discussed.

Vogel 1986), according to which prosodic constituents are hierarchically organized. We also adopt the Match theory of Selkirk 2011, which maintains that prosodic structures are built from and largely correspond to syntactic structures. Coupled with the Prosodic Hierarchy hypothesis, the Match theory constitutes a theory of prosodic mapping according to which a morphological word corresponds to a Prosodic Word ( $\omega$ ), a sub-sentential syntactic phrase maps onto a Phonological Phrase ( $\varphi$ ), and a clause is prosodically realized as an Intonational Phrase ( $\iota$ ):  $\iota > \varphi > \omega$ . Our final assumption is that the derivation of a linguistic object proceeds cyclically by phase (Chomsky 2000). Accordingly, syntactic structures are built bottom-up in derivational stages called phases. The introduction of a phase head ( $v^0, C^0$ ) triggers the spell-out of its complement, by which the structure is sent to the sensorimotor (PF) and conceptual-intentional (LF) interfaces for interpretation. It is at the point of transfer to PF that a syntactic structure is mapped onto a prosodic structure. Following Kratzer and Selkirk (2007), we assume that spell-out domains (SODs) are prosodic constituents; in particular,  $SOD(v^0) = \varphi$  and  $SOD(C^0) = \iota$ . In other words, VP complements of  $v^0$  are prosodically mapped as Phonological Phrases and TP complements of  $C^0$  are mapped as Intonational Phrases. The latter mapping will be crucial for what follows.

#### 4.2. *The proposal in a nutshell*

We propose the following prosodic licensing condition on *wh*- items in Tano.

- (7) For any C phase containing a *wh*- item, *wh*- must be  $\iota$ -internal at Spell-Out.

Assuming that matrix clauses are parsed as Intonational Phrases, a relatively uncontroversial assumption, (7) accounts for the fact that both languages under investigation allow *wh*- in-situ semantically appropriate items in root contexts. But what about embedded clauses? This issue is less straightforward and has been the subject of some debate. One position that has been advanced is that only root clauses are mapped onto  $\iota$  (Downing 1970), rendering embedded clauses some (sub)species of  $\varphi$ . This position has been challenged recently by a growing body of research that suggests that in addition to root clauses, embedded clauses in some languages (e.g. German) are mapped onto Intonational Phrases (Truckenbrodt 2005). Our findings are consistent with Truckenbrodt's. In what follows, we show that embedded complement clauses are parsed as Intonational Phrases in some, but not all Tano languages and propose that this difference in prosodic mapping underlies the distributional asymmetry in Tano embedded in-situ interrogative licensing. In those languages that map embedded clauses onto  $\iota$  when the lower C phase is spelled out (i.e. Krachi), embedded *wh*- in-situ meets the condition in (7) and is thus permissible. In those languages that do not map clausal complements as Intonational Phrases (i.e. Wasa), embedded in-situ *wh*- items fail to satisfy (7) upon spell-out of the lower C phase and are subsequently prohibited. In this way, our proposal is that the ability of a *wh*- item to appear in an in-situ position correlates with the prosodic status of its immediately containing clause.

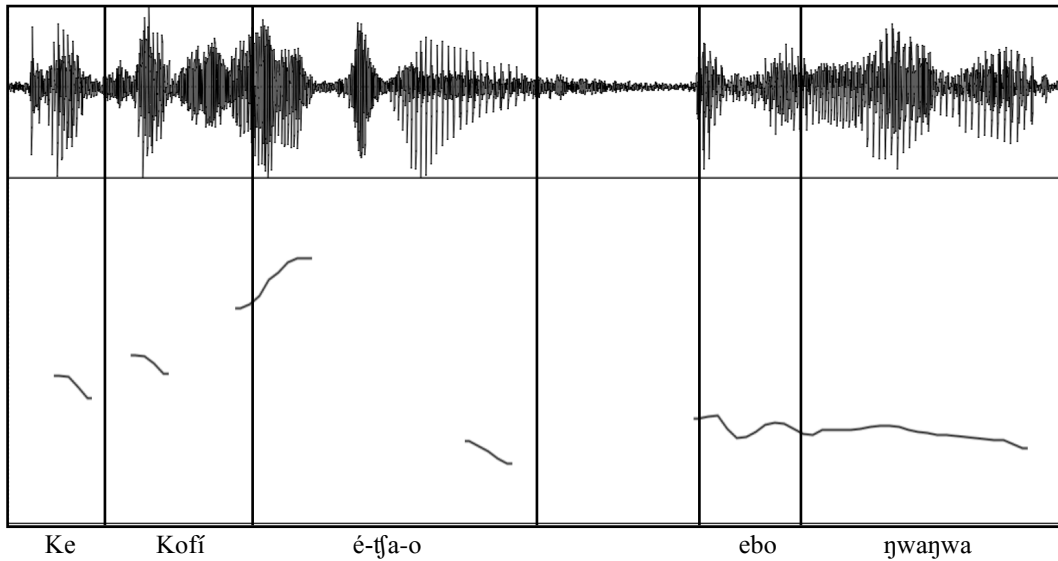
The remainder of this section is devoted to motivating the following prosodic analysis of Tano embedded clauses in support of the proposal in (7).

- (8) a.  $SOD(\text{embedded } C^0)_{\text{KRACHI}} = \iota$   
 b.  $SOD(\text{embedded } C^0)_{\text{WASA}} \neq \iota$

#### 4.3. *Prosodic status of Krachi embedded complement clauses*

The right edges of phrasal prosodic constituents in Krachi are tonally marked and detectable via a number of salient phonetic cues. Kandybowicz and Torrence (2012a) show that Phonological Phrases in the language are right edge-marked by way of Low boundary tones (L%). In the same way, the right boundaries of Intonational Phrases in the language are marked by L%. This is illustrated in the pitch track in (9) below.

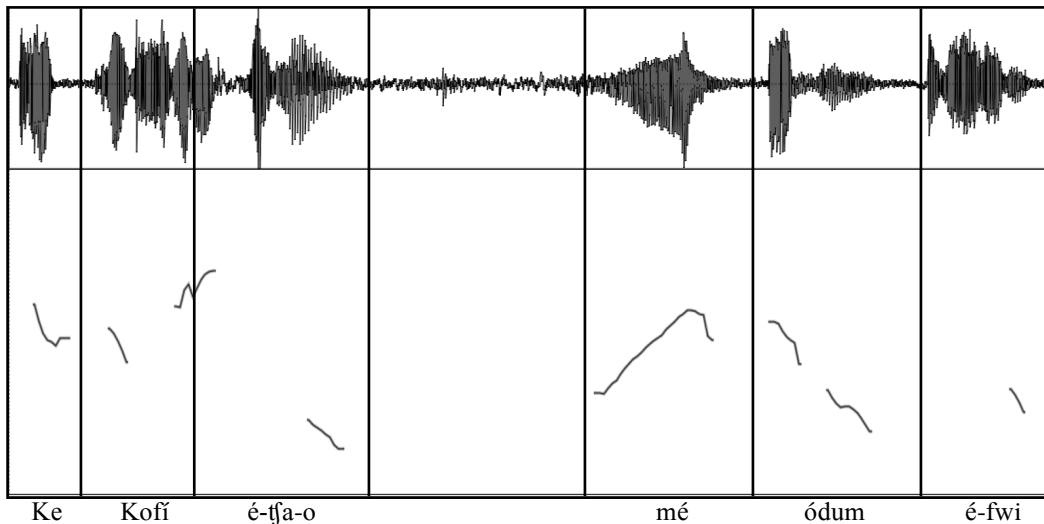
- (9)  $\iota$ (Ke Kofí é-tʃa-o) $\iota$   $\iota$ (ebo ηwanwa) $\iota$ .  
 COMP Kofí PST-dance-DET COP strange  
 ‘That Kofi danced is strange.’



Structurally, (9) contains a sentential subject CP (cross-linguistically, a structure regularly parsed as an obligatory  $\iota$ ) and thus, according to the Match theory of Selkirk 2011 outlined above, it will be prosodically realized as an Intonational Phrase. The final item in each  $\iota$  (*tʃa-o* ‘danced’ and *ηwanwa* ‘strange’) is realized with a low falling F0 pattern, demarcating the constituent’s right edge.

Other phonetic correlates of right edge  $\iota$ -marking in the language can be identified. These include the presence of pauses in non-fast speech and (partial) pitch reset. The presence of a pause immediately following the first Intonational Phrase in (9) is evident in the lapse in articulation between the items *tʃa-o* and *ebo*. Partial pitch reset can be detected in (9) following the pause, however because the items in  $\iota_2$  are lexically L-bearing, the effect is subtle and easy to miss. The pitch track in (10) below more clearly exemplifies pitch reset following the right boundary of  $\iota_1$ . Notice that the L-bearing second syllables of *ódum* ‘heart’ and *é-fwi* ‘boil’ are upstepped, that is, realized with higher F0s than that of the L-bearing item ‘dance’ at the right edge of the first Intonational Phrase.

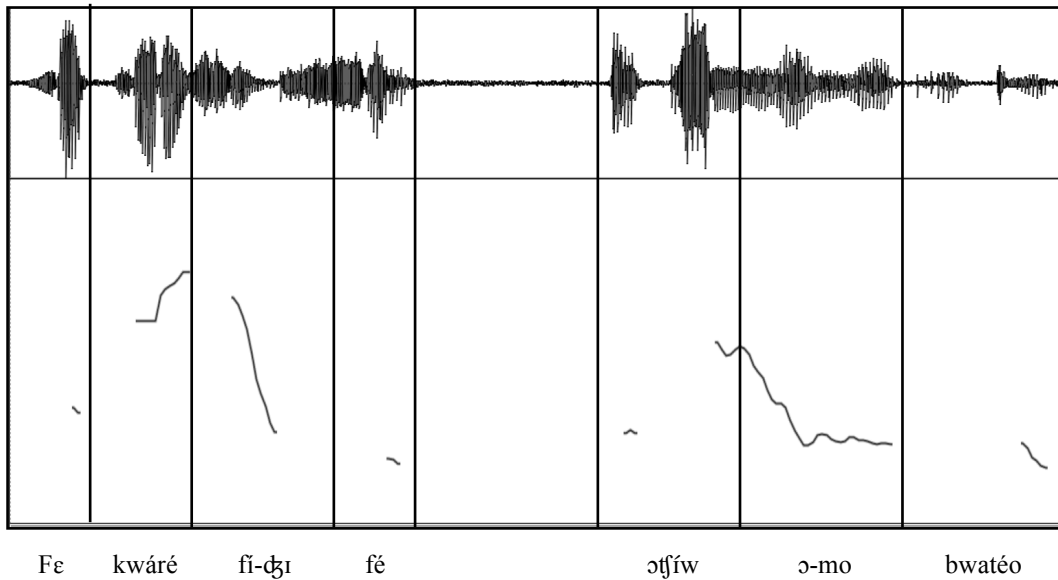
- (10)  $\iota$ (Ke Kofí é-tʃa-o) $\iota$   $\iota$ (mé ódum é-fwi) $\iota$ .  
 COMP Kofí PST-dance-DET 1<sup>ST</sup>.SG heart PST-boil  
 ‘That Kofi danced angered me (i.e. made my heart boil).’



The pitch track in (10) also exemplifies the other phonetic correlates of Krachi  $\iota$ -marking previously discussed. The presence of L% can be detected in the low falling F0 values at the right edges of the two Intonational Phrases and a clear prosodic break divides the sentential subject from the predicate.

Having established the phonetic correlates of right edge  $\iota$  marking in Krachi, we can proceed to demonstrate that embedded complement clauses (i.e. TPs) in the language are parsed as Intonational Phrases. Evidence for this comes from the following observations: one, the lexically High (H) tone bearing complementizer *fé* surfaces with an L/falling tone, indicating the presence of a right  $\iota$  boundary tone; two, a significant pause separates the complementizer from the embedded subject in non-fast speech; and three, partial pitch reset affects the F0 range of tones in the embedded clause immediately following the complementizer. This prosodic behavior is illustrated in the pitch track below.

- (11)  $\iota$ (F $\epsilon$  kwáré fí- $\text{ɕ}$ ɪ<sup>3</sup> fé) $\iota$   $\iota$ ( $\text{ɕ}$ fíw ɔ-mo bwatéo) $\iota$ .  
 2<sup>ND</sup>.SG collect 2<sup>ND</sup>.SG-eat COMP woman PST-kill chicken  
 ‘You think that the woman slaughtered the chicken.’

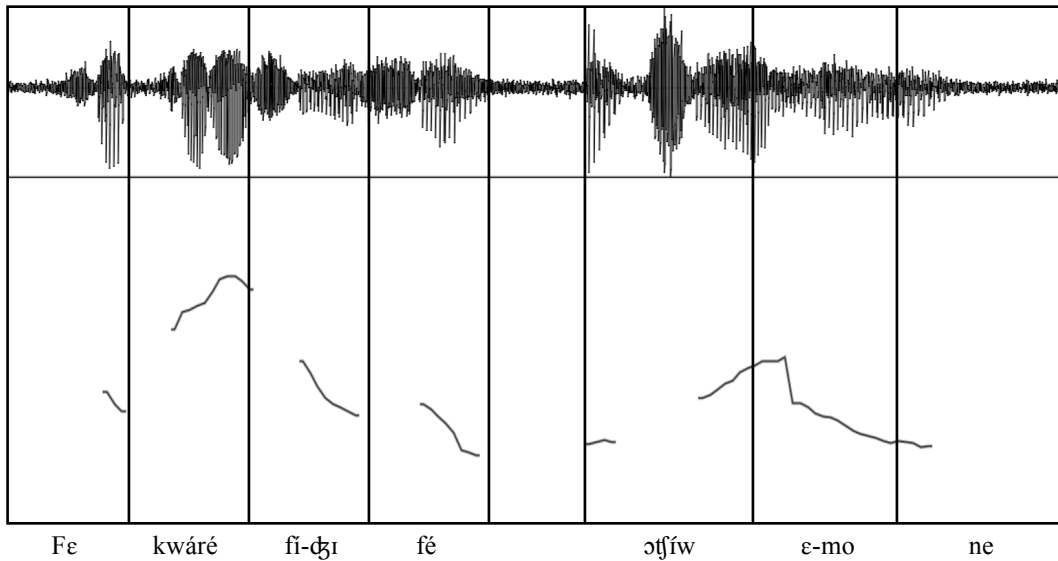


The prosodic status of complement clauses in Krachi is unaffected by the presence of in-situ interrogatives. The following data confirm that embedded complement clauses harboring in-situ *wh*-items are also parsed as Intonational Phrases. Two pitch tracks exemplifying the  $\iota$  status of *wh*-internal embedded complement clauses are presented below. The data showcase clausal embedding under different bridge verbs (‘think’ (12a) and ‘know’ (12b)), illustrating that the  $\iota$  status of the embedded clause is independent of the embedding predicate. The three acoustic correlates of  $\iota$  phrasing discussed above are clearly observable in each pitch track.

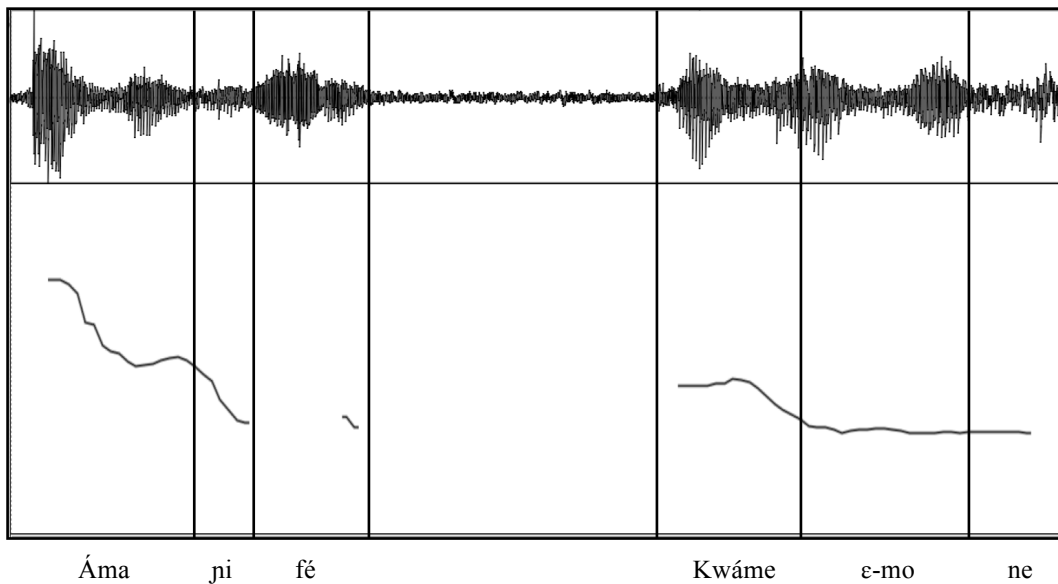
- (12) a.  $\iota$ (F $\epsilon$  kwáré fí- $\text{ɕ}$ ɪ fé) $\iota$   $\iota$ ( $\text{ɕ}$ fíw  $\epsilon$ -mo ne) $\iota$ ?  
 2<sup>ND</sup>.SG collect 2<sup>ND</sup>.SG-eat COMP woman PST-kill what  
 ‘What do you think that the woman slaughtered?’

<sup>3</sup> The item ‘think’ is an idiosyncratic split verb in Krachi composed of the predicates *kwáré* and *ɕɪ*, which in isolation bear the independent meanings ‘to collect’ and ‘to eat’ respectively. In the non-compositional split verb construction, however, neither predicate contributes its independent lexical meaning.





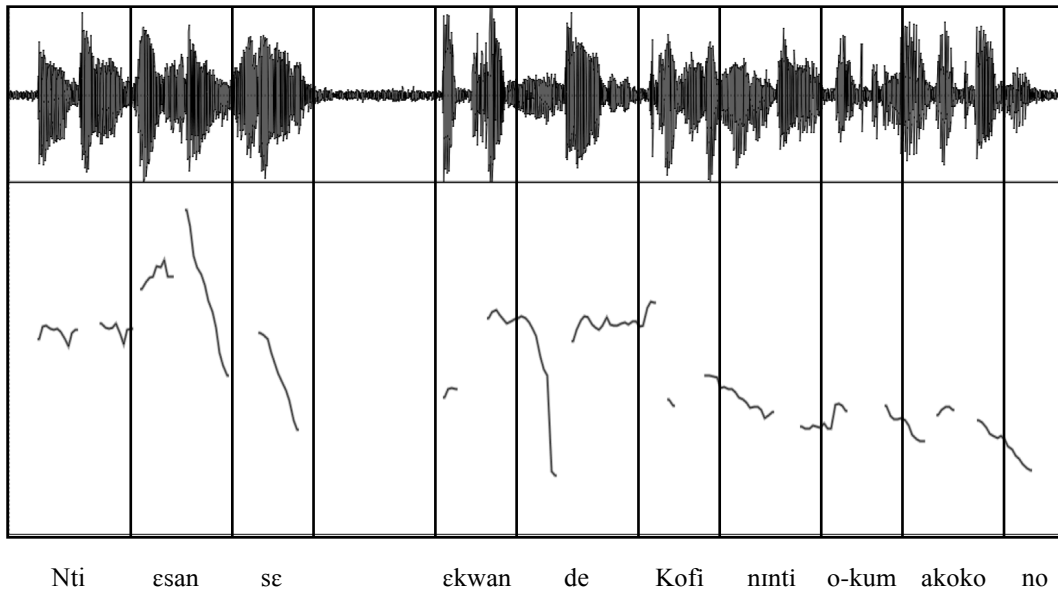
- b. *ʔ(Áma ɲi fɛ̀)ʔ ʔ(Kwáme ε-mo ne)ʔ*  
 Ama know COMP Kwame PST-kill what  
 ‘What does Ama know that Kwame slaughtered?’



#### 4.4. Prosodic status of Wasa embedded complement clauses

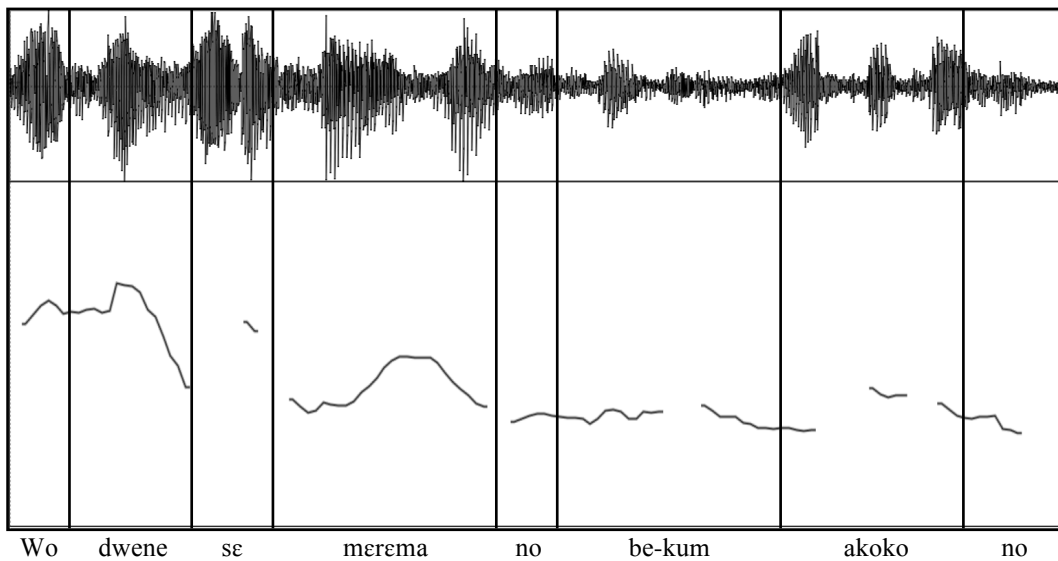
Comparable phonetic correlates of right edge *ʔ* marking (i.e. L%, pause, pitch reset) exist in Wasa. This is demonstrated below by way of a clause modified by a reason adjunct. In this construction, the lexically H-bearing *C<sup>0</sup> sɛ* at the right edge of *ʔ* surfaces with a depressed/falling F0. Following the complementizer is a pause. The range of F0 values following the break is also reset.

- (13) *ʔ(Nti εsan sɛ)ʔ ʔ(ekwan de Kofi ninti o-kum akoko no)ʔ*.  
 because *εsan* COMP hunger take Kofi therefore 3<sup>RD</sup>.SG-kill.PST chicken the  
 ‘Because he was hungry, Kofi slaughtered the chicken.’



Unlike Krachi, Wasa embedded complement clauses do not have the prosodic status of Intonational Phrases.<sup>4</sup> As illustrated below, the prosodic behavior of a Wasa complement clause is characterized by the tonal realization of complementizer *se*, whose lexical H tone is not overridden by a Low boundary tone in this construction. (Contrast the F0 realization of the complementizer in (14) below with that in (13) above.) If the post-C<sup>0</sup> domain in this construction constituted an independent Intonational Phrase, we would expect to find an accompanying prosodic break and pitch reset. However, as (14) shows, there is neither a significant pause separating C<sup>0</sup> from the embedded subject, nor does pitch reset occur in the embedded domain. Instead, we find continuous F0 downdrift from the main clause into the embedded clause.

- (14)     $\iota$ (Wo    dwene    se    merema    no    be-kum    akoko    no) $\iota$ .  
           2<sup>ND</sup>.SG    think    COMP    man.PL    the    3<sup>RD</sup>.PL-kill.PST    chicken    the  
           ‘You think that the men slaughtered the chicken.’



<sup>4</sup> Note that this mapping constitutes a violation of Selkirk’s (2011) Match condition because a clausal syntactic constituent (i.e. the embedded TP) does not correspond to an Intonational Phrase in the prosody. This, however, is unproblematic, as the Match condition is taken to be a violable constraint in Selkirk’s (2011) framework.

## 5. Conclusion

An important result of the Minimalist paradigm shift is that phenomena once thought to be purely syntactic in nature turn out instead to have more to do with the grammatical subsystems that interface with and impose well-formedness conditions on syntactic representations. The findings and conclusions presented in this article accord nicely with this position. We have argued that variation in the distribution of non-subject and non-‘why’ *wh*- in-situ in two Tano languages is interface-driven and ultimately prosodic. Our argument for this conclusion was based on an asymmetry in the availability of embedded *wh*- in-situ and partial *wh*- movement in Wasa that suggests that non-syntactic/semantic factors play a role in non-subject/non ‘why’ *wh*- licensing. Further support came from the observation that the ability of a *wh*- item to appear in an in-situ position correlates with the prosodic status of its immediately containing clause. In Krachi, where complement clauses have the prosodic status of Intonational Phrases, all in-situ interrogatives available in main clauses are available in embedded domains. In Wasa, however, where clausal complements do not have the status of Intonational Phrases, embedded *wh*- in-situ is restricted. The table below summarizes these findings.

Table 2. Correlation of embedded clause prosodic status and availability of *wh*- in-situ in Tano

	KRACHI	WASA
EMBEDDED CLAUSE = $\iota$	✓	✗
<i>wh</i> - IN-SITU (EMBEDDED CLAUSES)	✓	✗

We proposed a prosodic licensing condition on *wh*- items in Tano (7) to account for this correlation, which requires a *wh*- item to be contained within an Intonational Phrase whenever a C phase is spelled-out. Because root clauses are prosodically mapped onto Intonational Phrases across the board (Selkirk 2011), (7) accounts for and is consistent with the existence of semantically appropriate *wh*- in-situ in matrix domains both in Tano and elsewhere cross-linguistically. And because at the point of embedded C phase spell-out embedded domains fail to be parsed as Intonational Phrases in Wasa, embedded *wh*- in-situ is unavailable in the language, unlike in Krachi.

To the extent that (7) successfully accounts for the distributional variation in Tano *wh*- in-situ patterns, the prosodic licensing approach adopted in this article seems encouraging. One deeper issue that remains difficult to reckon with, however, is the motivation for a constraint like (7). What interface principle or design feature would underlie such a condition? Other proposals claiming that *wh*- in-situ is prosodically licensed (for at least some subset of interrogative expressions in a given language) face a similar challenge. For instance, Richards (2010) proposes that *wh*- in-situ is licensed when *wh*- prosodically phrases with its scope-marking complementizer by minimizing the number of intervening major prosodic boundaries separating *wh*- and  $C^0$ . Putting aside the analytical difficulties for Richards’ proposal posed by the Tano languages surveyed in this article<sup>5</sup>, it is difficult to assign a deep and satisfying motivation grounded in PF interface pressures or optimal design considerations to Richards’ phrasing condition. This may be because there simply is no deep explanation for certain prosodic licensing conditions. Or, perhaps more likely, it is rooted in the fact that our understanding of the syntax-phonology interface is currently underdeveloped. It is our hope that this research stimulates further development into this burgeoning field of linguistic inquiry to close the gap between our understanding of what we observe and why we observe it.

<sup>5</sup> Given that complement clauses in Krachi induce additional  $\iota$  boundaries, unlike in Wasa, Richards’ (2010) proposal wrongly predicts that embedded *wh*- in-situ should be less likely in Krachi than in Wasa because there are more major prosodic boundaries intervening between *wh*- and  $C^0$  in the former. See Kandybowicz and Torrence 2012b for more details on how the distribution and nature of *wh*- in-situ in Krachi poses an analytical dilemma for Richards’ proposal.

## References

- Beck, Sigrid. 1996. Quantified Structures as Barriers for LF Movement. *Natural Language Semantics* 4: 1-56.
- Cable, Seth. 2010. *The Grammar of Q: Q-Particles, Wh- Movement and Pied Piping*. Oxford, UK: Oxford University Press.
- Cheng, Lisa Lai-Shen. 1991. *On the Typology of Wh- Questions*. Ph.D. thesis, Massachusetts Institute of Technology.
- Chomsky, Noam. 2000. Minimalist Inquiries. In Roger Martin, David Michaels, and Juan Uriagereka (eds.), *Step by Step: Essays on Minimalism in Honor of Howard Lasnik*, 89-155. Cambridge, MA: MIT Press.
- Downing, Bruce. 1970. *Syntactic Structure and Phonological Phrasing in English*. Ph.D. thesis, University of Texas at Austin.
- Fanselow, Gisbert. 2006. Partial Movement. In Martin Everaert, Henk van Riemsdijk, Rob Goedemans and Bart Hollebrandse (eds.), *The Blackwell Companion to Syntax (Volume 3)*, 437-492. London: Blackwell Publishing.
- Green, Melanie and Philip J. Jaggard. 2003. Ex-situ and In-situ Focus in Hausa: Syntax, Semantics and Discourse. In Jacqueline Lecarme (ed.), *Research in Afroasiatic Grammar II [CILT 241]*, 187-213. Amsterdam: John Benjamins.
- Hagstrom, Paul. 1998. *Decomposing Questions*. Ph.D. thesis, Massachusetts Institute of Technology.
- Kandybowicz, Jason and Harold Torrence. 2011. How *Why* is Different: *Wh-* in-situ in Krachi. *Snippets* 23: 5-6.
- Kandybowicz, Jason and Harold Torrence. 2012a. Krachi *Wh-* In-situ: A Question of Prosody. In Jaehoon Choi, E. Alan Hogue, Jeffrey Punske, Deniz Tat, Jessamyn Schertz and Alex Trueman (eds.), *Proceedings of the 29th West Coast Conference on Formal Linguistics*, 362-370. Somerville, MA: Cascadilla Press.
- Kandybowicz, Jason and Harold Torrence 2012b. Are Syntax and Prosody Entangled? Insights from Krachi In-situ Interrogatives. Ms. University of Kansas.
- Kandybowicz, Jason and Harold Torrence. 2013. Unweaving the Interrogative Rainbow: the Interplay between Syntax, Semantics, and Prosody in Four Tano Languages. Paper presented at ACAL 44, Georgetown University.
- Kratzer, Angelika and Elisabeth Selkirk. 2007. Phase Theory and Prosodic Spell-Out: the Case of Verbs. *The Linguistic Review* 24: 93-135.
- Nespor, Marina and Irene Vogel. 1986. *Prosodic Phonology*. Dordrecht: Foris.
- Pesetsky, David. 2000. *Phrasal Movement and its Kin*. Cambridge, MA: MIT Press.
- Potsdam, Eric. 2006. More Concealed Pseudoclefts in Malagasy and the Clausal Typing Hypothesis. *Lingua* 116: 2154-2182.
- Reinhart, Tanya. 1998. *Wh-*in-situ in the Framework of the Minimalist Program. *Natural Language Semantics* 6: 29-56.
- Richards, Norvin. 2010. *Uttering Trees*. Cambridge, MA: MIT Press.
- Rizzi, Luigi. 2001. On the Position Int(errogative) in the Left Periphery of the Clause. In Guglielmo Cinque and Giampaolo Salvi (eds.), *Current Studies in Italian Syntax: Essays Offered to Lorenzo Renzi*, 287-296. Amsterdam: Elsevier North-Holland.
- Sabel, Joachim and Jochen Zeller. 2006. *Wh-*Question Formation in Nguni. In John Mugane, John P. Hutchinson and Dee A. Worman (eds.), *Selected Proceedings of the 35<sup>th</sup> Annual Conference on African Linguistics*, 271-283. Somerville, MA: Cascadilla Proceedings Project.
- Selkirk, Elisabeth. 1984. *Phonology and Syntax: the Relation between Sound and Structure*. Cambridge, MA: MIT Press.
- Selkirk, Elisabeth. 2011. The Syntax-Phonology Interface. In John Goldsmith, Jason Riggle and Alan Yu (eds.), *The Handbook of Phonological Theory (2<sup>nd</sup> edition)*, 435-484. Oxford, UK: Blackwell Publishing.
- Shlonsky, Ur and Gabriela Soare. 2011. Where's 'why'?. *Linguistic Inquiry* 42: 651-669.
- Snider, Keith. 1990. Tonal Upstep in Krachi: Evidence for Register Tier. *Language* 66: 453-474.
- Torrence, Harold and Jason Kandybowicz. 2012. Comparative Tano Interrogative Syntax: Typological and Genetic Implications. Paper presented at ACAL 43, Tulane University.
- Torrence, Harold and Jason Kandybowicz. To appear. Comparative Tano Interrogative Syntax: The View from Krachi and Bono. To appear in *Selected Proceedings of the 43<sup>rd</sup> Annual Conference on African Linguistics*. Somerville, MA: Cascadilla Press.
- Truckenbrodt, Hubert. 2005. A Short Report on Intonation Phrase Boundaries in German. *Linguistische Berichte* 203: 273-296.
- Williamson, Kay and Roger Blench. 2000. Niger-Congo. In Bernd Heine and Derek Nurse (eds.), *African Languages: An Introduction*, 11-42. Cambridge: Cambridge University Press.