Feature Bundling in the Left Periphery of Igbo Interrogatives*

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An open question in syntactic theory is whether items in the lexicon can bear more than a single feature of an extended projection (Giorgi and Pianesi 1997, Cinque and Rizzi 2009, Martinović 2015, 2023, Hsu 2021). If lexical items can bear only one feature, a derivational operation must occur whenever multiple features are hosted on a single head. In this paper, I argue that this is not the case – distinct features can be prespecified on the same lexical item. I demonstrate that this *presyntactic bundling* must be possible on the basis of an analysis of *wh-in-situ* questions in Igbo (Niger-Congo; Nigeria). Furthermore, the features which must be presyntactically bundled are A- and Ā-features. This contributes to a growing body of work which show that A- and Ā-features do surface on the same head (Van Urk 2015, Martinović 2015, 2023, Erlewine 2018, Bossi and Diercks 2019, Scott 2021). A consequence of this result is that bundled features must be able to Agree with distinct goals while instantiating a single search. Our understanding of Igbo clausal syntax is also furthered by the unified analysis of *wh-ex-situ* and *in-situ* questions proposed here.

In §1, I offer an analysis of *wh-in-situ* and *ex-situ* which motivates the bundling of features on lexical items. In §2 and §3, I further refine this proposal on the basis of the syntactic distribution and morphophonological realization of the functional morphemes discussed. Finally, in §4, I show that subject *wh*-questions require that the feature bundling involved in the derivation of *wh*-questions in Igbo be presyntactic.

1. Variably Bundled Features

In Igbo, *wh*-phrases can front sentence-initially or stay *in-situ* (Goldsmith 1981, Uwalaka 1991, Nwachukwu 1995, a.o.). *Wh-ex-situ* requires the morpheme *kà* (1) and *wh-in-situ* requires the morpheme *ò* (2). Notably, *kà* follows the fronted *wh*-phrase and surfaces to the *left* of the subject, while *ò* surfaces to the *right* of the subject.

*All data come from my own elicitation with three speakers of Igbo. Thank you to Amarachi Onuorah, Levi Eruala, and Ferdinand Ochor for sharing your language with me. I am grateful to Boris Harizanov and Martina Martinović for much detailed discussion. I also thank Vera Gribanova, Beth Levin, Katherine Johnson, Büşra Marşan, Ina Zeng, and the attendees of NELS54 for their feedback. All mistakes are my own.

(1) Gị́ ní *(**kà**) Àdá zù-rù ~~gị́ ní~~?
what **C** Ada buy-rV ~~what~~
'What did Ada buy?'

(2) Àdá *(**ò**) zù-rù gị́ ní?
Ada **CT** buy-rV what
'What did Ada buy?'

The observation that *wh-in-situ* clauses can host the whole range of subjects, including bare quantifiers, as well as distinct topics (Nwachukwu 1995; see also (20)) provides evidence that subjects in questions like (2) are not left dislocated.

Neither *kà* nor *ò* is found in canonical declaratives (3) and *wh*-questions cannot be licensed without these morphemes (4).

(3) Àdá zù-rù jí.
Ada buy-rV yam
'Ada bought yam.'

(4) *Àdá zù-rù gị́ ní?
Ada buy-rV what
Int.: 'What did Ada buy?'

I propose that *kà* and *ò* spell out distinct feature bundles. In *wh-ex-situ* (5), C *kà* bears an Ā-feature [FOC_{EPP}] and T bears an A-feature [ϕ_{EPP}]. In *wh-in-situ* (6), *ò* bears the same A-feature [ϕ_{EPP}] as T, but crucially, it also bears an *in-situ* licensing Ā-feature which I call [Q]. I label *ò* CT for exposition, due to the A-/Ā-features it bears (Martinović 2015, 2023).

Wh-ex-situ

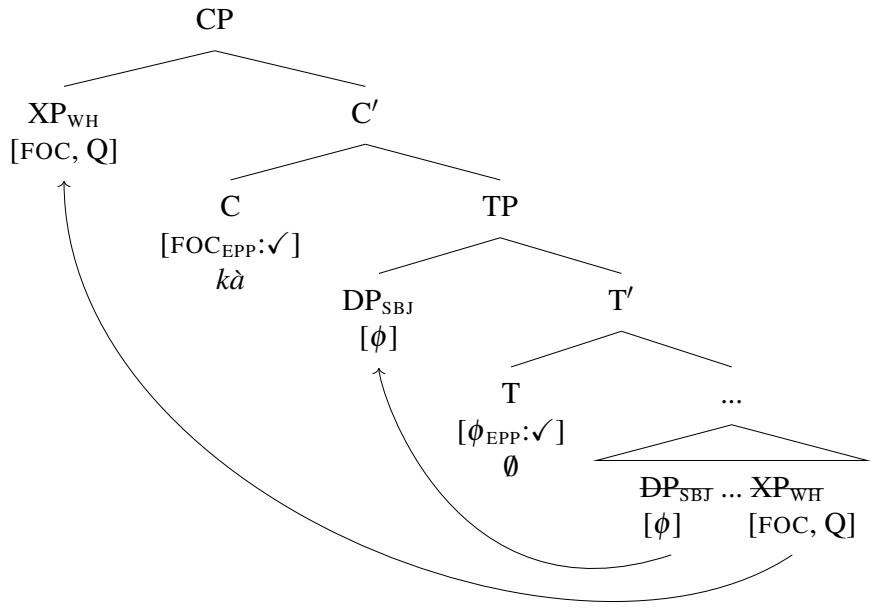
(5) a. *kà* ↔ C[FOC_{EPP}]
b. ∅ ↔ T[ϕ_{EPP}]

Wh-in-situ

(6) *ò* ↔ CT[ϕ_{EPP}, Q] *(to be revised)*

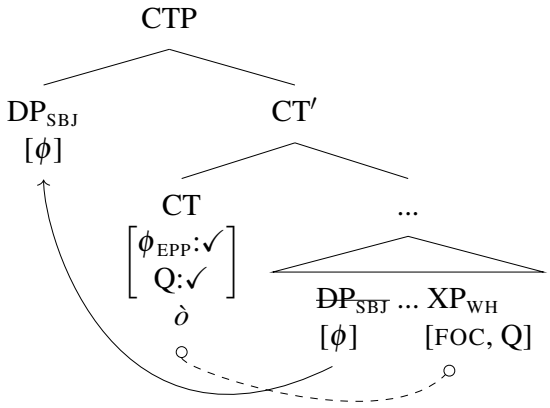
C and T yield *wh-ex-situ*. Subjects move to spec,TP, checking [ϕ_{EPP}], and *wh*-phrases move to spec,CP, checking [FOC_{EPP}]. This structure in (7) spells out with the morpheme *kà* between the *wh*-phrase and the subject, as in (1). I compare this to a similar account from Amaechi (2020) in §2.

(7)



CT yields *wh-in-situ*. The subject moves to spec,CTP to check [ϕ_{EPP}], as above, and [Q] is checked by the *wh*-phrase *in-situ* via Agree. This structure in (8) spells out with *ò* intervening between the subject and the verb, as in (2).

(8)



Both *wh-ex-situ* and *in-situ* strategies permit embedded *wh*-phrases to take matrix scope across a finite clausal boundary, e.g. clauses embedded by the complementizer *nà* (Amaechi 2020). In (9a), the *wh*-phrase fronts to the matrix clause, while in (9b), matrix CT agrees with the *wh*-phrase in the embedded clause. *Èbé*$^{\downarrow}$*é* 'where' takes matrix scope in both sentences. This supports the analysis that both C and CT bear Ā-features.

(9) a. Èbé$^{\downarrow}$é kà Chíọ́má chè [$_{\text{CP}}$ nà Àdá gà-rà ~~èbé$^{\downarrow}$é~~]?
where C Chioma think C Ada go-rV ~~where~~
'Where does Chioma think that Ada went?'

b. Chíọ́má ò chè [$_{\text{CP}}$ nà Àdá gà-rà èbé$^{\downarrow}$é]?
Chioma CT think C Ada go-rV where
'Where does Chioma think that Ada went?'

Other constructions containing *kà* and *ò* affirm that they do not bear the *same* Ā-feature. (10) demonstrates that *kà* is required in non-*wh* focus constructions. I assume that focused constituents bear [FOC] and that they check [FOC$_{\text{EPP}}$] on C, just as the *wh*-phrase *gị́*$^{\downarrow}$*nị́* does in (11).

(10) Jí *(**kà**) Àdá zụ̀-rụ̀.
yam **C** Ada buy-rV
'Ada bought YAM.'

(11) Gị́$^{\downarrow}$nị́ *(**kà**) Àdá zụ̀-rụ̀?
what **C** Ada buy-rV
'What did Ada buy?'

(12) shows that *ò* is required in polar questions. I take this to be the exponent of the same CT found in *wh-in-situ*. In the absence of a *wh*-phrase, [Q] on CT must be checked by a phonologically null operator (Grimshaw 1997, Holmberg 2013).

(12) Àdá *(**ọ̀**) zụ̀-rụ̀ jí?
Ada **CT** buy-rV yam
'Did Ada buy yam?'

(13) Àdá *(**ọ̀**) zụ̀-rụ̀ gị́$^{\downarrow}$nị́?
Ada **CT** buy-rV what
'What did Ada buy?'

Other than in *wh*-interrogatives, *kà* and *ò* are found in disjoint contexts – *kà* does not license polar questions, nor *ò* focus. The availability of both strategies additionally shows that Igbo is not a mandatory *wh*-movement language. Instead, the displacement of *wh*-phrases is an instance of a larger class of focus fronting constructions.

2. Local Complementarity

Within the left periphery, C[FOC_{EPP}] and CT[ϕ_{EPP}, Q] are in complementary distribution. Evidence for this comes from polar questions with focus fronting, a construction where they are expected to cooccur. Focus fronting requires C (10) and polar questions require CT (12). The unacceptability of both (14a) and (14b) shows us that C and CT cannot be in the same minimal clause.

(14) a. *Ò jí kà Àdá rì-rì?
CT yam C Ada eat-rV
Int.: 'Did Ada eat YAM?'

b. *Jí kà Àdá ò rì-rì?
yam C Ada CT eat-rV
Int.: 'Did Ada eat YAM?'

Polar questions with focus fronting are possible, but must be *biclausal* (15). In (15), CP[FOC_{EPP}] is embedded under a copula *bụ̀*. The copula introduces a distinct left periphery where CT[ϕ_{EPP}, Q] can then merge – C and CT are only *locally* incompatible. The realization of CT in the presence of pronouns such as the embedding copula's expletive 3SG subject (Amaechi 2020) is discussed in §3.

(15) Ọ̀ bụ̀ [$_{\text{CP}}$ jí kà Àdá rì-rì ~~jí~~]?
3SG+CT COP yam C Ada eat-rV ~~yam~~
'Did Ada eat YAM?'

In models where features in a functional hierarchy map one-to-one onto items available in the lexicon, e.g. Rizzi (1997), we in fact *predict* monoclausal polar questions with focus fronting to be possible, cf. (14). Amaechi (2020) instantiates such a model and proposes that the equivalent of [FOC_{EPP}] and [Q] are borne by heads Foc^0 and Int^0 which spell out as *kà* and *ò*. To capture their complementary distribution, this proposal must resort to selectional restrictions between functional heads which may in turn predict more variability in the extended projection than is attested crosslinguistically.

I too adopt the proposal that a functional hierarchy governs the order in which features appear in the clausal spine. However, presyntactic bundling, which may not be subject to the same constraints (see also Deal 2018), can result in irresolvable tension between different requirements of the functional hierarchy, leading to complementarity. This is the case when C and CT are in the same extended projection. Merging CT above C (14a) would result in [ϕ_{EPP}] above [FOC_{EPP}], violating requirements for Ā-features to be above A-features (Rizzi 1997, Williams 2002). The inverse (14b) would equally violate requirements for [Q] to be above [FOC_{EPP}] (Rizzi 2001). Both orders in (14) are thus predicted to be unacceptable, as is observed. Paired with these independently motivated proposals, this follows immediately from the featural identity of the lexical items I have proposed.

3. Morphophonological Realization

In §1, it was assumed that the head CT[ϕ_{EPP}, Q] involved in polar questions and *wh-in-situ* spells out as *ò* (see (6)). However, the interaction between CT and pronominal subjects suggests that this must be refined. Singular subject pronouns in Igbo are monomoraic and bear high tones in declaratives (16) and *wh-ex-situ* (17).

(16) Í/Ọ́ zụ̀-rù jí.
2/3SG buy-rV yam
'You/(s)he bought yam.'

(17) Gí¦nị́ kà í/ọ́ zụ̀-rù?
what C 2/3SG buy-rV
'What did you/(s)he buy?'

When CT cooccurs with a singular subject pronoun – i.e. when the subject of a *wh-in-situ* or polar interrogative is a singular pronoun – CT spells out as a low tone hosted on the pronoun without any additional segmental material like *o* (18).

(18) a. Ì/Ọ̀ (*ọ̀) zụ̀-rù gí¦nị́?
2/3SG buy-rV what
'What did you/(s)he buy?'

b. Ì/Ọ̀ (*ọ̀) zụ̀-rù jí?
2/3SG buy-rV yam
'Did you/(s)he buy yam?'

Therefore, I take the phonological exponent of CT to be a low tone without any segmental material, as in (19). Nwachukwu (1995) and Amaechi (2020) have similarly proposed connections between a low tone and an interrogative morpheme in Igbo.

(19) ` ↔ CT[ϕ_{EPP}, Q] *(revised (6))*

Singular pronouns can serve as hosts for the low tone because they are verbal proclitics. Evidence for the proclitic nature of these pronouns comes from ±ATR harmony between the pronouns and the verb, and the fact that these forms cannot appear in other positions, e.g. as the complement to V.[1] Other subjects, like names and plural pronouns, do not procliticize. As such, they are not adequate hosts. In the absence of a host, the vowel *o* is epenthesized as we have previously observed. Rolle and Merrill (2022) have proposed that this process can be employed to resolve situations where tones lack a host.

Plural subjects show that *o* is epenthetic and not, e.g., a 3SG pronoun (18a) resuming a topicalized subject. Topicalization requires fully-matching resumptives (Georgi and Amaechi 2023) and plural subjects can appear with *ò* alone (20a). Subjects topicalized in *wh-in-situ* appear with *ò* in addition to a matching resumptive – this is the 3PL *há* in (20b).

(20) a. Ụ́mụ̀nwányị̀ áhụ̀ ò sì-rì gí¦nị́?
women DEF.DIST CT cook-rV what
'What did those women cook?'

b. Ụ́mụ̀nwányị̀ áhụ̀, há ò sì-rì gí¦nị́?
women DEF.DIST 3PL CT cook-rV what
'Those women, what did they cook?'

[1] At this point, it is not clear whether the different phonological status of singular pronouns is due to a postsyntactic morphological process or a phonological process.

CT's realization involving epenthesis may be more broadly attested within T's realization in the language which triggers vowel epenthesis in other environments. In negation, for example, a different vowel previously analysed as T (Déchaine 1993) both appears preverbally and is in complementary distribution with clitic subjects. These parallels are consistent with my proposal that CT bears an A-feature traditionally associated with T, [ϕ_{EPP}], in addition to its Ā-feature.

4. Bundled Probing for Separate Goals

We have seen that the A- and Ā-features bundled on CT[ϕ_{EPP}, Q] can be checked by distinct goals: [ϕ_{EPP}] is checked by the local subject and [Q] by a *wh*-phrase lower in the structure. This is consistent with two options. Option 1 is that the features on CT probe separately and are checked via two instances of Agree. Option 2 is that the bundled features probe once (Béjar 2003, Coon and Bale 2014, Scott 2021, Deal 2023, a.o.), but are checked by distinct goals. I argue in favour of Option 2 on the basis of subject *wh*-questions, which I will first show are only licensed by C[FOC_{EPP}]. I then discuss how CT's inability to license subject questions requires that its features probe as a bundle.

Subject *wh*-questions feature neither *kà* (21) nor *ò* (22). However, two diagnostics show that they do contain C[FOC_{EPP}], which in this environment (23) is exponed by a null allomorph of *kà*.

(21) *Ònyé kà rì-rì jí?
who C eat-rV yam
Int.: 'Who ate yam?'

(22) *Ònyé ò rì-rì jí?
who CT eat-rV yam
Int.: 'Who ate yam?'

(23) Ònyé rì-rì jí?
who eat-rV yam
'Who ate yam?'

The first diagnostic employs perfective clauses which Amaechi (2020) has shown are incompatible with focus movement. This results in the expected unacceptability of object *wh-ex-situ* with overt C, *kà* (24). *Wh-in-situ* with CT, on the other hand, is acceptable in these clauses (25).

(24) *Gíꜜnḭ́ kà Àdá ꜜéríélá?
what C Ada eat.PFV
Int.: 'What has Ada eaten?'

(25) Àdá ò ríélá gíꜜnḭ́?
Ada CT eat.PFV what
'What has Ada eaten?'

The unacceptability of (26) shows that subject questions are also unacceptable with the perfective. This result is derived analogously to (24) if subject questions must also be licensed by C.

(26) *Ònyé ꜜéríélá ꜜjí?
who eat.PFV yam
Int.: 'Who has eaten yam?'

Multiple *wh*-questions offer a second diagnostic. The examples below show that multiple *wh*-questions are not possible with C left peripheries (27), but that they are possible with CT left peripheries (28).

(27) *Gí¦nị́ kà Àdá rì-rì n'èbé¦é?
what C Ada eat-rV PREP-where
Int.: 'What did Ada eat where?

(28) Àdá ò rì-rì gí¦nị́ n'èbé¦é?
Ada CT eat-rV what PREP-where
'What did Ada eat where?'

Applying this diagnostic to subject questions, we observe that multiple *wh*-questions are not possible when one of them is the subject (29). Once again, subject questions pattern with clauses containing C[FOC_{EPP}] to the exclusion of clauses with CT[ϕ_{EPP}, Q].

(29) *Ònyé rì-rì gí¦nị́?
who eat-rV what
Int.: 'Who ate what?'

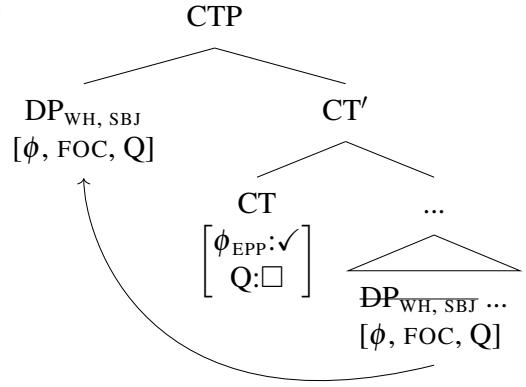
The null allomorph of C[FOC_{EPP}] (30) observed in subject questions like (23) parallels that of the embedding complementizer *nà* which also surfaces to repair a complementizer-trace effect (Amaechi and Georgi 2019).

(30) $\emptyset \leftrightarrow \text{C}[\text{FOC}_{\text{EPP}}] / \_\_ \ t_{\text{SBJ}}$

Having now established that subject questions are licensed by C[FOC_{EPP}], it must also be the case that CT[ϕ_{EPP}, Q] *cannot* license subject *wh*-phrases. If CT were able to license subjects, we would expect the configurations in (26) and (29) to be rescued by derivations which include CT. Why can CT license object questions, but not subject questions?

This can be understood if the features on CT probe as a bundle. Once a given feature on a probe agrees with a goal, the probe must immediately continue searching its c-command domain; only a single feature can be checked at a time. The observed inability of CT to license subjects results from an inability of subject *wh*-phrases to check both features on CT at once. This is schematized in (31).

(31) *



The model proposed above draws on mechanisms present in Martinović (2015, 2023), which incorporates a *Feature Accessibility Condition*, and Scott (2021), which discusses a

two probe system. Both capture the idea that a single instance of Agree does not always check all features hosted on a head. The model also incorporates the option of *non-cyclic* Agree (see discussion in Keine and Dash 2023); after the first search of CT's c-command domain has left [Q] unchecked, spec,CTP is not then searched in an attempt to check [Q].

What this analysis predicts is that while CT cannot license local subject *wh*-questions, embedded subject *wh*-questions should be licensed. Once the matrix subject has checked [ϕ_{EPP}] on CT, the probe is able to continue its search and find an embedded *wh*-subject lower down within the structure, checking [Q]. This hypothesis can again be tested with perfectives which we have seen are incompatible with C[FOC_{EPP}]. As such, any *wh*-phrase licensed in a perfective clause must have been licensed by an instance of CT. Indeed, (32) shows that a *wh*-subject in a perfective clause embedded under CT can be licensed.

(32) Àdá ọ̀ sị̀ nà ònyé ꜜéríélá ꜜjí?
Ada CT say C who eat.PFV yam
'Who did Ada say has eaten yam?'

An Agree-based analysis of CT's local subject restriction is more parsimonious than a non-syntactic analysis which might localize the restriction to the interpretation of *wh*-phrases. For example, Cable (2007) suggests that *wh*-phrases in certain languages must be c-commanded by a Q-particle or operator to be interpreted. If *wh*-phrases in Igbo did require c-command by such an operator, perhaps CT, then this derives the same predictions given that CT does not c-command its specifier. However, it is clear that *wh*-phrases in Igbo need not be c-commanded by CT, as in *wh-ex-situ* questions.

The data discussed in this section ultimately show that the presyntactic bundling of features which I have advocated for in this paper is a prerequisite for a consistent analysis of subject questions. Models where bundling occurs either syntactically or postsyntactically would both have difficulties capturing the same facts. For argument's sake, assume that the features I have argued for being presyntactically bundled on CT were actually introduced on two distinct heads, one bearing [ϕ_{EPP}] and one bearing [Q].

If bundling occurred postsyntactically, the structure built in the narrow syntax would consist of a head bearing [Q] c-commanding a head bearing [ϕ_{EPP}]. In such a configuration, local subjects in the specifier of the lower phrase would be structurally indistinguishable from object *wh*-phrases lower in the structure. As such, there is no explanation available for the licensing asymmetry that we have observed.

If bundling of the two heads occurred in the narrow syntax, e.g. Hsu (2021), we run into issues no matter how bundling is timed. With bundling *after* Agree, we would introduce the same issue as with postsyntactic bundling because upon External Merge of the head bearing [Q], the moved local subject would be in the c-command domain of the head bearing [Q] and thus eligible for Agree. With bundling *before* Agree, the higher copy of the subject in the specifier of the lower phrase would not be visible for Agree with [Q]. However, we are now unable to explain why no *lower* copy of the local subject can check [Q] when [Q] probes its c-command domain. The third option of halting [ϕ_{EPP}]'s search until the head bearing [Q] is merged and bundled so that both features can probe together incurs an undesirable lookahead problem. Presyntactic bundling suffers none of these issues.

5. Implications

I have argued in favour of an analysis where *wh-ex-situ* and *in-situ* in Igbo feature two distinct left peripheries. The seemingly divergent properties of the two clause types ultimately reduce to the lexical items which are available in the language and the bundles of features which they bear. The presyntactic bundling of features I have proposed here captures key distributional properties of left peripheral morphemes and is necessary for an understanding of the local subject licensing asymmetry.

The existence of presyntactic bundling opposes a universal one-to-one mapping of features to lexical items. This result is consequential for minimalist models of syntax where the distribution of features amongst functional heads is taken to be a principal driver of linguistic variation (Chomsky 2000). Salient questions for this proposal are what, if any, the restrictions are on the cooccurence of features on *lexical items*, and what predictions this makes for the coocurrence of features within *the clause*.

I suggest that how specific lexicons are organized may very well account for broader typological characteristics of the left periphery. Languages like Igbo and Wolof (Martinović 2015, 2023) show us that when the lexicon contains items where individual $\bar{A}$-features are bundled with A-features, certain $\bar{A}$-features cannot appear in the same extended projection and distinct $\bar{A}$-features may result in distinct left peripheries. Lexicons where all $\bar{A}$-features are bundled together may result in languages like Dinka (Van Urk 2015) where left peripheries contain a single $\bar{A}$ projection, but where different *types* of $\bar{A}$-features do not more broadly change clause structure. Finally, lexicons where $\bar{A}$-features are not bundled with A-features, nor with one another, may account for languages where an articulated array of different $\bar{A}$ projections can occur within a minimal clause, as in Italian (Rizzi 1997). Discerning whether this unification is possible is a direction for future work.

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