

Agreement in Ibibio: From Every Head, To Every Head*

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Abstract: The Ibibio language has the special property that agreement with a single grammatical subject can appear multiple times in the same clause. After showing that this is a general phenomenon in the language, we argue that every verbal functional head in Ibibio—Aspect, Auxiliary, Mood, and Participle, as well as Tense—acts as a probe, capable of initiating an Agree relationship. Furthermore, a close comparison of agreement in indicative, subjunctive, negative, and infinitival clauses shows that these functional heads do not agree with the subject directly; rather each agrees with the next highest functional head within the extended projection. The facts of Ibibio thus point toward a version of Chomsky’s theory of Agree in which any functional head can be the probe in an agreement relation, and any functional head can be the goal in such a relation.

Keywords: agreement, functional heads, Ibibio, tense, auxiliaries **Word count:** 14,688

1. Introduction

Many Niger-Congo languages are notable for their ubiquitous agreement. Still, Ibibio—a Cross-river language of Nigeria—stands out as being somewhat special in this regard, in that subject agreement shows up in some surprising places. The basic agreement morphemes of Ibibio are the following:¹

(1)		Subject	Object		Subject	Object
	1sg	n’-	n-	1pl	i-	i-
	2sg	à-/ú-	u-	2pl	è-/i-	i-
	3sg	á-	Ø-	3pl	é-	Ø-

Not surprisingly, subject agreement shows up on the finite verb, before an overt tense/mood prefix (if any). This is expected, given the standard Chomskian view that subject agreement is associated syntactically with a finite Tense node (Chomsky 1981).

- (2) a. N-yaa-dep ebot.
 1sS-FUT1-buy goat
 ‘I will buy a goat.’
- b. Okon á-ke-yem Emem.
 Okon 3sS-PAST2-look Emem
 ‘Okon was looking for Emem.’

But this is only the beginning. Full subject agreement is also found on the main verb as well as on the auxiliary verb in auxiliary constructions:

- (3) a. N-sák n-yem ebot odo.
 1sS-AUX 1sS-look goat the
 ‘I am looking for the goat.’
- b. ɔmmɔ: e-mana e-nam.
 they 3pS-do.again 3pS-do
 ‘They are doing it again.’
- c. Okon a-sɔsɔp a-dɔk ekpat.
 Okon 3sS-do.quickly 3sS-make bag
 ‘Okon quickly/easily made a bag.’

Ibibio is different from most Indo-European languages in this respect, although this sort of multiple agreement is also found in many Bantu languages (Kinyalolo 1991, Carstens 2001).²

An even more distinctive fact is that subject agreement can show up more than once even in clauses that have only a single verb. One instance of the subject agreement morpheme comes before the tense marker and a second instance comes between the tense marker and the verb stem (before the object agreement, if any) in examples like those in (4) (see Willie 2007).

- (4) a. ɔmmɔ: e-ya-e-dep ebot.
 they 3pS-FUT1-3pS-buy goat
 ‘They will buy a goat.’
- b. ɲɲin i-k-i-yem Emem.
 we 1pS-PAST2-1pS-look Emem
 ‘We were looking for Emem.’
- c. ɔmmɔ: e-ma-e-n-yem.
 they 3pS-PAST2-3pS-1pO-look
 ‘They looked for me.’

Previous work on Ibibio has not recognized this agreement doubling as a systematic property of the language. For example, Essien (1990) observes that the plural subject agreement markers are repeated, but claims that the singular ones are not (see also Urua 1997:197-199). But Willie (2007) shows that the pattern is systematic; all cases in which the subject agreement does not seem to be repeated (like the examples in (2)) are the result either of a phonological rule that resolves vowel hiatus, or a special rule of allomorphy that concerns the first person singular morpheme. Willie’s arguments on this point are reviewed in section 3 below. This property of Ibibio is quite rare; no other language that we know of is quite like it in this respect. The

question that we are concerned with, then, is what can be learned about the theory of agreement within the tradition of Chomsky (2000, 2001) from studying this unusual case.³

It is also striking that the various instances of subject agreement in a single clause are interdependent. In most cases, they are required to be the same. For example, when negation is attached to the verb, normal third person agreement (/á/ or /é/) is replaced by /í/, a form distinct from any of those listed in (1). This change in agreement affects all the copies of subject agreement. The second verb in examples like (5b-c) must thus have the “negative” form of agreement even though only the auxiliary verb is morphologically negative.

- (5) a. Okon i-k-i-nam-ma.
 Okon I-PAST2-I-do-NEG
 ‘Okon didn’t do it.’
- b. Okon i-sɔk-kɔ i-di.
 Okon I-AUX-NEG I-come
 ‘Okon has still not come (in spite of ...)’
- c. Okon i-sɔp-pɔ i-dɔk ekpat.
 Okon I-do.quickly-NEG I-make bag
 ‘Okon did not make the bag quickly.’

Another instance of interdependence among the subject agreements is seen in infinitival clauses. These clauses have a distinct nonfinite T, realized as /adi/, which does not vary with the phi-features of the understood subject of the clause. When this particular T is present, lower verbs in the nonfinite clause also have a phi-feature-invariant realization, spelled out as /n/:

- (6) Okon a-yem adi-si-mana n-nam.
 Okon 3sS-want INF-IMPF-do.again N-do

‘Okon wants to be doing it again.’

The correct analysis of subject agreement in Ibibio must also explain these interdependencies in the realization of agreement on the various functional heads in the clause.

2. The Hypothesis in a Nutshell

The four main patterns of agreement that we will be concerned with are summarized in (7).

(7)

Clause type	Agreement on T	Agreement on lower heads
Finite Indicative clause (e.g. (3c))	/a/+T (3sS), /e/+T, etc.	/a/, /e/, etc.
Negative indicative clause (e.g. (5))	/i/+T (3S)	/i/, etc.
Nonfinite clause (e.g. (6))	/adi/ (invariant)	/n/ (invariant)
Subjunctive clause (e.g. (58))	N/A (no T node)	/a/, /e/, etc.

There are many different technical executions that one might imagine as ways to capture the mechanics of agreement in Ibibio. Of the various possibilities, we argue that the most satisfactory for a relatively complex example like (8) goes as follows.

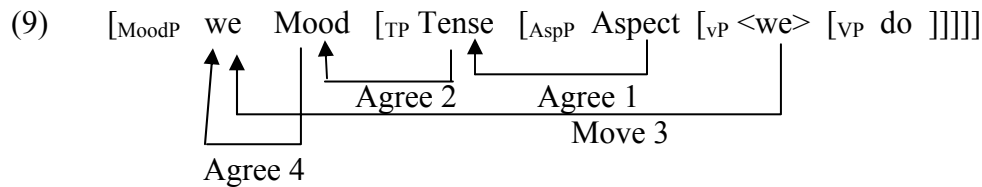
(8) i-kpa-i-k-i-si-nam

1pS-COND-1pS-PAST-1sS-IMPF-do

‘we would have been doing it’

First the Aspect head /si/ is merged with vP, which contains the subject ‘we’. Aspect is a probe, with unvalued phi-features, but it is constrained to search upward for something to agree with, rather than downward. Hence no agreement can happen at this stage. Next the tense head /ke/ is merged with the Aspect phrase. It too has unvalued phi-features, and must search upward for

something to agree with. Therefore, it cannot agree, but Aspect can now agree with it. This agreement relation does not give Aspect values for its phi-features yet, but it creates a dependency between the phi-features of Aspect and those of Tense, such that when features are assigned to one of these heads, they are automatically shared with the other. Third, the mood head /kpa/ is merged, and the tense head agrees with it. As the highest functional head in this clause, Mood is associated with an EPP feature, which attracts the thematic subject ‘we’ to Spec, MoodP. As a result, there is something with valued phi-features that c-commands Mood, which Mood can agree with. As a result, Mood shares the [1pl] features of the subject ‘we’. These features are then automatically shared with Tense and Aspect by virtue of the already established agreement relations among these nodes. Finally, in the postsyntactic morphology, the [1pl] features are spelled out on each functional head as /i/. The derivation is summarized in (9).



This derivation depends on three assumptions that, while nonstandard, have each been argued for in the previous literature. The first is the view that languages can have a parameter set such that probes search upward for a goal to agree with, rather than downward (Baker In press:ch.5). The second is the view that agreement can take place between two categories even when neither of them has (yet) a specified value for the feature involved (Pesetsky and Torrego 2007, plus references cited there). The third is the view that heads can be goals for agreement as well as probes for agreement (e.g., Collins 2003, Bhat 2005, Henderson 2006). The upshot is, we claim, that Ibibio shows that any functional head can in principle be the probe in an agreement relation, and any functional head can in principle be the goal in an agreement relation. In section 4, we

endeavor to show why derivations like the one in (9) cover the facts of Ibibio better than other, arguably more conservative derivations, carefully comparing the various kinds of clauses outlined in (7). Before doing this, however, we must defend our claim that subject agreement shows up on every functional head in Ibibio against some apparent counterexamples.

3. The generality of multiple agreement

Multiple subject agreement is not seen overtly in every form in Ibibio; it is visible in (4) but not in (2), for example. It has thus not been recognized as a systematic process in the previous descriptive literature. We claim that it is perfectly systematic, but this is concealed in many surface forms by two factors: a general rule of vowel deletion, and an allomorphy rule that concerns the realization of first person singular features.

3.1. Phonological rules of vowel hiatus

The first reason one does not always see multiple agreement on the surface is because of a phonological rule that resolves vowel hiatus. Willie (2007) argues for a phonological rule that can be stated roughly as in (10) (see Urua 1997:204 for a less general version):

- (10) A vowel deletes when it is adjacent to a vowel that is stronger than or equal to it on the following hierarchy: $u > i > e > a$.

(Note: other vowels are not found in agreement or tense/aspect markers in Ibibio)

This rule is independently motivated apart from the issue of multiple subject agreement by the interaction of subject agreement and object agreement. Consider first examples in the simple present tense—which is realized as a null morpheme—in which the first person singular object agreement marker /n/ is present. This object marker is not a vowel, so all the subject markers show up before it in the expected way:

- (11) a. Okon a-n-yem.
 Okon 3sS-1sO-seek
 ‘Okon is looking for me.’
- b. əmmə e-n-yem.
 they 3pS-1sO-seek
 ‘They are looking for me.’

In contrast, when the object marker is a strong vowel like second person singular /u/ or first person plural /i/, the subject markers /a/ and /e/ are deleted:

- (12) a. Okon u-yem. ‘Okon is looking for you.’
 b. əmmə u-yem. ‘They are looking for you.’
 c. Okon i-yem. ‘Okon is looking for us.’
 d. əmmə i-yem. ‘They are looking for us.’
 e. afo i-yem. ‘You(sg.) are looking for us.’

The first person plural subject marker /i/ also deletes before the stronger second person object marker /u/, as shown in (13).

- (13) ɲɲin u-yem ‘We are looking for you.’
 (compare: ɲɲin i-Ø-yem aɲe ‘We are looking for him’)

However, the marked /u/ form of second person singular agreement, used in irrealis clauses, does not delete before the first person plural object marker /i/; rather it is the object marker that deletes in this case:

- (14) Afo u-yem-me ɲɲin.

You 2sS-(1pO)-seek-NEG us

‘You are not looking for us.’

This shows that it is not necessarily the first vowel that deletes when two vowels are in contact.

Now we add a tense marker like /ke/ ‘PAST2’ into the picture.⁴ The consonant in this tense prefix separates the (first) subject agreement marker from the object agreement marker. As a result, the subject agreement marker does not delete in examples analogous to (12). However, the /e/ vowel of the tense marker does delete before the stronger object agreement markers /i/ and /u/, just as the /e/ subject agreement marker does in (12b,d).

- (15) a. a-ke-n-yem ‘s/he was looking for me’
b. a-k-i-yem ‘s/he was looking for us’
c. a-k-u-yem ‘s/he was looking for you’
d. e-ke-n-yem ‘they were looking for me’
e. e-k-i-yem ‘they were looking for us’
f. e-k-u-yem ‘they were looking for you’

Like /ke/ in these respects is the present/perfect marker /me/ (used only with first and second person subjects). In a similar manner, the /i/ vowel of /di/ ‘future 2’ deletes before the object marker /u/, just as the subject marker /i/ does in (13).

- (16) a. a-di-n-yem ‘s/he will look for me’
b. a-d-u-yem ‘s/he will look for you’

Like /di/ in this respect is the imperfective aspect marker /si/.

Slightly surprising is the fact that the weak /a/ vowel in /maa/ ‘past1’, /yaa/ ‘future1’, and /kpaa/ ‘conditional’ does not delete before the object prefixes /i/ and /u/:

- (17) a. a-ma-u-yem ‘s/he looked for you’ (not: *a-m-u-yem)

- b. a-ya-i-yem ‘s/he will look for us’ (not: *a-y-i-yem)
- c. a-kpa-i-yem ‘s/he should look for us’ (not: *a-kp-i-yem)

This can be accounted for by saying that these tense prefixes have long vowels underlyingly. Indeed, they show up with long vowels bearing contour tones in examples without object agreement such as:⁵

- (18)
- a. á-màá-dí ‘s/he came’
 - b. á-yàá-dí ‘s/he will come’
 - c. á-kpàá-dí ‘s/he should come’

These long vowels shorten before vocalic object prefixes, but they do not delete entirely.

We can now apply these phonological generalizations to the question of whether subject agreement doubling is systematic in Ibibio or not. We see the subject agreement marker repeated after past tense /ke/ in forms like (19a-b), but not in (19c-d):

- (19)
- a. i-k-i-di ‘we came’
 - b. u-k-u-di-ghe ‘you did not come’
 - c. a-ke-di ‘s/he came’
 - d. e-ke-di ‘they came’

This difference follows easily from what has already been said. The examples that show subject agreement both before and after the tense marker are all and only those examples in which the subject agreement is /u/ or /i/—vowels that are stronger phonologically than the /e/ vowel of the tense prefix. The observed pattern follows immediately if we say that the subject prefix is always doubled, but the second token is sometimes deleted by the rule in (10).

This approach generalizes to the future2 morpheme /di/. There is usually no subject agreement marker visible after this affix:

- (20) a. i-di-di ‘we will come’
 b. e-di-di ‘they will come’
 c. a-di-di ‘s/he will come’

This follows from the fact that the vowel in this tense marker is a relatively strong one, so it is usually the second subject marker that deletes rather than the vowel of the tense marker. The one vowel that is stronger than /i/ is /u/, and subject agreement doubling is observed precisely when the subject agreement marker is /u/, in irrealis clauses with second person singular subjects:

- (21) u-d-u-di-ghe
 2sS-FUT2-2sS-come-NEG
 ‘you will not come’

Finally, /maa/, /yaa/ and /kpaa/ contain the weakest of the vowels. Therefore we expect to see subject doubling in most cases with these tense prefixes, and we do:

- (22) a. i-ma-i-di ‘we came’
 b. e-ma-e-di ‘they came’
 c. (ɔ-fɔn sia) u-ma-u-di. ‘(It is good that) you have come.’

The only situation in which subject doubling is not evident is when the subject marker is second or third person singular /a/ (but see note 5):

- (23) a-maa-di ‘s/he came.’

This is because /a/ is the only vowel that is as weak as the vowel in the tense prefix.

We observe, then, that the distribution of subject agreement doubling follows from the assumption that subject agreement doubling happens across the board, plus the well-motivated phonological rule in (10). We conclude that subject agreement doubling is systematic in Ibibio, but this is partially concealed by general principles of vowel hiatus.⁶

3.2 Allomorphy of 1sS agreement

Given the discussion so far, one might think that clauses with first person singular subjects would provide the perfect opportunity to see the full generality of subject agreement doubling. Since this category is spelled out as a syllabic nasal /n/, it should not be vulnerable to the principles that resolve vowel hiatus. Hence, it should appear regardless of the quality of the vowels in the tense-mood-aspect prefixes and object markers that surround it, one would think.

In fact, the opposite is true. A second instance of /n/ does show up when there is a separate auxiliary word:

- (24) a. n-sʌk ɲ-yem ‘I am looking for it’
 b. m-mana n-nam ‘I do it again.’
 c. n-səsɔp n-nam ‘I do it quickly.’

But /n/ never shows up after a true tense-mood-aspect prefix:

- (25) a. m-maa-di ‘I came’ not *m-ma-n-di
 b. ɲ-yaa-di ‘I will come’ not *ɲ-ya-n-di
 c. ɲ-ke-di ‘I came’ not *ɲ-ke-n-di
 d. n-di-di ‘I will come’ not *n-di-n-di

This cannot be attributed to a general phonological rule, because the 1sO object marker is also /n/, and it does occur in the same phonological environments:

- (26) a. a-ma-ɲ-yem ‘he/she looked for me’
 b. a-ke-ɲ-yem ‘he/she looked for me’
 c. a-di-ɲ-yem ‘he/she will look for me.’ Etc.

We handle this glitch in the distribution of subject agreement with a rule of contextual allomorphy. Assuming a framework like Distributed Morphology (Halle and Marantz 1993), the segmental quality of the agreement marker is inserted by a set of vocabulary insertion rules at PF. Within such a theory, it is a simple matter to say that one of the vocabulary items, namely /n/, has a contextual restriction on it, to the effect that it is only inserted in word-initial position:

(27) AGR[1sS] → n / # ____

The result of this is that when a functional head that bears 1sS features is not word initial, (27) fails to apply. Then either no vocabulary item is inserted for agreement in this location, or some default agreement marker is inserted, depending on the details of how the morphological rule system is structured.⁷

In fact, the allomorphy rule in (27) should be stated a bit more generally than this. Back in example (6), we mentioned that when the T node on an auxiliary verb is the infinitival marker /adi/, agreement on the main verb is realized as an invariant /n/. This morpheme is homophonous with the 1sS marker discussed in this subsection. (28) contains an example.

(28) Okon a-yem adi-mana n-nam.

Okon 3sS-want INF-do.again N-do

‘Okon wants to do it again.’

However, when a nonfinite verb contains a prefixal aspect marker, such as /si/ ‘imperfective’, the /n/ seen in (28) does not appear either before or after /si/.

(29) Okon a-yem adi-(*n)-si-(*n)-nam.

Okon 3sS-want INF-N-IMPF-N-do

‘Okon wants to be doing it.’

Apparently, the /n/ that realizes agreement on lower heads in nonfinite clauses is like the /n/ that realizes agreement with first person subjects; it too can only be inserted in word-initial position.

The noninsertion of /n/ in (29) as opposed to (28) is probably related somehow to the special phonological properties of syllabic nasals in Ibibio—an obvious phonological characteristic that nonfinite agreement shares with first person singular agreement. Recall, however, that there cannot be a completely general phonological rule that deletes nasal segments internal to the tense-aspect-agreement complex, because 1sO agreement is also /n/, and this morpheme does not disappear word-internally ((26)). It is not obvious to us what is the best way to state (27) so that it captures the contrast between (24) and (25) and the similar contrast between (28) and (29), while still allowing (26). But however this is achieved, we take it as established that multiple subject agreement is a general phenomenon in the syntax of Ibibio.⁸

3.3 The range of heads involved in subject agreement

As our last preliminary to a theoretical analysis of multiple subject agreement in Ibibio, we illustrate more systematically the range of heads that participate in agreement. We have assumed implicitly that all heads in the tense-mood-aspect-auxiliary system of Ibibio are in principle involved in agreement. Now we make this more explicit, demonstrating a fuller range of contexts in which multiple subject agreement appears.

We already saw in section 3.1 that subject agreement appears both before and after all of the known tense markers, once one factors out the effects of vowel hiatus resolution. But in fact, subject agreement can appear more than twice in the Ibibio clause. Indeed, there is an exact correspondence between the number of overt functional morphemes in the Ibibio clause and the number of subject agreement morphemes that appear in that clause. This can be seen in several of the examples shown above, but it is quite general, once the phonological and allomorphic

rules are taken into account. For instance, the examples in (30)-(31) have two functional heads in addition to the verb: a tense morpheme and an aspect morpheme. In these examples, three instances of subject agreement can be seen when phonological conditions are right:

(30) a. utom se Okon a-maa-[a]-ke-[a]-nam
 work that Okon 3sS-PAST1-3sS-PERF-3sS-do
 ‘work that Okon had already done’

b. utom se ꞑꞑin i-ma-i-k-i-nam
 work that we 1pS-PAST1-1pS-PERF-1pS-do
 ‘work that we had already done’

(31) a. a-yaa-[a]-si-[a]-nam
 3sS-FUT1-3sS-IMPf-3sS-do
 ‘he will be doing it’

b. u-d-u-s-u-nam-ma
 2sS-FUT2-2sS-IMPf-2sS-do-NEG
 ‘you will not be doing it’

Another way to get three subject agreement morphemes in a single clause is to use an overt tense marker along with an auxiliary verb. In this case, agreement comes before the T head, between the T head and the auxiliary, and before the main verb:

(32) a. ꞑmmꞑ e-ma-e-sʌk e-di.
 they 3pS-PAST1-3pS-AUX 3pS-come
 ‘They still came...’

b. I-ya-i-mana i-nam.

1pS-FUT1-1sS-do.again 1pS-do

‘We will do it again.’

More complex combinations are also possible. (33) shows the combination of a mood prefix (*kpa* ‘conditional’), a tense prefix (*ke* ‘past2’ (or perfect)), and an aspect prefix (*si* ‘imperfective’). When the verb is a second person irrealis form, in which agreement is /u/, the strongest vowel, it can be seen that these forms have quadruple agreement:

(33) a. a-kpaa-[a]-ke-[a]-si-[a]-nam

3sS-COND-3sS-PERF-3sS-IMPF-3sS-do

‘he would have been doing it’

b. u-kp-u-k-u-s-u-nam-ma

2sS-COND-2sS-PERF-2sS-IMPF-2sS-do-NEG

‘you shouldn’t have been doing it’

Nor is quadruple agreement a record for Ibibio; one can have the same complex tense-mood-aspect combination show in (33), but attach it to an auxiliary verb. All the same agreements appear on the auxiliary, plus an additional one on the main verb, for a total of five:

(34) U-kp-u-k-u-s-u-mana-ke

u-nam.

2sS-COND-2sS-PERF-2sS-IMPF-2sS-do.again-NEG 2sS-do

‘You should not have been doing it again.’

One can even go beyond this, if one includes multiple auxiliaries in a sentence like (34) (or if one uses more than one verb, in a serial verb construction; see note 2); this results in six or more instances of the subject agreement morpheme.

It seems, then, that there is no firm upper limit on the number of times subject agreement can appear in an Ibibio clause. The clear generalization is that the more overt functional heads

one has in the clause, the more instances of subject agreement there are, in direct proportion. What is special about Ibibio, then, is that every verbal functional category in the clause is involved in subject agreement, including at least Mood, Aspect, Auxiliary, and Participle (the functional head that dominates main verbs in auxiliary constructions, which is otherwise covert in Ibibio)—not just Tense, as in more familiar languages.⁹

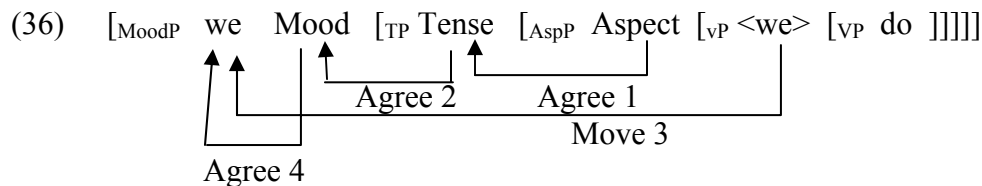
4. The Mechanics of Multiple Agreement

4.1 Surveying the theoretical options

Now we can turn to the question of what this special fact about functional heads in Ibibio can tell us about the nature of the Agree relation as it exists in Universal Grammar. We claim that there are three main implications: agreement can probe upward (Baker In press), agreement can take place between two categories with unvalued features (Pesetsky and Torrego 2007), and—most basically—agreement can take place between two heads.

We already sketched back in section two the sort of derivation for multiply-agreeing clauses that is made possible by these nonstandard theoretical assumptions. To repeat, we claim that a fairly typical example like (35) has the derivation sketched in (36).

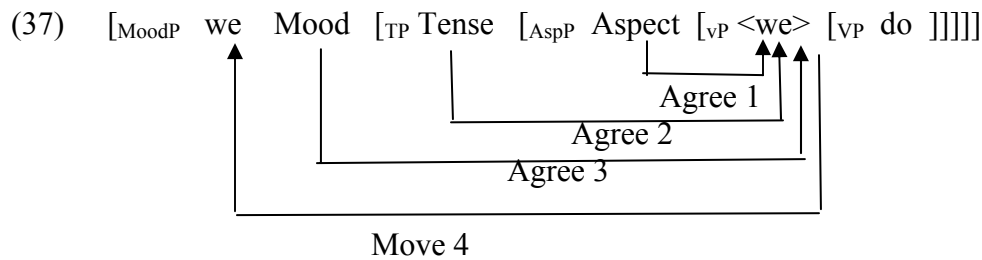
- (35) i-kpa-i-k-i-si-nam
 1pS-COND-1pS-PAST2-1pS-IMPF-do
 ‘we would have been doing it’



First the Aspect head /si/ is merged with vP, which contains the subject ‘we’. Aspect is a probe, with unvalued phi-features, but it is constrained to search upward for something to agree with, rather than downward. Hence no agreement can happen immediately. Next the tense head /ke/ is merged with the Aspect phrase. It too has unvalued phi-features, and must search upward for something to agree with. Therefore, it cannot agree, but Aspect can now agree with it. This agreement relation does not give Aspect a value for its phi-features yet, but it creates a dependency between the phi-features of Aspect and those of Tense, such that when features are assigned to one of these heads, they are automatically shared with the other. Third, the mood head /kpa/ is merged, and the tense head agrees with it. As the highest functional head in the clause, Mood is associated with an EPP feature, which attracts the thematic subject ‘we’ to Spec, MoodP. Now there is something with valued phi-features that c-commands Mood, which Mood can agree with, probing upward. As a result, Mood shares the [1pl] features of the subject ‘we’, and these features are automatically shared with Tense and Aspect by virtue of Tense agreeing with Mood, and Aspect agreeing with Tense. Finally, the [1pl] features are spelled out on each functional head as /i/, resulting in the observed form. We trust that it is fairly clear how the data from a wide variety of affirmative indicative clauses outlined in section 3.3 can be explained under these assumptions.

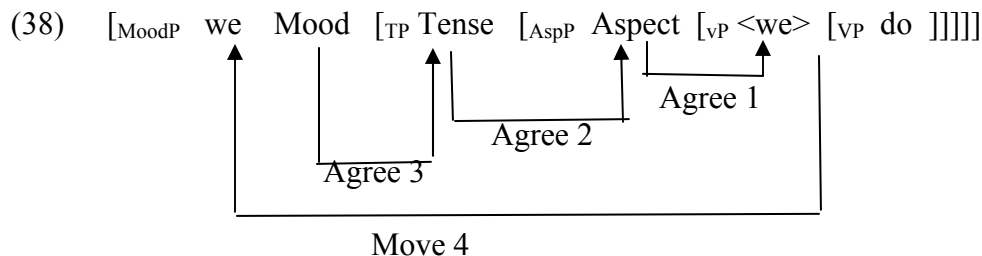
The question, then, is whether other, arguably simpler or more standard assumptions will work just as well. There are quite a few more or less plausible alternatives. Suppose, for example, we stick to the standard view of Chomsky (2000, 2001) that functional heads can only probe downward, inside their c-command domain, for a goal with which they can agree. On that assumption, the functional heads in (35) must be agreeing with the copy of the subject in its first-merged position in Spec vP, not the copy of the subject in Spec MoodP. Different theoretical

variants can then be generated depending on whether the functional heads all agree with this NP directly, or whether some of them agree with it indirectly. For example, one could hold that all of the functional heads are self-sufficient probes in their own right, each agreeing independently with the NP in Spec, vP. On this view, the derivation of (35) could be represented as in (37).



Minor variants of this hypothesis could add some shorter movements of the subject ‘we’ between the agreement steps. For example, Aspect could have an EPP feature, such that the thematic subject moves to Spec, AspP after Aspect agrees with it, and then Tense agrees with the copy of ‘we’ in Spec, AspP. Similarly, ‘we’ could move to Spec, TenseP and Mood could agree with it there. Chomsky (2001:17-18) offers an account of agreement on Tense and participles in participial constructions in Icelandic that works approximately along the lines of (37).¹⁰

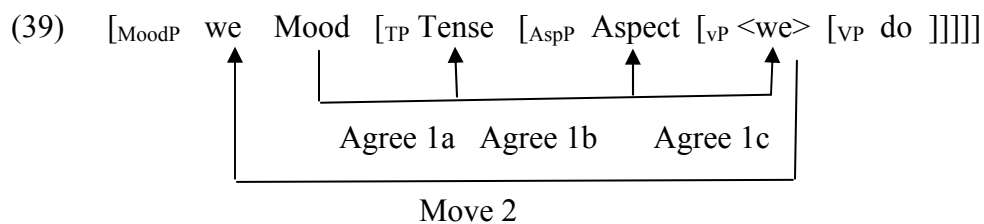
A second possibility that is consistent with downward probing is that the lowest head finds the subject in Spec, vP as its goal, and higher heads find lower heads as their goals. This hypothesis could be represented as in (38).



This is the exact opposite of our favored hypothesis in (36). (38) and (36) share the idea that each head agrees most directly with the structurally adjacent head, and only the head at the end

of the sequence agrees directly with the NP; they differ as to whether heads probe consistently upward or consistently downward. Again, exactly what path the subject takes to Spec, MoodP may not be particularly crucial on this view. (38) is similar to the kind of agreement that Collins (2003) uses in his analysis of the Khoisan language Ju|'hoansi.

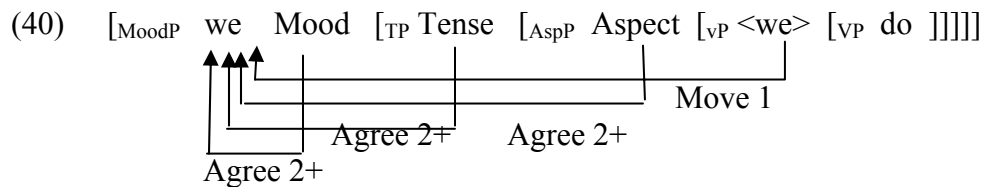
A third possibility in the downward probing family is that the various functional heads are not all independent probes; only the highest one (here Mood) is. On this view, lower heads like Tense and Aspect would have unvalued phi-features, but they would be of a passive sort that do not initiate an agreement relationship on their own. Such heads can, however, participate in agreement relationships when they are on the path between an active probe like Mood and its ultimate goal, the subject NP. Thus, Mood probes downward and finds matching features on Tense, and an agreement relationship is established. Since Mood does not receive values for (all of) its phi-features, it keeps probing downward, finding Aspect next, and ultimately the subject in Spec, vP. The subject has interpretable phi-features, so it values the unvalued features of Mood, and probing stops. The unvalued features of Tense and Aspect are valued as well, since they were taken up in the agreement relationship. This can be schematized as in (39).



A derivation like the one in (39) is used in an interesting way by Bhatt (2005:768-770) in his analysis of long distance agreement in restructuring constructions in Hindi. An infinitival verb in Hindi does not normally agree with its object in gender and number, but in certain configurations the finite T of the matrix clause cannot agree with the matrix subject, and is thus driven to agree with the object of the infinitival verb instead. When this happens, the infinitival

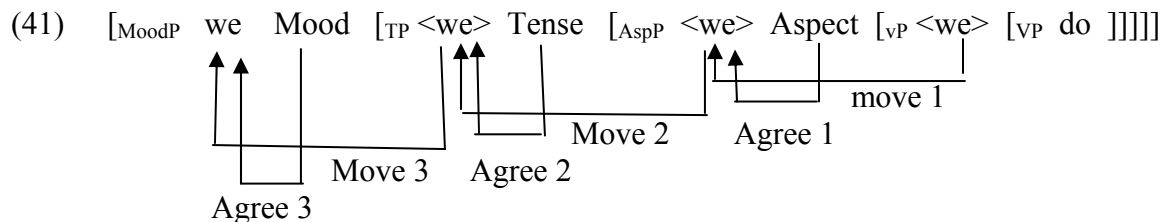
verb also manifests the same number and gender features as the object and the matrix T. This sort of derivation thus has independent empirical motivation. Henderson (2006) also argues that complex tense constructions in Bantu have a derivation like (39)—constructions that are very similar to those shown in examples like (3) in Ibibio.

Suppose now that we accept Baker’s idea that heads can be required to probe upward for something to agree with in a language like Ibibio, but not Pesetsky and Torrego’s idea that heads with unvalued features can be goals for an agreement relationship. One possibility would be that all the functional heads independently agree with the NP in Spec, MoodP, as in (40).



It is not clear what order the agreement relationships are established in (or whether this matters), in part because this derivation strains somewhat our common assumptions about the cyclic nature of the derivation. We are not aware of any actual proposals in the literature that are exactly like (40), but it is just like the respectable (37) except that agreement is consistently upward rather than consistently downward.

A sixth and final type of derivation to consider is the one sketched in (41), where the subject moves successive-cyclically through the specifier of each functional head, and the functional head agrees (upward) with the copy in its own specifier position.



This sort of derivation has some history behind it; it was the original proposal for multiple agreement in Bantu complex tenses, put forward by Kinyalolo (1991) and Carstens (2001, 2005)(but argued against by Henderson (2006)). It is like (40) in that agreement is upward and always targets fully-valued NPs, but agreement is more strictly local in (41), at the cost of some extra applications of Move.

This survey of possible agreement derivations is by no means exhaustive. Various blends of these hypotheses can be imagined. For example, it is conceivable that the subject moves through some intermediate specifier positions but not others, or that some functional heads probe downward for something to agree with whereas others probe upward. (36)-(41) do, however, give a good sample of the different sorts of derivations involving multiple agreement that have been entertained, and illustrate in a not-too-imperfect way the conceptual space defined by recent theoretical proposals about agreement. They also have the advantage of being fairly consistent, not positing distinctions in the agreement behavior of different functional heads in arbitrary ways when there is no clear empirical difference. Therefore, if we can find good data that choose between these possibilities, we will have learned something about agreement that is worth knowing. We proceed to do this in the next three subsections.

4.2 Finite versus nonfinite clauses: the special role of the highest head

In fact, many of the hypotheses in (36)-(41) can be ruled out simply by comparing finite clauses with nonfinite clauses. While all finite indicative Ts undergo agreement in Ibibio, there is at least one clausal functional head that is not a probe: the nonfinite morpheme *adi*.¹¹ Verbs marked with *adi* have a null subject (PRO in (62b) and (62c); probably NP-trace in (62a)) and do not vary with the phi-features of this subject. Like nonfinite verbs in other languages, they cannot be

used in matrix clauses, but are possible in the complements of matrix verbs with meanings like ‘want’, ‘try’, ‘start’, and ‘can/may’ ((42a,c)); they can be used as sentential subjects ((42b)):

(42) a. Mkpɔitie odo a-keme adi-bληηɔ.

chair the 3sS-may INF- break

‘The chair may break.’

b. ɔ-fɔn adi-kit Okon.

3sS-be.good INF-see Okon

‘It is good to see Okon.’

c. Okon a-yem adi-si-nam.

Okon 3sS-want INF-IMPF-do

‘Okon wants to be doing it.’

Adi cannot co-occur with any (other) tense marker, but it can co-occur with aspectual *si*, and when it does it appears outside of the aspect prefix, just as finite Ts do ((42c)). This simple distributional evidence shows that *adi* is well-analyzed as a nonfinite Tense head. Now the PRO subject of the infinitival clause probably does have specified phi-features, perhaps inherited from its controller, at least in instances of obligatory control such as (42c). Support for this comes from the fact that plural agreement must be used on reflexive anaphors and predicate adjectives when the subject of the clause is a PRO controlled by a plural noun phrase, as shown in (43).

(43) a. Ndito ado e-yem adi-yie idem-ɔmmɔ (*idem-ɔmɔ)

children the 3pS-want INF-wash body-their body-3s

‘The children want to wash themselves/*himself.’

b. Ndito ado e-yem adi-do n-tok-n-tok (*e-tok-e-tok)

children the 3pS-want INF-be PL-small-PL-small SG-small-SG-small

‘The children want to be small.’

But the infinitival T *adi* does not pick up these phi-features; it has the same form in (43a,b), when the PRO subject is plural, as it does in (42c), where PRO is singular. *Adi* is a T that simply does not initiate an Agree relation, and thus it does not acquire phi-features of its own.

Consider next what happens when *adi* is attached to an auxiliary verb. In these circumstances, the functional head Participle associated with the main verb also does not agree with the subject of the clause. Rather, the invariant prefix /n/ shows up in the agreement prefix slot in these circumstances, as shown in (44).¹²

(44) a. Mkpɔitie odo a-keme adi-mana n-bɔŋŋɔ.

chair the 3sS-may INF-do.again N-break

‘The chair may break again.’

b. ɔ-fɔn adi-sɔp n-nam. (*a-nam)

3sS-be.good INF-do.quickly N-do 3sS-do

‘It is good to do it quickly.’

c. Ndito ado e-yem adi-mana n-nam. (*e-nam)

children the 3pS-want INF-do.again N-do 3pS-do

‘The children want to do it again.’

This /n/ prefix is clearly different from with the /a/ or /e/ prefix that shows up on the main verb when the auxiliary verb bears a finite Tense, as shown by the contrast between (44c) and (45).

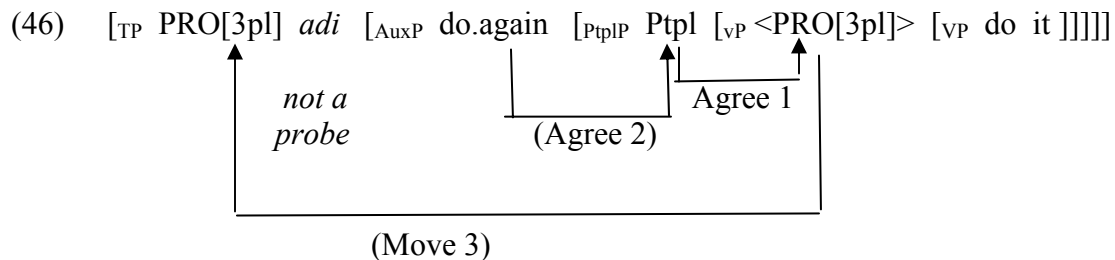
(45) Ndito ado e-ma-e-mana e-nam.

children the 3pS-PAST-3pS-do.again 3pS-do

‘The children want to do it again.’

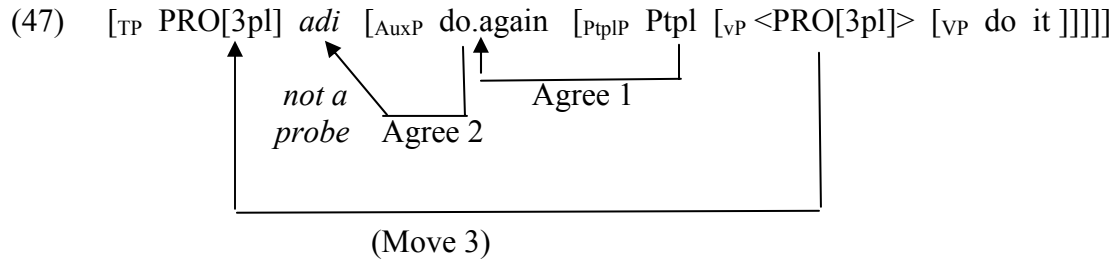
Thus whether the participial head on the main verb agrees with the subject in phi-features depends crucially on whether the highest functional head in the clause is a probe or not.

This observation tells against the hypotheses sketched in (37), (38), (40), and (41). These hypotheses all share the idea that the agreement of lower functional heads is independent of the agreement of the highest functional heads. First the lowest functional head agrees with the subject in whatever manner it does (the details about how this happens vary), and only at the end of the derivation does the highest functional head agree. Any such theory suggests that the form of agreement on the lower functional heads should always be the same, regardless of whether the highest functional head is a probe or not. For concreteness, consider the version in (38). Here the participle head should first agree (downward) with the plural PRO in Spec, vP. Then the T head *adi* is merged, but it is not a probe, so it fails to agree. But that should not undo the agreement relationship already established between P_{tpl} and PRO. The P_{tpl} head should thus be spelled out as /e/, giving the ungrammatical version of (44c), not the grammatical version.



(37), (40) and (41) create the same expectation, and thus face the same empirical problem.¹³

In contrast, on our favored hypothesis ((36)), it makes perfect sense that the realization of agreement on the lower participle head depends on whether the highest head is a probe or not:



On this view, there is nothing that Ptpl can agree upward with when it is first merged; nor does it (we assume) have an EPP feature that triggers the movement of PRO to Spec, PtplP. Next the Auxiliary head is merged with PtplP. Since the Aux head has potential phi-features, Ptpl can agree with it. However, Aux does not have actual, valued features yet, so Ptpl does not acquire values for its phi-features by this agreement process. Nor is there anything that Aux can agree with yet. Finally, the nonfinite T *adi* merges with AuxP. *Adi* does have an EPP feature, which triggers the movement of PRO from Spec vP to Spec TP, and *adi* is (we may assume) a legitimate goal for Aux to agree with.¹⁴ But *adi* itself is not a probe for agreement. Thus, it does not establish an Agree relationship with PRO, and does not receive third person plural features from PRO. Therefore, third person plural phi-features are not inherited by Aux or Ptpl either, the way they are in a structure where T is finite. Ptpl has undergone agreement, but has not received phi-feature values thereby; such a Ptpl head is spelled out as /n/ at PF in Ibibio. (No second instance of /n/ can be inserted before the Aux node, because this morpheme is only inserted in word initial position; see section 3.2.¹⁵) This view correctly captures the fact that the realization of agreement on lower functional heads depends on the probehood of the highest functional head, because it is that head that must anchor the whole chain of agreeing heads to an NP with valued interpretable phi-features.

The only other analysis that ascribes a special role to T is the one sketched in (39). Here T is the only probe, it agrees with the subject in Spec, vP, and any functional heads that are on

the path between T and the subject and are capable of manifesting phi-features are caught up in the agreement relation as well. On this view, when T is *adi*, it does not agree with the subject, so the other functional heads are taken into an agreement relationship initiated by T. /n/ could then be seen as a default spell-out of these functional heads when they do not undergo agreement (and are word-initial). Therefore, to distinguish between (36) and (39), we need a different kind of data. More specifically, we need data from subjunctive clauses in *Ibibio*....

4.3 Subjunctive Clauses: the probhood of lower functional heads

Next we add to the picture data from agreement in what we refer to as subjunctive clauses.

Although there is no special subjunctive morpheme in *Ibibio*, the clauses in question function as the complements of verbs like *yem* ‘want’ and have subjects that are disjoint from the subject of the matrix clause (rather than controlled PRO subjects, as in (42c)). Some examples are:

- (48) a. Okon a-yem Emem a-si-nam.
 Okon 3sS-want Emem 3sS-IMPF-do
 ‘Okon wants Emem to be doing it.’
- b. Okon a-yem (ɲɲin) i-di.
 Okon 3sS-want we 1pS-come
 ‘Okon wants us to come.’
- c. Ami n-yem afit owo e-kpa.
 I 1sS-want all person 3pS-die
 ‘I want everyone to die.’

We call these subjunctive clauses by comparison with Romance languages, in which the complement clause in sentences like these would be in the subjunctive mood.

The first structural property of subjunctive clauses to notice is that the verb displays normal phi-feature agreement with the subject, as is already evident in (48). In this respect, these clauses are like finite indicative clauses in Ibibio, rather than like infinitival clauses.

The second notable property of these clauses is that they have no overt Tense head. The embedded verbs in (48) consist of a verb root, an agreement prefix, and in one case an aspect head ((48a)), but there is no visible tense morpheme. The examples in (49) show that it is impossible to have an overt T morpheme in the complement of a verb like ‘want’.

- (49) a. *Okon a-yem Emem a-ke-nam.
 Okon 3sS-want Emem 3sS-PAST2-do
 ‘Okon wants Emem to have done it.’
- b. *Okon a-yem Emem a-di-nam.
 Okon 3sS-want Emem 3sS-FUT2-do
 ‘Okon wants Emem to do it (in the future).’

One conceivable interpretation of this observation is that verbs like ‘want’ select a complement that is in the simple present tense. That would be superficially consistent with (48)-(49), because the simple present tense is realized phonologically as \emptyset , as seen (again) in (50).

- (50) Okon a-yem ebot. (also: i-yem ... , e-yem... , etc.)
 Okon 3sS-look goat. (1pS-look, 3pS-look)
 ‘Okon is looking for a goat.’ (‘We are looking...’ ‘They are looking...’)

However, including negation in the clause reveals a structural difference. In the simple present tense, negation shows up as a suffix on the verb, as in all other finite indicative clauses in Ibibio:

- (51) Okon i-yem-me ebot odo.
 Okon I-look-NEG goat the

‘Okon is not looking for the goat.’

We take this to be an indication that the verb moves to T in Ibibio, and thus surfaces to the left of negation, rather than to its right, much as in the famous case of French (Pollock 1989). The null present tense T triggers this sort of verb movement in just the same way as overt past and future Ts do (compare *i-k-i-yem-me* ‘s/he did not look for it’; *i-di-yem-me* ‘s/he will not look for it’, with tense markers *ki* ‘past2’ and *di* ‘future2’). There is, however, no such movement of the verb past negation in subjunctive clauses in Ibibio. Rather, the negative particle *ke* shows up as an independent word to the left of the verb in (only) this sort of clause.¹⁶

(52) a. Okon a-yem ke Emem a-si-nam.

Okon 3sS-want NEG Emem 3sS-IMPF-do

‘Okon wants Emem not to be doing it.’

b. Okon a-ke-bo ke ɔmmɔ e-dep ebot.

Okon 3sS-PAST-say NEG they 3pS-buy goat

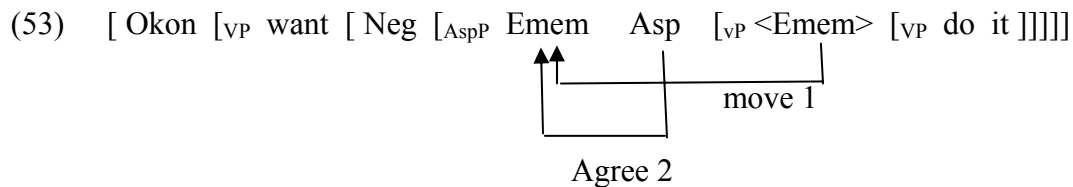
‘Okon said that they should not buy a goat.’

Subjunctive clauses thus have somewhat different structures from main clauses in Ibibio.

The best analysis of these facts, we claim, is that the T node is simply absent in subjunctive clauses in Ibibio. Verbs like *yem* ‘want’ and *bo* ‘say to’ select for an AspP or other lower functional projection, rather than for a TP. This expresses the impossibility of there being an overt tense morpheme in examples like (49) in a straightforward way. It also accounts for the absence of verb movement past negation in (52), because the trigger for verb raising is missing in these clauses. Finally, it explains the position of the subject relative to negation in (52). The normal order of morphemes in Ibibio is Subject – T+Verb – Neg – Other, the subject coming before both negation and the finite verb (see (51)). The position of the subject before the finite

verb is presumably due to an EPP feature on T that triggers raising of the subject from Spec, vP to Spec, TP. As a side effect of this raising, the subject ends up before the negative particle as well. The sentences in (52) are thus unusual in that the subject comes after negation. This also follows from saying that there is no T in subjunctive clauses in Ibibio: there is thus no functional head higher than negation in these clauses—nothing that could bear an EPP feature that would cause the subject to move past negation. Saying that subjunctive clauses in Ibibio have no T thus captures a cluster of properties that distinguish these clauses from others in the language.¹⁷

Now recall that, despite the absence of T in subjunctive clauses in Ibibio, there is still ordinary-looking phi-feature agreement with the subject in (48). This must be a manifestation of agreement on one of the lower functional heads in Ibibio—for example, on the Aspect head in (48a). In this situation, agreement on the lower functional heads clearly does not depend on there being agreement on T. On our favored view, an example like (48a) can be given a representation like the one in (53).



This analysis uses the additional assumption in (54), which we have tacitly assumed throughout.

(54) The highest verbal functional head in an Ibibio clause has an EPP feature.

(54) implies that Aspect has an EPP feature when it is not embedded under TP, although not when it is so embedded. (54) goes a long way toward accounting for the robust generalization, valid for all clause types, that overt subjects always come before the inflected verb in Ibibio.

We thus see in (48a)/(53) that Aspect must be able to function as a probe for agreement in its own right, since it agrees with the subject even when Tense is not present. Comparing

(53) with (42c) shows the difference between Aspect agreeing with a nonfinite T that does not itself agree and Aspect agreeing with the subject directly when there is no T. In the former case, Aspect agrees with T, but fails to get phi-features if T is not itself an initiator of agreement, whereas in the latter case Aspect agrees with the subject just fine on its own. Moving from this to the general case, it seems that all lower heads can be probes in their own right in Ibibio. (55) shows that this is also true for the auxiliary heads, for example.¹⁸

(55) Okon a-yem Emem a-mana a-nam.
 Okon 3sS-want Emem 3sS-do.again 3sS-do
 ‘Okon wants Emem to do it again.’

(55) also shows that overt multiple agreement—agreement on both the auxiliary and the participle—is possible in the absence of a T head. This is entirely expected on our account. Ptpl agrees with Aux when Aux is merged with PtplP. In the absence of T, Aux itself gets an EPP feature, by (54). Aux then agrees with the subject in Spec, AuxP, and the phi-features it receives are automatically shared with Ptpl by virtue of the prior agreement relationship.

In contrast, these data do not fit well with the alternative hypothesis in (39)—the idea that T is the only inherent probe in Ibibio, and lower heads like Aspect, Auxiliary, and Participle only agree when they come between T and the NP with intrinsic phi-features. On this rather popular view, it would be hard to properly distinguish subjunctive clauses from infinitival clauses in Ibibio. Neither type of clause has a T that initiates agreement: in one case, there is no T at all; in the other case, the T does not agree. Given this, plus the assumption that lower heads are not themselves probes, one would not expect to find agreement on Aspect or Auxiliary in subjunctive clauses any more than in infinitival clauses. If anything, one would expect to find

Okon a-yem Emem n-nam (Okon 3sS-want Emen n-do), much as one finds *Okon ayem adi-mana n-nam* (Okon 3sS-want INF-do.again n-do), but this is an incorrect result.

- (56) [VP want [Neg [AspP Emem Asp [VP <Emem> [VP do it]]]]]
-

The hypothesis in (39) was modeled on Bhatt’s analysis of agreement on infinitival verbs in restructuring constructions in Hindi; it is also similar to Chomsky’s (2001) analysis of agreement on participles in Icelandic. In both languages, agreement shows up on a nonfinite verb form that intervenes between the finite Tense and its goal, the thematic object.

- (57) a. *Shakrukh-ne tehniī kaat-nīī chaah-īī thīī* (Bhat, p. 761)

Shahrukh-ERG branch.F.SG cut-INF.F.SG want-PERF.F.SG be.F.SG

‘Shahrukh had wanted to cut the branch.’

- b. *Pað mundu þá sennilega ekki verða seldir bátar á uppboðinu.*

there would then probably not be sold.M.PL boats.M.PL at auction-the

‘Boats would then probably not be sold at the auction.’ (Sigurðsson 2000)

Crucially, however, when these nonfinite verbs are not on the path between T and its goal, they do not show agreement in their own right. For example, when T agrees with the subject of the matrix verb in Hindi, the infinitive does not agree with its object for most speakers.

- (58) a. *Shakrukh tehniī kaat-naa/*nīī chaah-taa thaa* (Bhat, p. 762)

Shahrukh branch.F.SG cut-INF.M/INF.F.SG want-IMPF.M.SG be.M.SG

‘Shahrukh wants to cut the branch.’

Similarly, when the past participle is used in an active sentence to express the perfect, it does not agree with the thematic object in Icelandic:

(59) ...að hann hefur ekki selt bátana. (Sigurðsson 2000)

that he has not sold.N.SG boats-the.M.PL

‘...that he hasn’t sold the boats.’

The difference is that T agrees with the thematic object in (57b), but with the thematic subject in (59). Neither the Hindi infinitive nor the Icelandic participle can agree with the object unless T does. So agreement on nonfinite verbs depends on there being a T to initiate the agreement in these languages, in a way that is captured nicely by (39). But the lower functional heads in Ibibio are different: they agree with the subject even in the absence of a T. So there is no reason to generalize the theory in (39) from Hindi and Icelandic to Ibibio. (36) stands alone as the best way to account for the contrast between infinitival, indicative, and subjunctive clauses in Ibibio.

4.4 Negative indicative clauses: the special role of Spec, TP

The last sort of clause with special agreement properties to consider is negative indicative clauses. The special property of these clauses is that the usual agreement with a third person subject is replaced with a distinct /i/ form of agreement. This was visible in the comparison between (50) and (51), and can also be seen in (60), with the overt tense marker *di*.

(60) a. Okon a-di-di.

Okon 3sS-FUT2-come

‘Okon will come.’

b. Okon i-di-di-ghe

Okon I-FUT2-come-NEG

‘Okon will not come.’

This /i/ form of agreement is found not only on T itself, but on all the lower functional heads as well, as mentioned in section 1. Two additional examples of this are given in (61).

(61) a. Okon i-k-i-si-nam-ma.

Okon I-PAST2-I-ASP-do-NEG

‘Okon was not doing it.’

b. Okon i-sɔp-pɔ i-dɔk ekpat.

Okon I-do.quickly-NEG I-make bag

‘Okon did not make the bag quickly.’

We claim that this fact can also be readily explained by our hypothesis in (36), in which the functional heads are linked together by head-to-head agreement. Examples like (61) also support the claim that the functional heads are agreeing with the pronounced copy of the NP in Spec, TP, not with the unpronounced copy in Spec, vP, as we will show. As such, they support (36) over the more familiar downward agreement analyses in (37), (38) and (39).

The first step is to understand why the agreement on the highest functional head (T) is /i/ in an example like (60b), rather than the usual 3sS form /a/ seen in (60a). One straightforward possibility would be to attribute this to a simple PF rule of allophony, which says that /i/ is inserted for Agr[3S] when there is a negative morpheme, and /a/ and /e/ are inserted elsewhere. But taken literally as a morphological rule, this would not account for the presence of /i/ rather than /a/ or /e/ on the main verb in an example like (61b): there is no negative morpheme on the main verb here, but only on the auxiliary, which is a distinct morphological unit. Alternatively, we could invoke some sort of semi-semantic rule, saying that agreement is spelled out as /i/

when it is in the scope of clausal negation. But this version wrongly predicts that third person agreement should be realized as /i/ rather than /a/ in the negative subjective clauses in (52).

Given these challenges, we adopt the more syntactic analysis of /i/ agreement developed in Baker (to appear), which we review the basics of here. One piece of the puzzle is that special /i/ agreement is used with third person subjects in at least two other circumstances in Ibibio: in a relative clause, when the subject argument is extracted ((62a)), and in *wh*-questions when the subject of the clause is an interrogative phrase—even if the subject is left in situ, as in (62b).

(62) a. Ami m-ma-kit ebót se i-k-i-ta udia. (*a-ke-ta)

I 1sS-PAST1-see goat that I-PAST2-I-eat yam 3sS-PAST2-eat
 ‘I saw the goat that ate the yams.’

b. Okon a-kere ke anie i-di-dep ebót mkpọ́? (*a-ya-dep)

Okon 3sS-think C(-wh)who I-FUT2-buy goat tomorrow 3sS-FUT1-buy
 ‘Who does Okon think will buy a goat tomorrow?’

This suggests that the use of /i/ prefix is a kind of anti-agreement effect, akin to the ones studied by Ouhalla (1993), among others. The second piece of the puzzle is that subjects in negative clauses take narrow scope with respect to negation—in marked contrast to English, in which a wide scope interpretation is possible and often preferred.¹⁹

(63) a. Udia i-sine-ke k-e:kpat.

yams I-be.in-NEG LOC-bag

‘There are no yams in the bag.’ ($\neg [\exists x (\text{yam } x) [x \text{ is in bag}]]$)

(Does not mean: ‘There are yams that are not in the bag.’)

b. Afit owo i-k-i-dia-gha ekpaṅ.

all person I-PAST2-I-eat-NEG porridge.

‘Not all of the people ate porridge.’ (\neg [$\forall x$ person (x) [x eat porridge]])

The generalization that Baker (to appear) arrives at based on data like these is that /i/ agreement is used on T in Ibibio when and only when the copy of the subject in Spec, TP does not correctly represent the scope of the subject. In (62a,b), the subject is a wh-operator that has *wider* scope than TP, scoping over the whole CP; this is particularly obvious in (62b), where it has scope over the matrix clause, as well as the embedded one. In (63a,b), the subject has *narrower* scope than TP, scoping under negation, rather than over it. In neither instance is the copy of the subject in Spec, TP the one that is interpreted scopally at LF.

To capture this generalization theoretically, Baker (to appear) adopts some of the assumptions of Bobaljik (2002) and Fox and Nissenbaum (1999). These authors argue that “covert movement” happens before spell-out in all languages, just as overt movement does. The difference comes from the fact that either the higher or the lower copy of a moved phrase can be interpreted at LF, and either copy can be interpreted (i.e., pronounced) at PF. When the higher copy is interpreted at LF and the lower copy is pronounced at PF, the result is “covert movement”. In addition to this, Baker adds the following two assumptions, specific to Ibibio.

(64) The semantic features of an NP chain are spelled out on the highest copy of the NP that is within the scope of negation, if any; otherwise they are spelled out on the highest copy.

(65) Phi-features are deleted along with semantic features on copies in a movement chain.

(64) accounts directly for the fact that the indefinite and quantified subjects take narrow scope with respect to negation in sentences like (63) in Ibibio (unlike in English). It states that when the subject raises from spec, vP to Spec, TP in a negative sentence, it must be the copy in Spec,

vP that is interpreted semantically, and not the copy in Spec, TP, even though that is the copy that is pronounced.²⁰ (65) then applies, stipulating that the phi-features associated with the chain are also retained on the lower copy of the NP but not on the higher copy. This results in a representation like (66) for the example in (63b).

(66) [TP <all person> T+eat [NEG [vP <all person> v [vP <eat> porridge]]] (=63b))
 $\forall x \dots [3pl] \leftarrow$ Agree $\forall x \dots [3pl]$

/i/ can then be analyzed as a kind of default realization of subject agreement in Ibibio—the form that is inserted when Agree happens but fails to endow a head like T with any substantive values for the phi-features. (65) also applies to examples with wh-phrase subjects, like (62b). In these examples, wh-movement applies to give the subject scope over a CP, and the semantic features of the higher copy are retained for interpretation at LF, not those of the copy in Spec, TP. Hence the phi-features are also retained on the higher copy in Spec, CP, not on the copy in Spec, TP. This results in the representation in (67), and /i/ agreement on the embedded T.²¹

(67) [CP <who> C [TP Okon think [CP <who> C [TP <who> T [vP buy goat]]]]]
 Wh x...[3sg] \leftarrow Agree \leftarrow Whx...[3sg]

In contrast, when the subject is not +wh and when there is no negation in the clause, no principle prevents the Spec, TP position from being interpreted at LF. Therefore, the semantic features of this copy are retained (see the second clause of (64)), and phi-features are also retained in Spec, TP. As a result, full phi-feature agreement is found on T in simple affirmative clauses like (60a):

(68) [TP <Okon> T+come [vP <Okon> v [vP <come>]]]
 [3sg] \leftarrow Agree [3sg]

(65) thus captures the generalization that agreement on T is /i/ when and only when Spec, TP is not a legitimate scope position for the subject argument.

The importance of this analysis for us is that it implies that the verbal functional heads in Ibibio must be agreeing with the copy of the subject in Spec TP, not with some other copy of the subject. The generalization is that T shows full phi-feature agreement with the subject if and only if the Spec, TP position accurately represents the subject's semantic scope—not some higher position (as in (67)), or some lower position (as in (66)). Whenever the Spec, TP position does not represent the scope of the subject, then default /i/ agreement is used on T instead. This makes sense only if T is in an Agree relationship with the Spec, TP position itself, not with some other position in the chain. That T agrees upward with the NP in Spec, TP is a crucial ingredient of our hypothesis in (36), distinguishing it from the hypotheses in (37)-(39). Thus, these “anti-agreement effect” data reconfirm hypothesis (36) over the alternatives.²²

To see this more clearly, consider what would be involved in saying that T agrees with the copy of the subject in Spec, vP, the position of its first merge, either directly as in (37) or (39), or indirectly by agreeing with a lower head that itself agrees with Spec, vP, as in (38). The copy in Spec, vP is always semantically interpreted, in the sense that it determines the thematic role that the subject NP receives at LF (although not necessary its semantic scope). Given this, it is reasonable to interpret (65) as implying that phi-features are never deleted on the lowest trace of the subject chain. That this is the correct interpretation is confirmed by examples like those in (69); these show that reflexive anaphors and predicate adjectives agree with the subject in person and number features, regardless of whether the clause is affirmative or negative (or even interrogative).²³

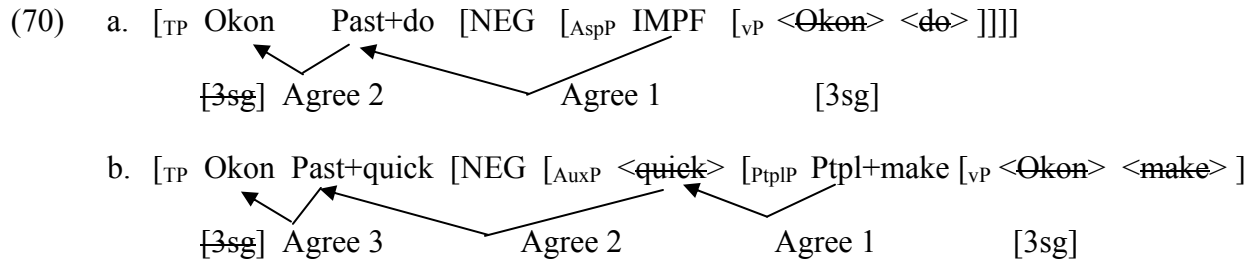
- (69) a. Ndito ado e-ma-e-yie/ i-k-i-yie-ghe idem-᠔mm᠔.
 children those 3pS-PAST1-3pS-wash I-PAST2-I-wash-NEG body-their(3pl)
 ‘Those children washed (did not wash) themselves.’
- b. Ndito ado e-do/ i-do-gho n-tok-n-tok.
 Children those 3pS-be i-be-NEG PL-small-PL-small
 ‘Those children are (not) small.’

Unlike tense and aspect heads, the reflexive object and the predicate adjective are contained inside the thematic predicate proper. They are thus in the c-command domain of the lowest copy of the subject, in Spec, vP (or Spec, PredP, in the case of (69b)). That lowest copy is the closest goal for these elements, probing upward, and it must be this copy that they agree with. The fact that they always show full number agreement confirms that the phi-features of the lowest copy are never deleted by (65). But then suppose that T were agreeing downward with the NP in its theta-position, as in many standard treatments. Then it too should show full phi-feature agreement in a structure like (66), appearing as /e/, rather than /i/, contrary to fact. This difference between the agreement properties of “low” elements like anaphors and adjectives and “high” elements like Tense shows that they are agreeing with different copies of the movement chain. In particular, Tense must be agreeing upward with the copy in Spec, TP.

Next consider the fact that in negative indicative clauses (and in clauses with subject extraction), the same agreement morpheme /i/ that is found on T is also found on all the lower functional heads. This suggests that they are also agreeing—directly or indirectly—with the copy of the subject in Spec, TP, not with the copy in Spec, vP or any other copy. Our hypothesis in (36) has this desirable feature: each functional head agrees with the next highest head, the highest one (T) ultimately agreeing with the subject in its Spec position. When T receives only

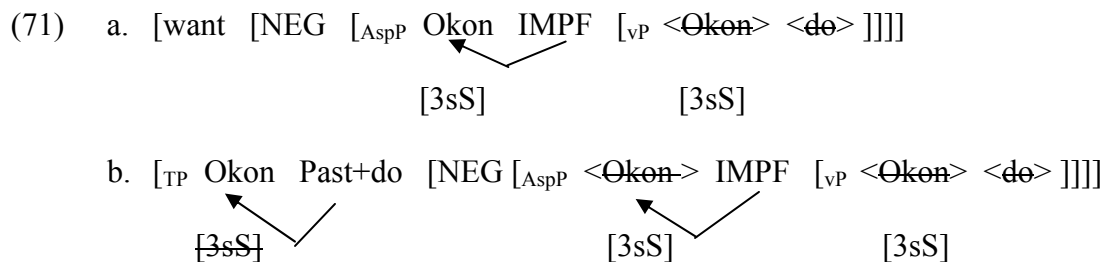
default phi-features from its Spec as result of (65), then the lower functional heads also receive only default phi-features as well. Their agreements are thus all spelled out as /i/ at PF.²⁴

Representations of examples like (61a,b) are in (70).



In contrast, if any of the lower functional heads were to agree independently with the copy in Spec vP, they should appear with /a/ or /e/ agreement, not with /i/ agreement, contrary to fact.

This line of reasoning can be generalized to tell against any theory in which functional heads agree with some copy of the subject other than the one in Spec, TP, including hypothesis (41), which was proposed for Bantu languages by Kinyalolo (1991) and Carstens (2001). For example, this sort of theory would find it difficult to distinguish between negative subjunctive clauses like (52)/(53) and negative indicative clauses like (61a)/(70a). Possible structures for these examples are given again in (71).



(52) shows that when Asp agrees directly with a third person singular NP known to be in Spec, AspP, the agreement is realized as /a/. This is predicted by (64), which implies that phi-features are retained on the copy of the subject in Spec, AspP, since it is the highest one under negation ((71a)). Now suppose that in sentences like (61a), Asp agrees most directly with a copy of the

subject in Spec, AspP, created by successive cyclic movement on the way to Spec, TP, as hypothesis (41) would have it. By parity of reasoning, (64) implies that the copy in Spec, AspP should be one that is semantically interpreted and that retains its phi-features in (61a) also (see (71b)). Then Asp would be expected to bear /a/ agreement in (61a), just as it does in (52). But Asp actually bears /i/ agreement in (61b)—a fact that is expected under the (36)-based analysis shown in (70a). Thus, hypothesis (36) seems superior to hypothesis (41) in this respect.

We conclude that hypothesis (36) is the only one that properly accounts for agreement in negative clauses in *Ibibio*.²⁵ This agrees with the conclusion of sections 4.2 and 4.3, which showed that this hypothesis is also the only one that accounts for the differences in agreement between indicative clauses, subjunctive clauses, and infinitival clauses. Therefore we have two lines of argument that converge on this analysis from among the myriad of possibilities.

5. Conclusion

In this paper, we have seen that every verbal functional head in the clause can be involved in agreement in *Ibibio* (except C). Among other things, this shows that there is nothing unique about Tense, such that it can bear agreement but lower heads like Aspect, Mood, and Auxiliary cannot. We have also used the differences in agreement among the various kinds of clauses in *Ibibio* to investigate the mechanics of agreement. The four primary kinds of clauses that we have considered are summarized in the following table, along with a schematic representation of how agreement works in each construction under our analysis.

Clause type	Agreement on T	Agreement on lower head(s)	Analysis
Finite Indicative	/a/+T (3sS), etc.	/a/, etc.	
Negative indicative	/i/+T	/i/	
Nonfinite clause	/adi/ (invariant)	/n/ (invariant)	
subjunctive clause	N/A (no T)	/a/, etc.	

In particular, we have made crucial use of three nonstandard ideas about how agreement works:

(a) agreeing heads are required to look upward through the structure for something to agree with in some languages, including Ibibio (Baker In press); (b) one head can be the goal that another head agrees with within the same extended projection (cf. Grimshaw 2005); (c) two heads can agree even if neither one has a value for the sought-after feature (Pesetsky and Torrego 2007).

Other combinations of assumptions might be able to capture one or two of these agreement patterns, but only this combination of assumptions succeeds in capturing the whole paradigm in a relatively straightforward way, as we have shown. In this way, the unusual agreement properties of Ibibio—the fact that so many functional heads participate in agreement, and the fact that Ibibio has more than one “default” agreement marker—give an important window into the inner workings of the agreement relation provided by Universal Grammar.

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Notes:

* The data from Ibibio used in this paper represents the native-speaker judgments of the second author. The research reported here grew out of discussions in a field methods class held at Rutgers University in the spring of 2006. We thank the participants of the seminar for their input, especially Akin Akinlabi and Carlos Fasola. Thanks also to José Camacho, Ken Safir, and Jane Grimshaw for their input. Remaining errors are our responsibility.

Examples are presented in a broad phonetic transcription, with tone marking omitted except at a few crucial points. Abbreviations used in the glosses are: AGR, agreement; AUX, auxiliary; C, complementizer; COND, conditional mood; ERG, ergative case; F, feminine; FUT, future tense; I, the default agreement prefix /i/; IMPF, imperfective aspect; INF, infinitive; LOC, locative preposition; M, masculine; NEG, negation; PAST, past tense; PCPL, participle; PERF, perfect; PL, plural; SG, singular. Agreement morphemes are glossed with a triple consisting of a number (1, 2, or 3) expressing the person of the agreed-with argument, a lower case letter (s or p) expressing the number of the agreed with argument, and an upper case letter (S or O) expressing whether the agreed-with argument is the subject or the object. For example, 1pS indicates agreement with a first person plural subject.

¹ The /a/ vowel of the 2sS and 3sS prefixes is phonologically weak. It deletes in contact with other vowels (see section 3.1), and frequently undergoes vowel harmony with either the following vowel or the preceding vowel, especially in fast speech. Thus, it can be realized as /e/,

/o/ or /ɔ/ as well as /a/ (although never as a high vowel, /i/ or /u/). Akin Akinlabi (personal communication) suggests that these morphemes might consist simply of a vowel slot devoid of segmental features, /a/ being the default expression of such a vowel.

The variation between /a/ or /e/ and /u/ or /i/ in second person forms reflects some sort of mood-tense distinction, the details of which are not clear to us. A rough generalization is that the /u/ and /i/ allomorphs are used in irrealis clauses (for example, in negative clauses and in the antecedent clauses of conditionals), but that may not be exactly the right generalization.

Not included in (1) is an agreement marker /i/ that expresses subject or object agreement with a logophoric pronoun (discussed briefly in Baker to appear). Also omitted are the default agreement markers /i/ (with high tone) and /n/, discussed at length below.

² Another environment in which one sees multiple subject agreement in Ibibio is serial verb constructions, where agreement shows up on the second verb as well as the first:

- (i) M-maa-dep udia n-tem.
1sS-PAST1-buy yam 1sS-cook
'I bought yams and cooked them.'

Although agreement on the second verb in examples like (i) behaves like the instances of “lower” agreement we analyze in this paper, we do not discuss this type of multiple subject agreement further here, because space does not permit us to enter into questions concerning the exact structure of serial verb constructions (see Fasola 2007 for some discussion).

³ It is plausible to think that most or all of Ibibio’s tense-mood-aspect markers developed historically from auxiliaries. Thus, the double agreement in examples like (4) might be historically dependent on the existence of double agreement in examples like (3). But tense markers are not to be analyzed as auxiliaries synchronically in Ibibio. This is shown by (i) the

allomorphic behavior of 1sS agreement, which is spelled out as /n/ word initially and as /Ø/ word-medially, including after a tense marker (see (24) versus (25)), and by (ii) the placement of negation, which appears as an enclitic after an auxiliary and before the main verb, but after the tense+verb complex as a whole (see (5a) versus (5b-c)).

⁴ The Ibibio tenses come in pairs: /maa/ Past1 and /yaa/ Fut2 are used in simple affirmative indicative clauses, when no argument is focused; /ke/ Past2 and /di/ Fut2 are used in negative clauses and when any argument of the clause is semantically focused or extracted in some way.

⁵ As an anonymous reviewer correctly observes, the second /a/ in the examples in (18) could also be analyzed as a second instance of the third singular subject agreement marker. An alternative to the text account, then would be to say that the vowel of these tense prefixes is underlyingly short (/ma/, /ya/, /kpa/) but they are marked as not undergoing the vowel hiatus rule in (10). We do not know how to choose between these two approaches, but do not feel the need to, given that our interest is in the syntax of agreement in Ibibio.

⁶ For consistency's sake, we can analyze even simple present tense clauses like those in (i) as having subject agreement doubling, even though no doubling is apparent.

- (i) a-yem / i-yem / e-yem ebot
he-looks / we-look / they-look for a goat.

T is realized as Ø in this tense (see also (11)-(14)). As a result, the two copies of subject agreement are always adjacent to each other in this tense, and one of them deletes by (10).

⁷ It is not immediately obvious whether a default agreement marker is present between the tense-aspect prefix and the verb root in examples like (25). When /n/ cannot be inserted, the most plausible replacement morpheme would be the 3sS marker /a/; this morpheme shares the singular feature of /n/ and has the default value of the person feature (third) in place of the marked value

(first). /a/, however, is the weakest vowel in Ibibio, and would always delete in contact with the vowel of the tense-aspect prefix.

A hint that there is in fact a default agreement marker between the tense prefix and the verb root even in first person singular forms comes from the contrast in (i).

(i) a. *nkēdi* ‘I came’ ← n-ke-[a?]-di (1sS-PAST2-[3sS?]-come)

b. *nkidighe* ‘I did not come’ ← n-k[e]-i-di-ke (1sS-PAST2-3S.NEG-come-NEG)

(ia) is as expected, but the question arises as to why (ib) is [nkidighe], rather than [nkedighe], given that the PAST2 morpheme is otherwise /ke/. We believe that this is a sign that there is a second subject agreement marker after /ke/, /n/ is not insertable (as before), and the third person/default agreement marker in negative sentences is /i/, rather than /a/ (see section 4.4 for discussion). Since /i/ is a stronger vowel than the /e/ of the tense marker, it survives in the final form (unlike the default /a/ in (ia)). Fleshing out this idea, however, would require us to make some very specific assumptions about the timing of various agreement-related operations at PF, so we do not pursue the matter here.

⁸ A second morphophonological peculiarity that 1sS agreement shares with the nonfinite agreement on heads below /adi/ is that both are deleted before the overt object agreement markers /u/ (2sO) and /i/ (1pO, 2pO). Thus, ‘I am looking for you’ is *u-yem*, not **n-u-yem*, and ‘Okon wants to see you again’ comes out as *Okon a-yem adi-mana (*n)-u-k# fiin*. This confirms that the two morphemes form a natural class and/or are historically related.

⁹ The alternative to saying that agreement attaches directly to each substantive functional head in Ibibio would be to say that there are separate Agr heads, which are dedicated exclusively to the task of executing agreement, as in Pollock 1989, Chomsky 1991, 1993 and related work. In these terms, what would be special about Ibibio is that it requires an AgrP projection to be

generated between every two substantive functional projections. This seems like a somewhat clumsier and more stipulative way to capture the facts, but we acknowledge it as a possible alternative. See Chomsky 1995:349-355 for discussion of the dubiousness of semantically vacuous Agr projections on basic conceptual grounds.

¹⁰ Chomsky's discussion also assumes that there is an agreement relationship between T and the participle in Icelandic, so that the participle will manifest nominative case. His analysis thus combines aspects of (37) and (39).

¹¹ *Adi* also has a reduced variant *i*, which can substitute for it in many environments. Although this infinitival *i* looks similar to the default agreement marker discussed in section 4.4, auxiliary constructions show that they are different. When infinitival *i* is used on an auxiliary verb, the prefix used on the main verb is /n/, just as it is with *adi*. In contrast, when the *i* of default agreement is used on the auxiliary verb, the prefix on the main verb is also *i* (see (61b)).

¹² These sentences are also bad with *i-nam*, where the main verb bears the other type of "default" agreement, which is discussed in section 4.4 below.

¹³ Hypothesis (38) and its kin could possibly be squared with these data by claiming that PRO has some unique (null?) set of phi-features, different from those of any other NP in Ibibio. Then *adi* could be the spell-out of agreement with these special features on T, and *n* could be the spell out of agreement with these features on Ptpl. This view seems not only ad hoc but wrong on two counts. First, PRO acts like a bearer of ordinary phi-features for agreement on anaphors and adjectives (see (43)). Second, (44a) is probably a raising construction, not a control construction (its subject can be an idiom chunk, for example). As such, it would not contain an instance of PRO with unique phi-features, and yet the agreement morphology is the same as it is in (44c).

¹⁴ This account raises the question of why the nonfinite T *adi* can function as a goal for a lower functional head to agree with in Ibibio. The standard idea about why a given category can be a target for agreement in theories derived from Chomsky (2000, 2001) is that a category is a target for agreement if it bears the same feature slots as the agreeing probe, hence it could in principle be a source of values for features that are unvalued on the probe. It is not clear that *adi* should be a possible goal within this approach. It is not a probe (by hypothesis), so it does not have unvalued phi-features. Presumably it does not have intrinsic (valued) phi-features either. It thus has no phi-features at all, so it would not qualify as a goal within the Chomskian conception.

An alternative conception could come from Grimshaw (2005:17-23), who argues that functional heads can agree with each other whenever they are contained in the same extended projection. The various heads in an extended projection share intrinsic category features, and this makes it possible and natural for them to share phi-features as well. This could form a new basis for explaining why T can be the goal for agreement from another functional head in the same clause, even when there is no evidence that T has agreement features. This would involve replacing the normal “Match” condition on agreement with something like (i).

- (i) A functional head F can agree with X only if:
 - (a) X is an phrase that has phi-features, *or*
 - (b) X is a functional head F' and F' and F are part of the same extended projection.

We do not explore a full-scale implementation of this idea here, however, for reasons of space.

¹⁵ Given that the infinitival marker *adi* ends in /i/, a strong vowel, it is hard to know what other form of agreement (if any), is inserted on the Aux head in (44c). The agreement morpheme here could be 3sS /a/, or default /i/, or Ø, and the end result would be the same phonologically.

¹⁶ The negative morpheme shows up as [ke] both when it remains as a separate phonological word, as in (52), and when it follows a disyllabic verb root that has moved to T, as in (i).

(i) Okon i-k-i-təŋŋə-ke.

Okon I-PAST-I-start-NEG

‘Okon did not start.’

When the verb root is only one syllable long and precedes the negative morpheme, the negative morpheme is incorporated into the same phonological foot as the verb root, and it weakens phonologically: the vowel of the negative morpheme then harmonizes with the vowel of the root, and the consonant of the negative morpheme assimilates to the final consonant of the root or weakens to [ɸ] (orthographic gh). These phonological processes partially conceal the fact that the same negative morpheme is used in both (51) and (52).

¹⁷ Alternatively, one might say that there is a null T that is devoid of substantive features in these clauses. In particular, this null T would not have a strong V feature (in the sense of Chomsky 1995) to trigger verb movement, nor an EPP feature to trigger raising of the subject, nor does it participate in agreement. We see no reason, however, to posit a functional head that has no grammatical features, no phonological features, and may not even have any semantic properties.

¹⁸ A potentially important question remains as to exactly what functional head is agreeing with the subject in an example like (48b), where there is no overt head other than the verb root—neither Aspect, nor Auxiliary, nor Tense. We can not say that it is *v*, because we want to reserve this as the locus of object agreement in Ibibio, as is standard. We thus suppose that there is always at least one functional head above *vP* in Ibibio. For (48b), it could be that the Aspect head is obligatory, and is filled with a null perfective morpheme whenever imperfective *si* is

absent. Even so, examples like (31b) show that there is an agreement-bearing functional head even lower than Aspect in Ibibio. The exact identity of this head is not crucial to our account. (The fact that *v* is not the locus of the lowest subject agreement is confirmed theory-internally by the analysis of negative indicative clauses developed in the next section.)

¹⁹ Consideration of other quantifiers (e.g. numerals, ‘many’, positive polarity ‘some’) might show that this is a bit of an oversimplification. But we are reasonably confident that the scopal properties of a quantified subject with respect to negation are no different in Ibibio than the scopal properties of a similarly quantified object, even though the subject moves out of the scope of negation overtly and the object does not. Thus the A-movement that the subject undergoes apparently gives it no scopal advantages over the object; this is the more nuanced generalization that is captured by saying that the semantic features of the copy in Spec, TP are always deleted in negative clauses (and with them, the phi-features).

²⁰ An anonymous reviewer asks (in effect) how general this phenomenon is—i.e., whether scope reconstruction is obligatory under other operators in Ibibio or not, and if so whether those operators also induce /i/ agreement on the verb, as we would predict. The short answer is that we do not know of any other relevant cases, but may not have looked at a full range of cases adequately; see Baker (to appear) for brief discussion. The scopal properties of raising predicates in Ibibio (if such exist—see (44a)) would merit further investigation, for example.

²¹ An anonymous reviewer asks why agreement cannot take place between T and the *wh*-phrase before the *wh*-phrase moves to Spec, CP, hence before copy deletion removes its phi-features. Our answer is that agreement does take place before movement, but, following Pesetsky and Torrego (2007), agreement creates a representation in which the same features are shared by two distinct syntactic nodes. As a result, when deletion removes the phi-features on the copy in

Spec, TP in a representation like (67), at some point after wh-movement, this automatically changes the features associated with T as well, because they are the very same features.

²² This reasoning converges with that of Baker (In press: chapter 5), who argues on independent grounds that probes need to search upward for something to agree with in some languages. This is expressed in the parameter in (i), which Baker shows holds of many Niger-Congo languages.

(i) A head F agrees with its goal X only if X asymmetrically c-commands F.

Chomsky's (2000) primary empirical reason for saying that T probes downward for something to agree with is the possibility of agreement in expletive constructions such as (iia) in English.

(ii) a. There were three women in the store.

b. Three women were in the store.

But it is notable that there is no similar evidence for downward agreement in Ibibio. On the contrary, the agreed-with subject must always precede all the heads that agree with it in Ibibio:

(iii) a. *E-ba ibaan ita k' urua.

3pS-be women three LOC market

'There are three women in the market.'

b. Ibaan ita e-ba k' urua.

women three 3pS-be LOC market

'There are three women in the market.'

²³ We thank an anonymous reviewer for suggesting that we look for data like this. This reviewer also asks about agreement on floated quantifiers, but these do not exist in Ibibio.

²⁴ Note that we distinguish between agreement with an NP that has no marked phi-features and absence of agreement. Agreement with an NP that has no phi-features gives /i/ morphology on lower heads, whereas absence of agreement gives /n/ morphology, as in infinitives. The

distinction is subtle, but independently attested. For example, some Slavic languages have a form of default agreement, used in impersonal sentences, that is different from both third person singular agreement and from the absence of agreement (say, in infinitives). We are proposing that a similar three-way contrast is found on certain functional heads in Ibibio.

²⁵ Hypothesis (40) is also easily made consistent with the facts about agreement in negative clauses. However, no one has seriously pursued this hypothesis, and it is rather easily ruled out by another consideration. Baker (in press) argues that a functional head can only show person agreement with a goal if there is no intervening head that c-commands one but not the other. Among other things, this explains the fact that predicate adjectives can agree with the subject of the clause in number and gender, but not in person—a fact that holds true for Ibibio as well as many other languages. Given this, if agreement happened in the way that is indicated in (40), one would expect that the lower functional heads could agree with Spec, TP in number but not in person, much like adjectives. But this is false: lower functional heads can agree with the subject in person as well as in number, as shown by various examples in the text, including (3a), (4b), (8), and (31b).