Krachi *wh-* In-Situ: A Question of Prosody

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1. Introduction

Wh- expressions may appear in-situ and in left peripheral focus positions in Krachi, an endangered member of the North Guang subgroup of Kwa languages spoken in the Volta region of Ghana.

(1) a. ɔʧʃíw ɛ-mò bwatéo momo?[1]
woman AGR-kill.PST chicken which
'Which chicken did the woman slaughter?'
b. Bwatéo momo jí ɔʧʃíw ɛ-mò?
chicken which FOC woman AGR-kill.PST
'Which chicken did the woman slaughter?'

This dual distribution characterizes all Krachi interrogative expressions, with the exception of *nání* 'why'. Unlike every other *wh-* item in the language (2a-c), *why* may not appear clause-internally (2d). Instead, it must surface in the left periphery (2e), where it is interpreted as a reason operator.

(2) a. Ṇse ɛ-mò bwatéo?
who AGR-kill.PST chicken
'Who slaughtered the chicken?'
b. ɔʧʃíw ɛ-mò ne?
woman AGR-kill.PST what
'What did the woman slaughter?'
c. ɔʧʃíw ɛ-mò bwatéo ṇfré/kɛmekɛ́/nɛnɛ?
woman AGR-kill.PST chicken where/when/how
'Where/when/how did the woman slaughter the chicken?'
d. *ɔʧʃíw ɛ-mò bwatéo nání?
woman AGR-kill.PST chicken why
e. Nání jí ɔʧʃíw ɛ-mò bwatéo?
why FOC woman AGR-kill.PST chicken
'Why (for what reason) did the woman slaughter the chicken?'

It is worth noting that not even purpose readings for 'why' are available in cases like (2d) as they are in some languages (e.g. French). Similar facts obtain in embedded domains, as illustrated below.

(3) a. Kofí ɛ-dʒɪrà fé ɔʧʃíw ɛ-mò ne?
Kofi AGR-say.PST COMP woman AGR-kill.PST what
'What did Kofi say that the woman slaughtered?'

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[1] Because the Krachi language is not written, we present all data in IPA notation.

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b. Kofí ɛ-dʒɪrà fé ɔʧ͡ʃíw ɛ-mò bwatéo nɛnɛ?
Kofi AGR-say.PST COMP woman AGR-kill.PST chicken how
'How did Kofi say that the woman slaughtered the chicken?'
'How did the woman slaughter the chicken, according to Kofi?'

c. *Kofí ɛ-dʒɪrà fé ɔʧ͡ʃíw ɛ-mò bwatéo nání?
Kofi AGR-say.PST COMP woman AGR-kill.PST chicken why

d. Nání jí Kofí ɛ-dʒɪrà fé ɔʧ͡ʃíw ɛ-mò bwatéo?
why FOC Kofi AGR-say.PST COMP woman AGR-kill.PST chicken
'Why did Kofi say that the woman slaughtered the chicken?'
'Why did the woman slaughter the chicken, according to Kofi?'

In this article, we discuss two analytical options for deriving Krachi's asymmetrical distribution of in-situ *wh-* items. The first derives the distribution from the prosodic mapping of DPs in the language, drawing on Richards' (2010) theory of *wh-* in-situ. The second exploits the cartographic notion that *why* is cross-linguistically a dedicated left peripheral operator. We argue that typological and semantic considerations favor the latter approach and hence, that prosody does not drive *wh-* syntax as per Richards 2010. The Krachi facts do suggest, however, that certain aspects of Richards' proposal are correct. Based on these considerations, we propose a reinterpretation of Richards' theory.

2. Krachi *wh-* in-situ through the lens of Richards 2010

2.1. Overview of Richards' proposal

Richards (2010) proposes a universal PF condition regulating *wh-* constructions, according to which a *wh-* DP and its scopally-associated complementizer are required to phrase together prosodically. When syntax and prosody collaborate to build structures satisfying this condition, *wh-* movement is unnecessary and *wh-* in-situ obtains. When the phrasing of *wh-* and C cannot be achieved, *wh-* movement becomes obligatory, repositioning the interrogative closer to C for prosodic grouping.

In Richards' framework, two factors determine whether a *wh-* item can be phrased with C independent of movement: 1) whether prosodic boundaries are mapped onto the left or right edges of interrogative DPs and 2) the position of C in the linear order. Richards assumes a mechanism of (minor) prosodic domain formation in which the domain of an interrogative is extended by way of an algorithm that delimits C as one its bounding edges and the interrogative's independently determined boundary as its other edge. Thus, when a *wh-* item's prosodic boundary and corresponding C are on opposite sides, the required prosodic grouping can obtain, facilitating *wh-* in-situ. Successful phrasing of this sort can happen in one of two ways according to Richards: a) C may precede a right edge-marked *wh-* (cf. (4a), as in Chichewa) or b) C may follow a left edge-marked *wh-* (cf. (4b), as in Japanese).

(4) a. 👍 C … *wh-*]
b. 👍 [*wh-* … C

When an interrogative's prosodic boundary and corresponding C fall on the same side of the *wh-* item, however, the requisite phrasing can obtain only if movement to the opposite side of C occurs. For Richards, Tagalog (cf. (5a)) and Basque (cf. (5b)) exemplify these scenarios.

(5) a. 👎 C … [*wh-*
b. 👎 *wh-*] … C

2.2. Richards-style analysis

Richards' theory is based on case studies of languages in which the distribution of *wh-* items is symmetrical; either all interrogative constituents front or they all appear in-situ. On his analysis, this state of affairs follows as a consequence of the fact that the prosodic boundaries of DPs in these

languages are uniformly determined. Distributional asymmetries like those in Krachi can be made to follow from Richards' system as well. An approach in this vein would appeal to a prosodic asymmetry in the edge-marking of Krachi interrogatives. More specifically, given the facts in (2), the structural requirements in (4-5) and the fact that Krachi has clause-initial complementizers (cf. (6) below), an analysis along these lines would predict that unlike all other interrogative DPs in the language, whose right edges mark prosodic boundaries, Krachi exceptionally marks the left edge of *why*.

(6) a. Kofí ɛ-dʒɪrà fé ɔʧĩw ɛ-mò ne?
Kofi AGR-say.PST COMP woman AGR-kill.PST what
'What did Kofi say that the woman slaughtered?'
b. Ke Kofí ɛ-mò bwatéo ɛ-wa ŋwaŋwa.
COMP Kofi AGR-kill.PST chicken AGR-be strange/surprising
'That Kofi slaughtered the chicken is surprising.'

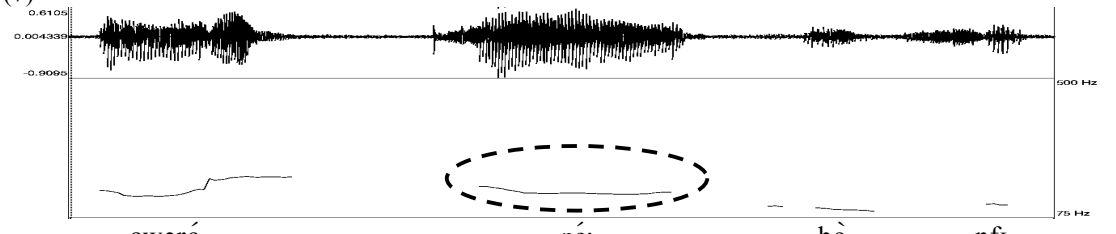
Under this analysis, all non-*why* interrogatives would have their prosodic boundaries and corresponding Cs on opposite sides (cf. (4a)), obviating the need for movement (when the focus marker is not merged). In the case of *why*, however, the DP's prosodic boundary and associated C would occur on the same (left) side of the interrogative (cf. (5a)), forcing movement to a high pre-C position. As we will see below, these prosodic predictions are indeed borne out.

2.2.1. Prosodic evidence

2.2.1.1. The prosody of non-interrogative DPs

The Krachi DP's right edge generally delimits the boundary of a minor prosodic domain. The presence of this boundary is signaled by a Low boundary tone, which depresses F0 and overrides tone sandhi processes like upstep (Snider 1990).[2] The pitch track in (7) illustrates that lexically High tone-bearing determiners are realized with a low falling contour when appearing phrase-finally in the DP.

(7)



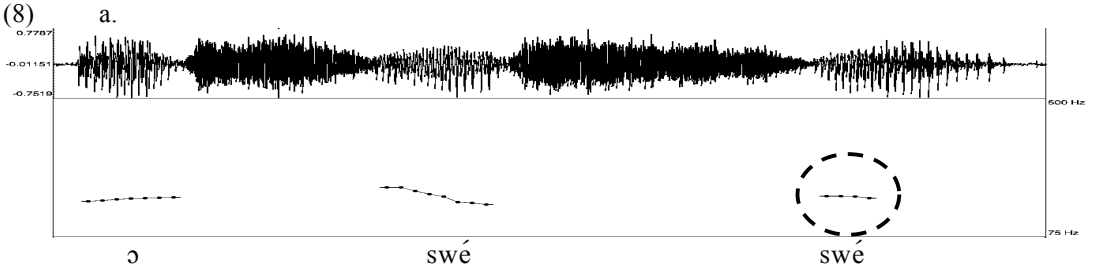
ɛwɔró	pé:	bò	ṇfɪ.
book.PL	all	LOC	here

'All the books are here.'

The pitch tracks in (8) below illustrate the effect of Low phrase boundary tones on sandhi process like upstep. In Krachi, the second in a series of consecutive High tones undergoes an F0 boost, as exemplified by the adjective *ɔswéswé* 'tall' in (8a). However, when a High tone that would otherwise undergo upstep appears at the right edge of a DP, it is realized with a depressed falling contour (8b).

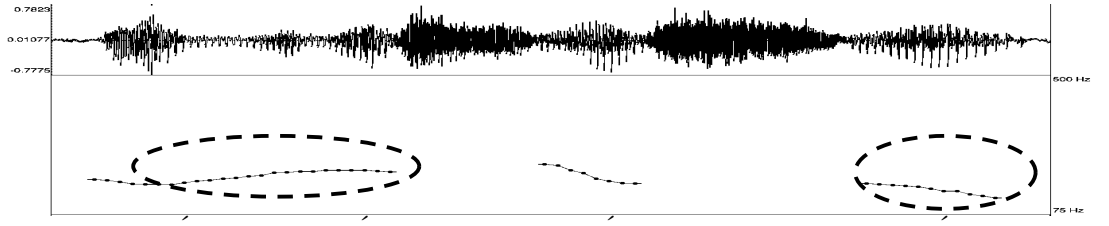
[2] Krachi has three register tones (High, Mid, Low) as well as contour tones. In this article, High tones are indicated by means of acute accents, while Low tones are marked with grave accents. Mid tones are unmarked.

(8) a.



ɔ swé swé

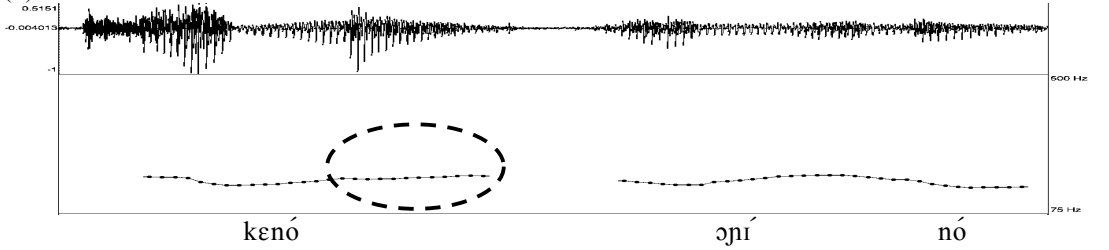
b.



ɔɲí né swé swé
man the tall
'the tall man'

Evidence that the left edge of the Krachi DP is not prosodically marked comes from a number of related observations. For one, if the left edge were marked, the F0 of preceding demonstratives (which would then occupy the right edge of the previous prosodic domain) should be depressed. The pitch track in (9) for the phrase 'this man' shows that in reality, the F0 of the demonstrative has a rising trajectory – the F0 of the item's second syllable is greater than the Mid tones that precede and follow it.

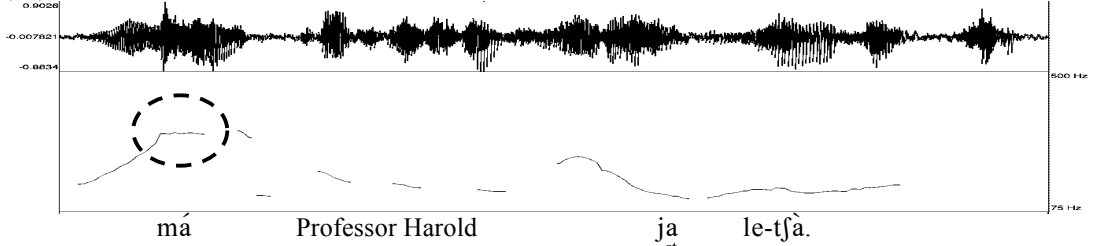
(9)



kɛnó ɔɲí nó
[DemP DEM [DP man the]]

Further evidence comes from the prosody of H-bearing prepositions. If the left edge of DP were a prosodic boundary, then these items (which would also sit at the right edge of the previous domain) would have lowered F0 values. The pitch track below illustrates that in fact the opposite obtains.

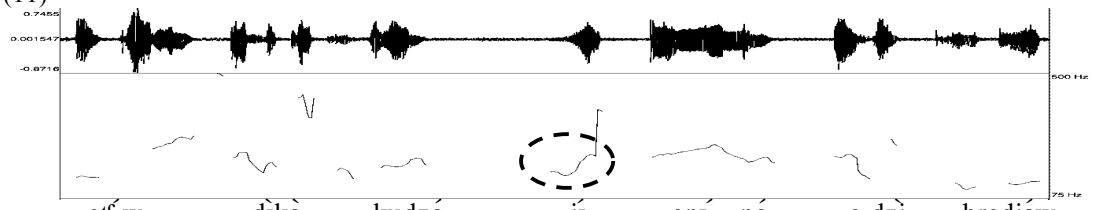
(10)



má Professor Harold ja le-tʃà.
with Professor Harold 1st.SG AGR-dance.PST
'With Professor Harold, I danced.'

Finally, if the left edge of DP were a prosodic boundary, H-bearing clausal coordinators preceding subject DPs should have lowered fundamental frequencies, contrary to fact.

(11)

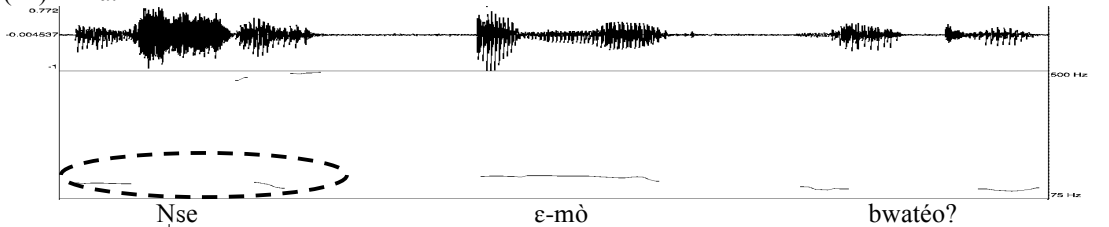


ɔʧʃ̌ɪw ɛ-dɪ̀kɛ̀ kudʒó jí ɔɲɪ́ nó e-dʒ̀ì brɔdiɛ́w.
woman AGR-cook.PST yam and man the AGR-eat.PST plantain
'The woman cooked a yam and the man ate a plantain.'

*2.2.1.2. The prosody of non-*why *interrogative DPs*

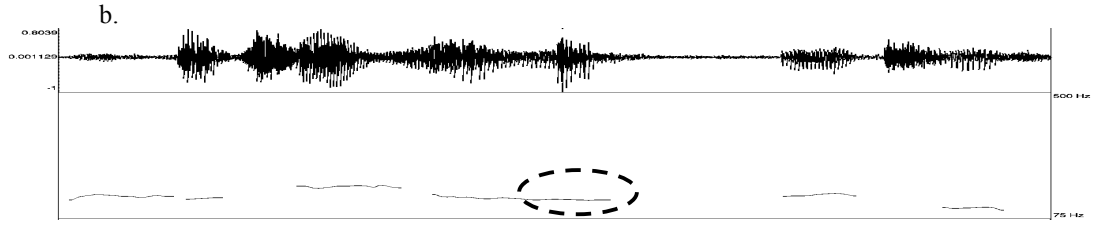
Having established the prosodic boundaries of non-interrogative Krachi DPs, we consider next the prosody of non-*why wh-* phrases. All Krachi non-*why* interrogative expressions behave like non-interrogative DPs with respect to Low boundary tones at their right edges. In (12), we present an assortment of pitch tracks demonstrating the comparable realizations of non-*why wh-* items. In the case of *wh-* expressions like 'where' (12c) and 'when' (12d), we see considerable H-depression, as expected. Items that end on Mid tones like 'who' (12a) and 'how' (12e) also show clear F0 lowering effects. The prosody of 'what' (12b) is less immediately obvious, but shows the same pattern nonetheless. In this case, despite the lack of a drastic fall as in other instances, the item's F0 is clearly lower than the preceding Low tone and also lower than the following Mid, suggesting a Low tone surface realization.

(12) a.



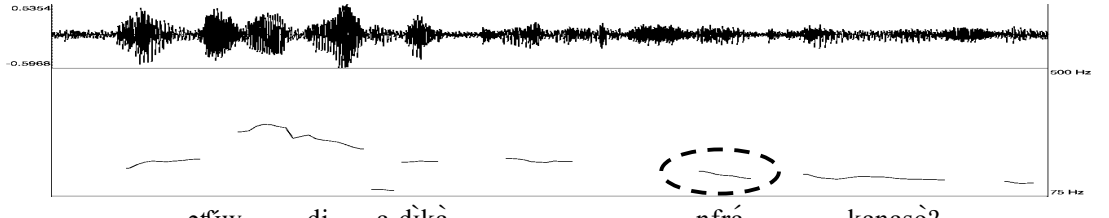
Nṣe ɛ-mò bwatéo?
who AGR-kill.PST chicken
'Who slaughtered the chicken?'

b.



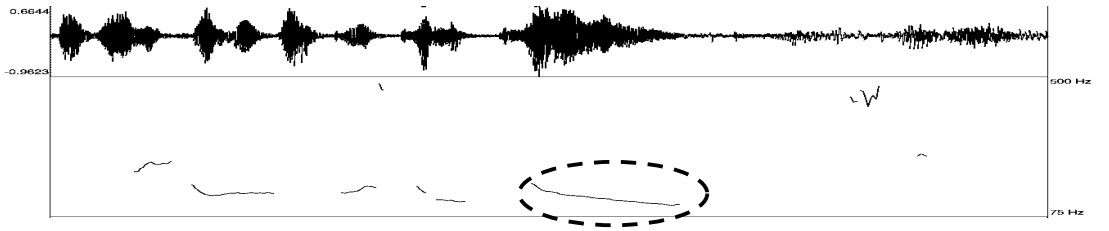
ɔʧʃ̌ɪw ɛ-mò ne ɪndiè?
woman AGR-kill.PST what yesterday
'What did the woman slaughter yesterday?'

c.



ɔʧʃ̌ɪw di ɛ-dɪ̀kɛ̀ ṇfrɛ́ kɛɲɛsɔ̀?
woman often AGR-cook.PST where at night
'Where did the woman often cook at night?'

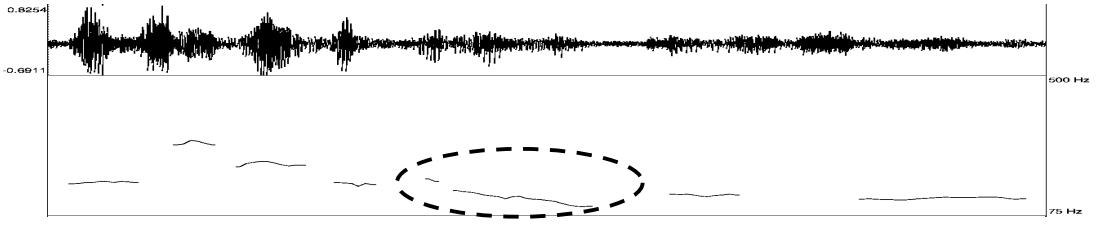
d.



ɔʧ͡ʃɪw	ke	ɔ-mɔ̀	bwatéo	kɛmekɛ́	bɔ̀	ɳfɪ.
woman	C	AGR-kill.PST	chicken	when	LOC	here

'The woman who slaughtered the chicken WHEN? is here.'

e.



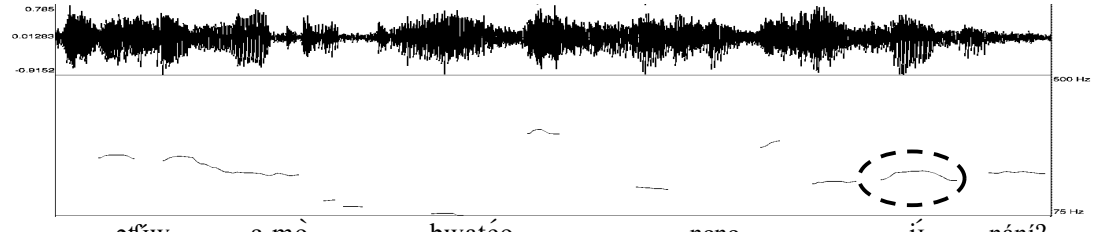
ɔʧ͡ʃɪw	di	ɛ-dɪ̀kɛ̀	nɛnɛ	kɛɲɛsɔ̀?
woman	often	AGR-cook.PST	how	at night

'How did the woman often cook at night?'

2.2.1.3. The prosody of why

Despite the fact that *why* expressions in Krachi do not appear clause-internally and thus do not generally interact with material to their left, there is evidence that the left edge of *why* demarcates a prosodic boundary in the language. This evidence comes from sluicing. Underlyingly High-bearing clausal coordinators[3] appearing before sluiced *why* surface with falling F0 patterns (13a), as would be expected if they occupied the right edge of the previous prosodic domain (e.g. if *why* imposed a prosodic boundary to its left). However, when preceding other sluiced *wh-* expressions like *when* (13b) and *how* (13c), expressions that are prosodically bounded on their right edges, the same coordinator surfaces as H (e.g. its lexical tonal realization), as is evident upon comparison with following F0 values.

(13) a.

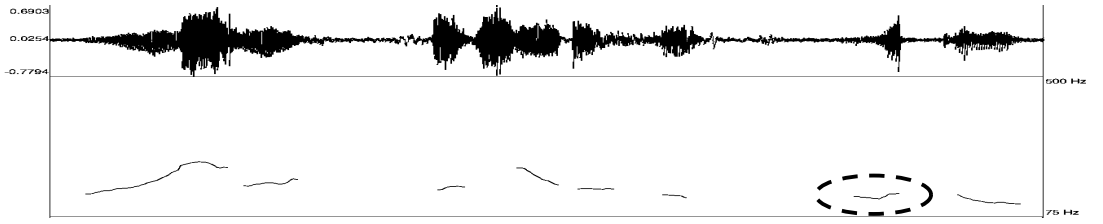


ɔʧ͡ʃɪw	ɛ-mɔ̀	bwatéo	nɛnɛ	jɪ́	nánɪ́?
woman	AGR-kill.PST	chicken	how	and	why

'How did the woman slaughter the chicken? And why?'

[3] Like many Kwa languages, Krachi employs distinct coordinators depending on the size of the coordinated constituents. The High tone-bearing connective *jɪ́* is used for clausal coordination, while Mid tone-bearing *jɛ* is used to coordinate sub-sentential constituents. As such, this is evidence that the examples in (13) involve true sluicing (clausal coordination + ellipsis), as opposed to mere coordination of *wh-* DPs.

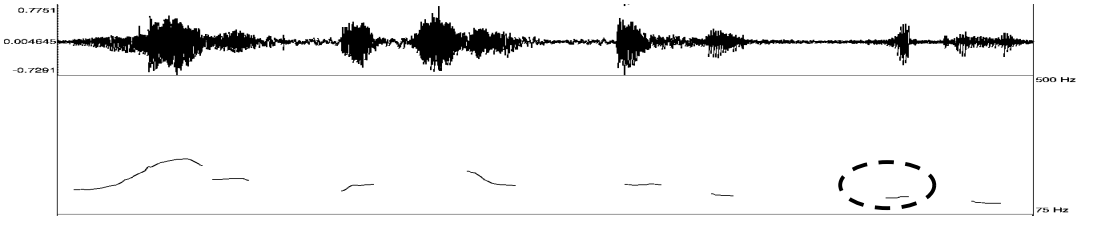
b.



ne	jí	ɔʧĭw	ɛ-mɔ̀	jɪ́	kɛmekɛ́?
what	FOC	woman	AGR-kill.PST	and	when

'What did the woman slaughter? And when?'

c.



ne	jí	ɔʧĭw	ɛ-mɔ̀	jɪ́	nɛnɛ?
what	FOC	woman	AGR-kill.PST	and	how

'What did the woman slaughter? And how?'

2.2.2. Syntactic evidence

Under a Richards-style analysis, because *why*'s prosodic boundary and associated C both appear to its left, the grammar must resort to movement in order to ensure that the two items phrase together prosodically. In order for this phrasing to take place, the landing site of the movement must be high. More precisely, *why* must move to a pre-C position in order to phrase with it on the right. This entails that *why* moves to a position higher than FocusP and makes the prediction that *why* should be able to precede/co-occur with focused constituents, but not follow them. As shown below, this prediction is borne out.

(14) a. Nání bwatéo jí ɔʧĭw ɛ-mɔ̀?
why chicken FOC woman AGR-kill.PST
'Why did the woman slaughter THE CHICKEN (as opposed to, say, *the goat*)?'

b. *Bwatéo (nání) jí (nání) ɔʧĭw ɛ-mɔ̀?
chicken why FOC why woman AGR-kill.PST

Strikingly, none of the other *wh-* operators in the language may co-occur with peripheral focused constituents, as shown below.

(15) a. *Ṇse bwatéo jí ɔ-mɔ̀?
who chicken FOC AGR-kill.PST

b. *Ṇfrɛ́ bwatéo jí ɔʧĭw ɛ-mɔ̀?
where chicken FOC woman AGR-kill.PST

c. *Kɛmekɛ́ bwatéo jí ɔʧĭw ɛ-mɔ̀?
when chicken FOC woman AGR-kill.PST

d. *Nɛnɛ bwatéo jí ɔʧĭw ɛ-mɔ̀?
how chicken FOC woman AGR-kill.PST

Because the non-*why* interrogatives of Krachi are bounded on their right edges, there is no need for them to move as high as *why* – they still phrase with C when occurring below it in Spec, FocusP.

3. Rethinking the Richards-style approach

3.1. Problems with the current analysis

Under the Richards analysis, the syntactic behavior of a *wh-* item in Krachi directly follows from the way it is prosodically mapped. This conclusion challenges most existing conceptions of (*wh-*) grammar, which maintain that syntax has primacy over phonology and as such functions autonomously. The current approach to Krachi's *why*/non-*why* asymmetry faces further conceptual difficulties as well.

One such challenge is semantic in nature. If prosody alone drives the distribution of *wh-* items, then we would not expect the availability of *wh-* in-situ to be limited by semantic factors. In Krachi, despite the fact that both in-situ and in-focus options exist, *wh-* items are constrained by intervention effects. The data below illustrate that *wh-* expressions in the language must take surface scope over negation. In the presence of negation[4], *wh-* in-situ is unavailable and *wh-* movement is forced.

(16) a. *ɔʧ́ɪw ɛ-n-dɪ̀kɛ̀ ne? (👎 Neg c-commands *what*)
woman AGR-NEG-cook.PST what

b. Ne jí ɔʧ́ɪw ɛ-n-dɪ̀kɛ̀? (👍 *What* c-commands Neg)
what FOC woman AGR-NEG-cook.PST
'What didn't the woman cook?'

c. *ɔʧ́ɪw ɛ-n-dɪ̀kɛ̀ kudʒɔ́ nɛnɛ? (👎 Neg c-commands *how*)
woman AGR-NEG-cook.PST yam how

d. nɛnɛ jí ɔʧ́ɪw ɛ-n-dɪ̀kɛ̀ kudʒɔ́? (👍 *How* c-commands Neg)
how FOC woman AGR-NEG-cook.PST yam
'How didn't the woman cook yam?'

e. Ṇse wɔ-n-dɪ̀kɛ̀ kudʒɔ́? (👍 *Who* c-commands Neg)
who AGR-NEG-cook.PST yam
'Who didn't cook yam?'

f. ɔʧ́ɪw ɛ-n-dɪ̀kɛ̀ kudʒɔ́ kɛmekɛ́? (👍 *When* c-commands Neg)
woman AGR-NEG-cook.PST yam when
'When didn't the woman cook yam?'

Another hurdle for the Richards approach concerns the fact that the analysis provides no explanation for *why*'s prosodic exceptionality. Under the Richards story, this fact must be stipulated. Barring an explanation for prosodic exceptionality, the analysis predicts the existence of languages with comparable *wh-* asymmetries involving items other than *why* (e.g. languages in which all *wh-* items except, say, *when* or *where* may appear clause-internally). To the best of our knowledge, such languages are typologically unattested. It appears to be no accident that with respect to the distribution of *wh-* items, *why* is special. Asymmetries involving *why* comparable to those of Krachi have been documented in a variety of unrelated languages (e.g. Chinese (Lin 1992); English (Hornstein 1995, Thornton 2008, Stepanov & Tsai 2008); Italian (Rizzi 2001); Korean and Japanese (Ko 2005); Persian (Karimi 2005); Kiitharaka (Muriungi 2005); Bakweri (Marlo & Odden 2007); Lubukusu (Wasike 2007); Romanian (Shlonsky & Soare 2009); New Testament Greek (Kirk 2010); and Zulu (Buell 2011), among others). These considerations motivate a reevaluation of the current analysis, which in turn suggests a possible reinterpretation of Richards' theory of the syntax-prosody interface in *wh-* constructions.

3.2. Alternative analysis and reinterpretation

Because the deviant behavior of *why* is cross-linguistically robust, it makes sense to seek a semantic explanation for its special syntax. Reinhart (1998) accounts for the interpretation of *wh-* in-situ by invoking choice functions (functions that apply to non-empty sets and yield members of those sets). In order for a choice function to apply, though, its domain must include a set of individuals. In Reinhart's analysis, *wh-* adverbials (*why* and *how*) are semantically distinct from other *wh-* operators

[4] Modals like *fíŋki* 'might' also act as interveners in Krachi. Space limitations preclude a presentation of the relevant data.

in that their domains crucially lack sets of individuals over which the choice function can range. Along these same lines, Szabolcsi & Zwarts (1993) argue that *wh*- adverbials like *why* range over propositions, not individuals. Therefore, since choice functions are what allow *wh*- expressions to be interpreted in-situ and given that they cannot apply to the denotations of *wh*- adverbials, Reinhart (1981, 1998) concludes that *wh*- adverbials must be base-generated in the left periphery.

The cartographic approach to *why* (Rizzi 2001, Shlonsky & Soare 2009, etc.), which posits a high peripheral base merge position, is consistent with this view. We therefore have another vantage point from which to view the Krachi facts. Along these lines, we could propose that instead of prosody driving the syntax of *why*, semantic/cartographic considerations force *why* to be exceptionally generated high/fronted. In languages like Krachi with initial complementizers and high pre-C positions for *why*, Richards' theory would then explain *why*'s exceptional prosody: given its pre-C merge position, *why*'s left edge must be prosodically marked in order to phrase with C. If its right edge were marked like other DPs in the language, *why* would fail to prosodically phrase with C, as both its prosodic boundary and associated complementizer would fall on the same side.

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