When you can't agree in person:

Partial agreement in Tshiluba auxiliary constructions

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Contents

1 Introduction

Auxiliary verbs exist in many language families and are often used along with lexical verbs[1] to express tense, aspect, or mood. Since auxiliary constructions are built using two or more verbs, subject agreement can appear in various ways.

In many languages, including most Indo-European languages, the highest verb in an auxiliary construction shows agreement with its subject while lower verbs appear in a non-agreeing form such as a gerund or infinitive. Examples of this kind of agreement are given in (1) and (2), in which the auxiliaries *have* and *be* agree with the subject while the participle *eat* maintains the same non-agreeing form with each subject.

(1) *English auxiliary across subjects that vary in person*
   a. I have eaten
   b. She has eaten

(2) *English auxiliary across subjects that vary in number*
   a. He was eating
   b. They were eating

However, Bantu languages present an exception to this pattern. Auxiliary constructions in many Bantu languages show full phi-feature subject agreement (agreement in person, number, and gender) on both the auxiliary and the participle[2]. These kind of constructions are typically called a 'compound tense' in Bantuist literature. The examples in (3) are taken from Tshiluba, the Bantu language that is the focus of this paper.[3]

In (3a), both the both the auxiliary *ʤi* and the participle *seka* 'laugh' agree with the null first person plural subject. This agreement is shown by the first person plural subject prefix *tu-* appearing on both the auxiliary *ʤi* and the participle *seka* 'laugh.' Similarly, in (3b), agreement is shown by the same second person plural subject prefix *nu-* appearing on both the auxiliary and the participle. Finally, in (3c), agreement is shown by the class 2 (plural human) noun class prefix *ba-* appearing on both the auxiliary and the participle. In all three examples, full subject agreement appears twice: first on the auxiliary, then on the participle.

[1] In this paper, the term 'lexical verb' is used to refer to verbs that belong to the open class of content verbs (verbs like 'run,' 'think,' and 'give'), as opposed to the closed class of auxiliary verbs that serve grammatical functions.

[2] The word 'participle' rarely occurs in the Bantuist literature, so it may seem out of place here. In fact, Nurse (2008) does not use the term 'participle' in his overview of Bantu tense and aspect, which details the tense and aspect systems of one hundred Bantu languages from across the continent. Here, I use the word 'participle' to mean a word derived from a verbal root that is used along with one or more auxiliary(-ies) to form a complex predicate. My avoidance of the terms 'main verb' or 'lexical verb' when discussing Tshiluba auxiliary constructions is intentional and is explained further in Section 4.

[3] Transcriptions are in IPA (International Phonetic Alphabet) and are broad phonetic transcriptions, with the second line of the examples showing morpheme breaks. The glossing in this paper follows the Leipzig Glossing Rules, which can be found here: [https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf]. The bare numbers represent noun classes (e.g. 1 = noun class one), while numbers immediately followed by 'SG' or 'PL' represent person (e.g. 1SG = first person singular). A list of glosses used in this paper and a table of Tshiluba noun classes can be found in Appendix A.

(3) *Full agreement across persons*

a. *Full agreement in first person plural*

tuʤi	tuseka
tu-ʤi	**tu**-sek-a
1PL.VA-AUX.PRS	**1PL.VA**-laugh-IPFV

'We are laughing' Tshiluba (Sep 28, 2016)[4]

b. *Full agreement in second person plural*

nuʤi	nuseka
nu-ʤi	**nu**-sek-a
2PL.VA-AUX.PRS	**2PL.VA**-laugh-IPFV

'You (plural) are laughing' Tshiluba (Sep 28, 2016)

c. *Full agreement in third person plural (class 2)*

baʤi	baseka
ba-ʤi	**ba**-sek-a
2.VA-AUX.PRS	**2.VA**-laugh-IPFV

'They are laughing' Tshiluba (Sep 28, 2016)

In this paper, I use newly elicited data from the Bantu language Tshiluba to explore a little-described agreement pattern in auxiliary constructions. Unlike the typical Indo-European[5] and Bantu agreement patterns described above, in these constructions, the auxiliary exhibits full phi-feature agreement while the participle exhibits partial phi-feature agreement, only agreeing with the subject in number and gender (not person).

In Tshiluba auxiliary constructions like those in (4), when the subject differs in person (first person in (4a), second in (4b), and third in (4c)), the person agreement appears on the auxiliary (*ʤi*) while the participle (*ʤa*) exhibits the same agreement across all the persons. The prefix *ba-*[6] is the marker for noun class 2 and can be read as plural in number and A (or class 1/2) in grammatical gender.[7]

(4) *Partial agreement across persons*

a. *Partial agreement in first person plural*

tuʤi	baʤa	bimuːma
tu-ʤi	**ba**-ʤa	bi-muːma
1PL.VA-AUX.PRS	**2.AA**-eat	8-fruit

'We ate the fruits.' Tshiluba (Dec 7, 2016)

[4]All elicitation data in this paper is marked with the date it was elicited. See Section 1.2 for more information on data gathering methods. All English examples are produced by the author according to native speaker intuitions. All errors are my own.

[5]Similar patterns are found in some Indo-European languages, though they are not common. This will be discussed further in Section 5.3.

[6]Readers may notice that the prefix *ba-* in these examples is glossed as .AA, which is defined as 'adjectival agreement prefix,' even though the element it attaches to does not seem transparently to be an adjective. This choice of glossing is explained in Section 4.1.

[7]In this paper, I follow (Carstens 1991:18) in analyzing Bantu noun classes as inherently including gender and number. Whenever the word 'gender' is used, it refers to grammatical gender, which in Bantu has no relation to biological sex. Each grammatical gender is given a letter, which can be found in Appendix B. For example, noun classes 1 and 2 make up gender A.

b. *Partial agreement in second person plural*
nuʤi baʤa bimu:ma
nu-ʤi **ba**-ʤa bi-mu:ma
2PL.VA-AUX.PRS **2.AA**-eat 8-fruit
'You (plural) ate the fruits.' Tshiluba (Dec 7, 2016)

c. *Partial agreement in third person plural (class 2)*
baʤi baʤa bimu:ma
ba-ʤi **ba**-ʤa bi-mu:ma
2.VA-AUX.PRS **2.AA**-eat 8-fruit
'They ate the fruits.' Tshiluba (Dec 7, 2016)

In this paper, I propose that the agreement difference between sentences like those in (3) and those in (4) hinges on a difference in the lexical category of the participle. In particular, I argue that the fully agreeing participles should be analyzed as verbs and the partially agreeing participles should be analyzed as adjectives.

Based on this lexical category distinction, I build off of Baker (2008)'s Structural Condition on Person Agreement (SCOPA) to propose that full multiple agreement occurs when the phrase headed by the participle contains a specifier position for the subject DP to move through (as is the case for verbs), while partial phi-feature agreement occurs when the phrase does not have a specifier position for the subject to move through (as is the case for adjectives).

In order to account for the agreement facts of Tshiluba, I also propose a modification to SCOPA. This change restricts any person agreement, not just first or second person agreement. Ultimately, I build an analysis that combines structural differences, the restrictions of SCOPA, and morphological vocabulary insertion rules to generate the unusual agreement forms found in Tshiluba auxiliary constructions.

In addition to making an empirical contribution by describing an agreement pattern that is previously under-described, I provide support for SCOPA while also modifying it to widen the range of phenomena to which it can apply. This allows me to propose an analysis that may be extended to other Bantu alternative agreement or anti-agreement patterns.

In this first section, I continue the introduction of agreement in Tshiluba auxiliary constructions with a brief background on the language and a summary of my data gathering methods and consultant's background.

1.1 Tshiluba language background

Tshiluba (also known as Ciluba, Luba-Kasai, and Western Luba, among others) is an official provincial language spoken in the Kasai region of the Democratic Republic of the Congo (Lewis et al. 2016). In Guthrie's (1948) classification of the Bantu languages (updated in Maho 2003), Tshiluba falls into the central L region and is given the number L31a.

The language has been described in older descriptive grammars (De Clercq 1897; Morrison 1906; Burssens 1939; Willems 1954) and more recent work has included analyses

of morphological verbal extensions (Cocchi 2009; De Kind & Bostoen 2012), but syntactic analysis has been limited. In particular, the agreement patterns described in this paper are not well-described in the literature and, to my knowledge, no modern syntactic analysis of these Tshiluba constructions has been attempted.

Like other Bantu languages, Tshiluba is a morphologically agglutinating language and its canonical word order is SVO (subject-verb-object) (Nurse 2008:21). Tshiluba is commonly considered a tonal language, although the tones' role in the language's syntax has not been well established (Van Spaandonck 1971).[8] It has no clear standardized orthography, but when it is written, Latin script is used.

1.2 Data gathering methods and consultant background

The new data presented in this paper was collected through elicitation sessions with a native speaker consultant. My consultant, Beatrice N. Tumba, is an adult native speaker of Tshiluba and is multilingual, speaking Tshiluba, Kiwahili, French, Lingala, Chichewa (also called Nyanja), and English fluently. She was born and raised in Lubumbashi, a city in the south of the Democratic Republic of the Congo. Although the majority language of Lubumbashi is Kiswahili, Beatrice's parents came from Kananga in the central Lulua province, where Tshiluba is the majority language. Beatrice spoke Tshiluba as her first language used with her immediate family.

Most of the data was gathered verbally through translation from English into Tshiluba by the consultant, occasionally using images, videos, or other visual prompts to provide context. Some of the data was gathered by asking for verbal judgments of acceptability of Tshiluba phrases and sentences which I had constructed. The consultant then repeated my sentences back to verify her judgments.

Our sessions took place in September 2016 through March 2017. The majority of the sessions were conducted as part of a field methods course taught by Professor Ryan Bennett in the Linguistics department of Yale University in New Haven, CT.[9] The roughly hour-long sessions took place in classrooms on Yale's campus. All sessions that took place during the course included the consultant, one or more additional classmates, and myself. Any examples that were elicited by a classmate is marked with a footnote which attributes credit to that person. I (the author) elicited all unmarked Tshiluba examples.

The session audio was recorded and the data is stored in both hand-written field notes and an online database.

[8] A clear shortcoming in this paper is the inconsistent marking of tone on the examples within. This should not interfere with the reader's understanding of what the examples demonstrate, but further work on the tonal system of Tshiluba may provide a richer understanding of the language's syntax, particularly its tense and aspect system.

[9] This paper builds off of a final paper written for this field methods course, and some of the description of Tshiluba remains unchanged from that paper, but the way the data is presented and the analysis is, for the most part, new.

2 Tshiluba verb and adjective morphology

2.1 Verb and adjective agreement morphology

Like other Bantu languages, Tshiluba has a noun class system. Noun classes appear as prefixes on nouns, verbs, and adjectives. Attributive adjectives take a concord prefix that reflects the noun class of the modified noun, as shown in (5) where the attributive adjective *kesa* 'small' takes the class 2 prefix *ba-* in concord with the modified class 2 noun *bâːna* 'children.' Predicate adjectives and verbs take an agreement prefix that reflects the noun class of their subject.[10] In (5), this means that the verb *-akulala* 'fell asleep' takes the class 2 prefix *ba-* in agreement with the class 2 subject *bâːna* 'children.' Similarly, in (6), this means that the predicate adjective *-toka* (clean) takes the class 2 prefix *ba-* in agreement with the class 2 subject *bâːna* 'children.' In the Bantuist grammatical tradition, noun classes are usually considered a form of grammatical gender, but they are also divided by number, so each noun class is either exclusively singular or exclusively plural (Carstens 1991; Corbett 2007). I have given each gender (most made up of two noun classes: one singular, one plural) a letter. The number noun classes that correspond to each lettered gender are given in Appendix B.

(5) *Noun class concord/agreement with attributive adjective and verb*
ba:na bakesa ba:kulala
ba-ana **ba**-kesa **ba**-aku-lala
2-child **2.AA**-small **2.VA**-ANT-sleep
'The small children fell asleep' Tshiluba (Mar 6, 2017)

(6) *Noun class agreement with predicate adjective*
ba:na baʤi batoka
ba-ana **ba**-ʤi **ba**-toka
2-child **2.VA**-AUX.PRS **2.AA**-clean
'The children are clean' Tshiluba (Nov 16, 2016)

The noun classes that occur most often in this paper are classes 1 and 2, or gender A, because I am interested in examining person agreement, which typically occurs with human subjects. The noun class prefix *mu-* (class 1) is mainly used for singular human nouns. For example, class 1 nouns include *mu-ntu* 'person', *mu-ana* 'child', and *mu-loŋeʃi* 'student'. The noun class prefix *ba-* (class 2) is mainly used for plural human nouns. Class 2 nouns include *ba-ntu* 'people', *ba-lunda* 'friends', and *ba-kaʒi* 'women'.

Each noun class has a nominal prefix, an adjectival agreement prefix, and a verbal agreement prefix, which may or may not be phonologically identical. A table of noun classes and their corresponding subject prefixes can also be found in Appendix B. Since the noun classes are used to refer to others (rather than the speaker herself or the addressee), their subject prefixes are inherently third person, so the noun class prefixes all share the same person feature but vary in grammatical gender and number.

[10] There are exceptions to this generalization, especially when inversion is involved. See Marten & van der Wal (2014) for a description of Bantu locative inversion, which is one notable exception.

For first and second person subjects, Tshiluba also has human subject prefixes that correspond to person-number combinations. These can be found in (7) below. Since third person human (gender A) subjects fall into noun classes 1 and 2, the singular gender A subject prefix is the class 1 subject prefix, and the plural gender A subject prefix is the class 2 subject prefix.

Note that there are a few cases of syncretism here: *ba-* functions as both the class 2 (plural human) nominal prefix and the class 2 subject prefix[11], and *u-* functions as both the second person singular prefix and the class 1 subject prefix. In addition, the pronouns for second and third person singular are both *wêːwa*.

(7) *Tshiluba human (gender A) subject prefixes*

Class	Gender	Person	Number	Pronoun	Prefix(es)	Example verb	translation
	A[12]	1st	SG	mêːma	N-[13]	n-seka	I laugh
	A	1st	PL	tuetu	tu-	tu-seka	We laugh
	A	2nd	SG	wêːwa	u-	u-seka	You (sg.) laugh
	A	2nd	PL	nuenu	nu-	nu-seka	You (pl.) laugh
1	A	3rd	SG	wêːwa	u-	u-seka	He/she laughs
2	A	3rd	PL	baːbu	ba-	ba-seka	They laugh

2.2 Tense and aspect

Tshiluba has a complex system of tense and aspect which interacts with both agreement morphology and auxiliary selection. Much of the existing descriptive literature on tense and aspect in Tshiluba is incomplete or conflicting, so my intent here is to provide a description that matches with my elicitation data, helps the reader understand the examples given in this paper, and is plausible in the context of generalizations about Bantu tense and aspect described in Nurse (2008).

2.2.1 Tense

The only two clear tenses I have encountered in elicitation data are past, signaled by the auxiliary *vwa* as in (8), and present, signaled by the auxiliary *ʤi* as in (9). Future, even distant future, was always translated into Tshiluba by the consultant using the present progressive, as shown in (10).[14]

[11] When this *ba-* prefix appears on a verb, this particular syncretism makes it hard to definitively say whether the prefix should be called a verbal subject prefix (which would include the third person feature), an adjective prefix, or a noun class prefix (which would not have an inherent person feature).

[12] I follow Diercks (2010) in assuming here that first and second person subjects share the same (human) grammatical gender as the nouns in classes 1 and 2. I call this 'gender A.'

[13] The first person singular prefix may be ŋ-, m-, n-, ɲ-, or ∅. Due to phonologically conditioned allomorphy, it varies according to the following sound, generally exhibiting assimilation in place of articulation. In this paper, the morpheme gloss for the first person singular prefix is consistently given as N-.

[14] Given this, it may be argued that *ʤi* could be more accurately labeled as a non-past auxiliary, rather than a present auxiliary. In this paper, *ʤi* is glossed as AUX.PRS to be more consistent with existing descriptions of Tshiluba, which describe *ʤi* as a present tense marker.

(8) *Past tense*
pamene m**vwa** mukaŋule ʧibi, u**vwa** uʤa mataːmba
pamene N-**vwa** mu-kaŋul-e ʧi-bi, u-**vwa** u-ʤ-a ma-taːmba
when 1SG.VA-**AUX.PST** 1.AA-open-PFV 7-door, 1.VA-**AUX.PST** 1.VA-eat-IPFV 6-cassava
'When I opened the door, she was eating cassava.' Tshiluba (Nov 10, 2016)

(9) *Present tense*
n**ʤi** ɲiːmba pinʤeju
N-**ʤi** N-iːmb-a pinʤeju
1SG.VA-**AUX.PRS** 1SG.VA-sing-IPFV now
'I am singing now.' Tshiluba (Nov 2, 2016)

(10) *Future tense using the present progressive*
pamene n**ʤi** ndwa mukulu, n**ʤi** loŋeʃa
pamene N-**ʤi** N-du-a mu-kulu, N-**ʤi** N-loŋeʃ-a
when 1SG.VA-**AUX.PRS** 1SG.VA-become-IPFV 1.AA-big, 1SG.VA-**AUX.PRS** 1SG.VA-teach-IPFV
'Spanish'
'Spanish'
Spanish
'When I become big, I will teach Spanish.' Tshiluba (Nov 3, 2016)
context: A child speaking about what they will do when they are an adult

2.2.2 Aspect

There is also a set of common aspectual categories that are widely attested in many Bantu languages: perfective, imperfective, progressive, habitual, persistive, and anterior (Nurse 2008:24). All of these aspects seem to appear in Tshiluba, although they do not all appear in the same slot in the verb phrase. In addition, one other aspect marker marks the completive aspect.

Aspect Slot 1: Pre-auxiliary

There are two aspects that are marked as a prefix to the auxiliary. This slot sits between the first agreement prefix and the tense auxiliary.

The first aspect is persistive, which is marked by the pre-auxiliary morpheme *ʧi-*, as exemplified in the second clauses of (11) and (12) below. This aspect has a similar meaning to 'still' in English, as in, 'He still works here.' The chart that follows divides the verb into morphemes, where the dotted vertical lines represent morpheme boundaries and solid vertical lines represent word boundaries.

(11) *Persistive aspect in present tense*

uvwa	mutwadiʒe	kuʤila	mala:ba	utʃiʤi	uʤila
u-vwa	mu-twadiʒ-e	ku-ʤila	mala:ba	u-**tʃi**-ʤi	u-ʤil-a
1.VA-AUX.PST	1.AA-begin-PFV	INF-cry	yesterday	1.VA-**PER**-AUX.PRS	1.VA-cry-IPFV

to ni pinʤeju
to ni pinʤeju
PTCL CONN now
'He started crying yesterday, he's still crying now.' Tshiluba (Nov 10, 2016)

Example:	u	**tʃi**	ʤi	u	ʤil	a
Gloss:	1.VA	**PER**	AUX.PRS	1.VA	'cry'	IPFV
Slot type:	AGR	**ASP**	TNS	AGR	V	(I)PFV

(12) *Persistive aspect in past tense*

pamene mvula	uvwa	uloka,	utʃivwa	uloŋa	
pamene N-vula	u-vwa	u-lok-a,	u-**tʃi**-vwa	u-loŋ-a	
when 9-rain	9.VA-AUX.PST	9.VA-fall-IPFV,	1.VA-**PER**-AUX.PST	1.VA-study-IPFV	

kukalasa
ku-ka-lasa
17-12-school
'When it was raining, she was still studying at school.' Tshiluba (Dec 13, 2016)

Example:	u	**tʃi**	vwa	u	loŋ	a
Gloss:	1.VA	**PER**	AUX.PST	1.VA	'study'	IPFV
Slot type:	AGR	**ASP**	TNS	AGR	V	(I)PFV

The other aspect that occurs in this pre-auxiliary slot is the completive aspect, which is marked by the pre-auxiliary morpheme *ka-*. The completive aspect, exemplified in (13), is often translated as 'have already' or 'have just,' as in 'I had already eaten' or 'I have just eaten.' In the completive, the auxiliary is followed by a participle that agrees with its subject in gender and number only.[15]

(13) *Completive aspect*

tukavwa	baʤa
tu-**ka**-vwa	ba-ʤ-a
1PL.VA-**COMPL**-AUX.PST	2.AA-eat-IPFV

'We had already eaten.' Tshiluba (Dec 8, 2016)

[15]From my elicitation data, it appears that the type of agreement shown in a given auxiliary construction depends on its aspect. I will not attempt to answer the question of why aspect should affect agreement (or determine the structure of the participle), but this is a question for further research.

Example:	tu	**ka**	vwa	ba	ʤ	a
Gloss:	1PL.VA	**COMPL**	AUX.PST	2.AA	'eat'	IPFV
Slot type:	AGR	**ASP**	TNS	AGR	V	(I)PFV

Aspect Slot 2: Lower auxiliary

The habitual aspect is marked by the auxiliary *tu*, which follows the tense auxiliary *ʤi/vwa* when it is present. Both the tense auxiliary and the habitual auxiliary have subject agreement prefixes. The habitual aspect is used to describe actions that occur(red) regularly or as a habit. This is exemplified in (14) below.

(14) *Habitual aspect*

uvwa	utu	uloŋa
u-vwa	u-**tu**	u-loŋ-a
1.VA-AUX.PST	1.VA-**AUX.HAB**	1.VA-study-IPFV

'She used to study (habitually).' Tshiluba (Dec 8, 2016)

Example:	u	vwa	u	**tu**	u	loŋ	a
Gloss:	1.VA	AUX.PST	1.VA	**AUX.HAB**	1.VA	'study'	IPFV
Slot type:	AGR	TNS	AGR	**ASP**	AGR	V	(I)PFV

Aspect Slot 3: Before verb root

Anterior aspect is different from the other aspects described in the paper in that verbs in the anterior cannot appear in an auxiliary construction. Instead, aspect is marked by the morpheme *-aku* appearing inside the lexical verb itself, between the subject agreement prefix and the verb root.[16] This can be seen in (15) and (16) below.

The anterior aspect is used for either completed actions that are relevant to the present situation, as in 'I fixed this pot,' or states that started in the past and continue into the present, as in 'He is dead' or 'He died.' In Bantuist literature, the terms 'anterior' and 'perfect' are sometimes used interchangeably (Nurse 2008:308).

(15) *Anterior aspect appearing with first person singular subject prefix*

ŋakuʃipa	mita:nda
N-**aku**-ʃip-a	mi-ta:nda
1SG.VA-**ANT**-kill-IPFV	4-spider

'I killed the spiders' Tshiluba (Nov 16, 2016)

[16]The anterior aspect could also be analyzed as the agreeing auxiliary *aku* followed by a bare non-agreeing complement (the verb stem). I analyze *-aku* here as a morpheme within the verb because I assume that all Tshiluba auxiliary constructions show some form of agreement on both the auxiliary and the participle. For further discussion of what should (and has) been labeled as an 'auxiliary' in Bantu, see Pietraszko (2017)

Example:	N	**aku**	ʃip	a
Gloss:	1SG.VA	**ANT**	'kill'	IPFV
Slot type:	AGR	**ASP**	V	(I)PFV

(16) *Anterior aspect appearing with class 13 subject prefix*
tumpusu twakuso:mba
tu-mpusu tu-**aku**-so:mb-a
13-cat 13.VA-**ANT**-sit-IPFV
'The cats sat down (and are still sitting)' Tshiluba (Nov 10, 2016)

Example:	tu	**aku**	so:mb	a
Gloss:	13.VA	**ANT**	'sit'	IPFV
Slot type:	AGR	**ASP**	V	(I)PFV

Aspect Slot 4: Final vowel

The final aspect slot is immediately following the verb root.[17] The perfective/imperfective final vowel alternation described here is based on pairs provided by my consultant that express different aspects but only differ in the verb's final vowel. This comparison can be made between (17) and (19) below.

In the perfective, the verb root is followed by *-e*, as shown in (17) and the second clause of (18). The perfective aspect is used for actions viewed as a single event, with no internal composition, such as 'I opened the door' or 'I will find the treasure.'

(17) *Perfective aspect*
kampusu kavwa kasume poku
ka-mpusu ka-vwa ka-sum-**e** poku
12-cat 12.VA-AUX.PST 12.AA-bite-**PFV** mouse
'The cat bit the mouse.' Tshiluba (Dec 8, 2016)

Example:	ka	vwa	ka	sum	**e**
Gloss:	12	AUX.PST	12	'bite'	**PFV**
Slot type:	AGR	TNS	AGR	V	**(I)PFV**

In the imperfective, the verb root is followed by *-a*. This also seems to be the default final vowel, appearing on infinitive forms. The imperfective is used (sometimes in combination with other aspect markers) to express background events viewed with interior

[17]The role the final vowel plays in expressing aspect is somewhat elusive, because it seems that this vowel can sometimes be changed by its phonological environment (most likely the initial sound of the following word in the sentence) and my consultant noted that speakers of other dialects (or even the same dialect) of Tshiluba may use different final vowels for the same verbs to express the same meanings. The glossing in this paper is consistent with the analysis given in this section, but further work needs to be done to determine what factors other than aspect might alter the final vowel in Tshiluba verbs and adjectives.

composition, as seen in the first clause of (18). It is also always used in Tshiluba to express the progressive aspect, usually alongside a tense auxiliary. This progressive use is shown in (19).

(18) *Imperfective aspect used for background event*

pamene	mvwa	ŋkwata	nso:mba	mvwa	mumone
pamene	N-vwa	N-kwat-a	N-so:mba	N-vwa	mu-mon-e
when	1SG.VA-AUX.PST	1SG.VA-catch-IPFV	9-fish	1SG.VA-AUX.PST	1.AA-see-PFV

ndeka
N-deka
9-bird
'When I was catching fish I saw a bird.' Tshiluba (Dec 8, 2016)

Example:	N	vwa	N	kwat	**a**
Gloss:	1SG.VA	AUX.PST	1SG.VA	'catch'	**IPFV**
Slot type:	AGR	TNS	AGR	V	**(I)PFV**

(19) *Imperfective aspect used for progressive action*

kampusu	kavwa	kasuma	poku
ka-mpusu	ka-vwa	ka-sum-**a**	poku
12-cat	12.VA-AUX.PST	12.VA-bite-**IPFV**	mouse

'The cat was biting the mouse. Tshiluba (Dec 8, 2016)'
context: 'What was the cat doing when you came home?'

Example:	ka	vwa	ka	sum	**a**
Gloss:	12	AUX.PST	12	'bite'	**IPFV**
Slot type:	AGR	TNS	AGR	V	**(I)PFV**

3 Tshiluba auxiliary construction agreement data

As briefly described in the introduction, the focus of this paper is on agreement patterns in Tshiluba auxiliary constructions. Particularly, there are some auxiliary constructions that show full subject agreement on the auxiliary (agreeing in person, number, and gender) but only partial subject agreement on the participle (agreeing in number and gender but not person). There are also auxiliary constructions that show full agreement on both the auxiliary and the participle, which is more typical of Bantu compound tense constructions.

In this section, I first present these fully agreeing forms, followed by the partially agreeing forms. From my elicitation data, it appears that the type of agreement shown in a given auxiliary construction depends on its aspect, but since agreement is the focus of this paper, the examples are grouped according to their agreement patterns (rather than their aspect).

Each type of participle is exemplified with pairs of sentences that differ in only one of the three phi-features: person, number, or gender. These examples can be compared to find which phi-features influence (or do not influence) agreement.

3.1 Auxiliary constructions showing full phi-feature multiple agreement

In constructions exhibiting full phi-feature agreement on both the auxiliary and the participle, the subject prefixes on both the auxiliary and the participle agree with the subject in person, number, and gender. These agreement patterns occur in the habitual aspect and the progressive aspect.

3.1.1 Gender feature

When auxiliary constructions exhibiting full phi-feature agreement differ in gender, this difference is reflected by a difference in subject prefixes on both the auxiliary and the participle.

This alternation is shown in (20) below. In both (20a) and (20b), the subjects are third person singular, but (20a)'s subject *muluma* 'man' is class 1 (gender A) while (20b)'s subject *kampusu* 'cat' is class 12 (gender G). Therefore, the subjects differ only in the gender feature.

(20) *Full agreement across subjects that vary in gender*

a. muluma ucʤi ucʤila
mu-luma **u**-cʤi **u**-cʤil-a
1-man **1.VA**-AUX.PRS **1.VA**-cry-IPFV
'The man is crying' Tshiluba (Mar 6, 2017)

b. kampusu kacʤi kacʤila
ka-mpusu **ka**-cʤi **ka**-cʤil-a
12-cat **12.VA**-AUX.PRS **12.VA**-cry-IPFV
'The cat is crying' Tshiluba (Mar 6, 2017)

In (20a) we see the class 1 subject prefix *u-* on both the auxiliary and the participle. In (20b) we see the class 12 subject prefix *ka-* on both the auxiliary and the participle. Since the subjects of the two examples only differ in gender, but they end up with distinct agreement markers, we can conclude that, in fully agreeing auxiliary constructions, both the auxiliary and the participle agree with the subject in gender.

3.1.2 Number feature

Just like when they differ in gender, when auxiliary constructions exhibiting full phi-feature agreement differ in number, this difference is reflected by the subject prefixes on both the auxiliary and the participle.

This alternation is shown in (21)–(23) below. In each pair, the two sentences have subjects that match in grammatical gender and person, but (a) is singular and (b) is plural. For example, in (21a) and (21b), the subjects are second person and gender A, but (21a)'s subject is singular while (21b)'s subject is plural. Therefore, the examples only differ in the number feature.

(21) *Full agreement across second person subjects that vary in number*

a. utu uimba
u-tu **u**-imb-a
2SG.VA-AUX.HAB **2SG.VA**-sing-IPFV
'You (singular) sing (habitually)' Tshiluba (Mar 6, 2017)

b. nutu nuimba
nu-tu **nu**-imb-a
2PL.VA-AUX.HAB **2PL.VA**-sing-IPFV
'You (plural) sing (habitually).' Tshiluba (Mar 6, 2017)

(22) *Full agreement across third person subjects that vary in number*

a. uʤi wenda
u-ʤi **u**-end-a
1.VA-AUX.PRS **1.VA**-walk-IPFV
'He is walking' Tshiluba (Oct 4, 2016)

b. baʤi beːnda
ba-ʤi **ba**-end-a
2.VA-AUX.PRS **2.VA**-walk-IPFV
'They are walking' Tshiluba (Oct 4, 2016)

(23) *Full agreement across class 9/10 subjects that vary in number*

a. mbwa uʤi unaja
N-bwa **u**-ʤi **u**-naj-a
9-dog **9.VA**-AUX.PRS **9.VA**-play-IPFV
'The dog is playing' Tshiluba (Mar 6, 2017)

b. mbwa iʤi inaja
N-bwa **i**-ʤi **i**-naj-a
10-dog **10.VA**-AUX.PRS **10.VA**-play-IPFV
'The dogs are playing' Tshiluba (Mar 6, 2017)

In (21a) we see the second person singular subject prefix *u-* on both the auxiliary and the participle. In (21b) we see the second person plural subject prefix *nu-* on both the auxiliary and the participle. Since the subjects of the two examples only differ in number, but they end up with distinct agreement markers, we can conclude that, in fully agreeing auxiliary constructions, both the auxiliary and the participle agree with the subject in number.

In the same manner, we can compare (22a) to (22b) and (23a) to (23b) to see that whenever the number feature of the subject differs, the agreement prefixes are different.

3.1.3 Person feature

Finally, when auxiliary constructions exhibiting full phi-feature agreement differ in person, this difference is reflected by the subject prefixes on both the auxiliary and the participle.

This alternation is shown in (24) below. In both (24a) and (24b), the subjects are plural and gender A, but (24a)'s subject is first person ('we') while (24b)'s subject is third

person ('they'). Therefore, the examples only differ in the person feature. For more fully agreeing examples that differ only in person, see (3).

(24) *Full agreement across subjects that vary in person*

a. tuʤi tuɲema
tu-ʤi **tu**-ɲem-a
1PL.VA-AUX.PRS **1PL.VA**-run-IPFV
'We are running' Tshiluba (Sep 28, 2016)

b. baʤi baɲema
ba-ʤi **ba**-ɲem-a
2.VA-AUX.PRS **2.VA**-run-IPFV
'They are running' Tshiluba (Sep 28, 2016)

In (24a) we see the first person plural subject prefix *tu-* on both the auxiliary and the participle. In (24b) we see the third person plural (class 2) subject prefix *ba-* on both the auxiliary and the participle. Since the subjects of the two examples only differ in person, but they end up with distinct agreement markers, we can conclude that, in fully agreeing auxiliary constructions, both the auxiliary and the participle agree with the subject in person.

3.2 Auxiliary constructions showing partial phi-feature agreement

In constructions exhibiting partial phi-feature agreement, any auxiliaries occurring before the participle have subject prefixes that agree with the subject in person, number, and gender, just as they do in the fully agreeing constructions in Section 3.1 above.

However, the participle has a prefix that only agrees with its subject in number and gender. When the subject is human (gender A), this means that all verbs with singular subjects have the class 1 prefix *mu-*, which represents number (singular) and grammatical gender (A), while all verbs with plural subjects have the class 2 prefix *ba-*, which also represents number (plural) and grammatical gender (A).

3.2.1 Gender feature

Just as is shown above in Section 3.1.1 for full phi-feature agreement, when auxiliary constructions exhibiting partial phi-feature agreement differ in gender, this difference is reflected by a difference in subject prefixes on both the auxiliary and the participle.

This alternation is shown in (25) below. In both (25a) and (25b), the subjects are third person plural, but (25a)'s subject *mabeːʒi* 'leaves' is in class 6 (gender C) while (25b)'s subject *nsomba* 'fishes' is in class 10 (gender E). Therefore, the subjects differ only in the gender feature.

(25) *Partial agreement across subjects that vary in gender*

a. mabeːʒi avwa makuluke
ma-beːʒi **a**-vwa **ma**-kuluk-e
6-leaf **6.VA**-AUX.PST **6.AA**-fall-PFV
'The leaves fell' Tshiluba (Mar 9, 2017)

b. nsomba ivwa mifwe
N-somba **i**-vwa **mi**-fu-e
10-fish **10.VA**-AUX.PST **10.AA**-die-PFV
'The fishes died' Tshiluba (Mar 9, 2017)

In (25a) we see the prefix *a-* on the auxiliary and the prefix *ma-* on the participle. In (25b) we see the prefix *i-* on the auxiliary and the prefix *mi-* on the participle.[18] Since the subjects of the two examples only differ in gender, but they end up with distinct agreement markers, we can conclude that, in partially agreeing auxiliary constructions, both the auxiliary and the participle agree with the subject in gender.

3.2.2 Number feature

Again, like the fully agreeing forms in Section 3.1.2, when auxiliary constructions exhibiting partial phi-feature agreement differ in number, this difference is reflected by a difference in subject prefixes on both the auxiliary and the participle.

This alternation is shown in (26) below. In both (26a) and (26b), the subjects are first person and gender A, but (26a)'s subject is singular while (26b)'s subject is plural. Therefore, the examples only differ in the number feature.

(26) *Partial agreement across subjects that vary in number*

a. ŋkaʤi muʤe mataːmba
N-ka-ʤi **mu**-ʤ-e ma-taːmba
1SG.VA-COMPL-AUX.PRS **1.AA**-eat-PFV 6-cassava
'I have eaten cassava.' Tshiluba (Mar 6, 2017)

b. tukaʤi baʤe mataːmba
tu-ka-ʤi **ba**-ʤ-e ma-taːmba
1PL.VA-COMPL-AUX.PRS **2.AA**-eat-PFV 6-cassava
'We have eaten cassava.' Tshiluba (Mar 6, 2017)

In (26a) we see the first person singular subject prefix *N-* on the auxiliary and the class 1 prefix *mu-* on the participle. In (26b) we see the first person plural subject prefix *tu-* on the auxiliary and the class 2 prefix *ba-* on the participle. Since the subjects of the two examples only differ in number, but they end up with distinct agreement markers, we can conclude that, in partially agreeing auxiliary constructions, both the auxiliary and the participle agree with the subject in number.

3.2.3 Person feature

The person feature is what differentiates fully agreeing participles from partially agreeing participles. In both fully and partially agreeing Tshiluba auxiliary constructions, the auxiliary takes a subject prefix that agrees with the subject in person, number, and gender. The participle is the participle where the agreement difference appears. In partially

[18] Classes 9 and 10 (gender E) are unique in having three different noun class prefixes for nouns, adjectives, and verbs. This is discussed further in Section 4.2.2.

agreeing auxiliary constructions, the participle does not agree with the subject in person. This means that two partially agreeing constructions that differ only in person should have identical prefixes on their participle.

This alternation is shown in (27) below. In both (27a) and (27b), the subjects are singular and gender A, but (27a)'s subject is first person ('I') while (24b)'s subject is third person ('she'). Therefore, the examples only differ in the person feature. For more partially agreeing examples that differ only in person, see (4).

(27) *Partial agreement across subjects that vary in person*

a. mvwa mukuluke
N-vwa **mu**-kuluk-e
1SG.VA-AUX.PST **1.AA**-fall-PFV
'I fell' Tshiluba (Dec 13, 2016)

b. uvwa mukuluke
u-vwa **mu**-kuluk-e
1.VA-AUX.PST **1.AA**-fall-PFV
'She fell' Tshiluba (Dec 13, 2016)

In (27a) and (27b), the auxiliary *ʤi* takes the subject prefix that matches with its subject in person (first in (27a) and third in (27b)), number (singular), and grammatical gender (A). Because the two examples differ in person, the prefix on the auxiliary is different.

However, the participle *kuluke* 'fall' in both (27a) and (27b) takes the same prefix *mu-*. Since the other two phi-features are held constant, this indicates that the prefix on the verb does not alternate along with the person feature. In other words, these examples indicate that the participle in partially agreeing constructions does not agree with its subject in person.

4 Explaining the difference in agreement through lexical category

As noted briefly above, whether an auxiliary construction contains a partially or fully agreeing participle seems to be conditioned by aspect. For example, habitual aspect conditions full phi-feature agreement while perfective aspect conditions partial phi-feature agreement.

However, this observation does not transparently explain or give the mechanics of how one set of auxiliary constructions gets full agreement while the other gets partial agreement. I propose here that this difference in agreement is due to a difference in lexical category of the participle. In particular, I propose that the participle in fully agreeing constructions should be analyzed as a verb while the participle in partially agreeing constructions should be analyzed as an adjective.

4.1 Similarities between partially agreeing participles and adjectives

On a surface level, the morphology of the partially agreeing participles looks like the morphology of Tshiluba predicate adjectives. Looking at (28a) and (28b), both the adjective *-kesa* 'skinny' and the verb *-seka* 'laugh' take the same class 1 prefix *mu-*.

(28) *Comparison between predicate adjective and partially agreeing participle*

a. mvwa mukesa
N-vwa **mu**-kesa
1SG.VA-AUX.PST **1.AA**-skinny
'I was skinny.' Tshiluba (Nov 16, 2016)

b. mvwa museka
N-vwa **mu**-seka
1SG.VA-AUX.PST **1.AA**-laugh
'I laughed' Tshiluba (Sep 28, 2016)

The reason for this apparent similarity is that both partially agreeing participles and predicate adjectives agree with their subject in number and grammatical gender but not in person. In (29) below, this means that the adjective *-impa* 'good' can take the prefix *mu-* to agree with its singular human subject, but it cannot take the prefix *ɲ-* to show first person agreement.

(29) *Ungrammaticality of person agreement on predicate adjectives*

a. * nʤi ɲimpa
N-ʤi **N**-impa
1SG.VA-AUX.PRS **1SG.VA**-good

b. nʤi mwimpa
N-ʤi **mu**-impa
1SG.VA-AUX.PRS **1.AA**-good
'I am beautiful.' Tshiluba (Nov 16, 2016)

Similarly, Tshiluba partially agreeing participles in auxiliary constructions can take a prefix inflected for gender and number, but they cannot take a subject prefix that is inflected for person. If the participle is inflected for person, its sentence may still be grammatical, but it expresses a different aspect than the partially agreeing form.

An example of this is given in (30) below, where the change from the non-person-specific prefix *mu-* in (30a) to the person-specific prefix *u-* in (30b) results in a change in aspect and meaning.

(30) *Person agreement on participle leads to difference in meaning*

a. uʤi mumaɲa kwendeʃa ʤikalu
u-ʤi **mu**-maɲ-a ku-endeʃa ʤi-kalu
1.VA-AUX.PRS **1.AA**-come.to.know-IPFV INF-ride 5-bicycle
'She knows how to ride a bicycle' Tshiluba (Nov 10, 2016)

b. uʤi umaɲa kwendeʃa ʤikalu
u-ʤi **u**-maɲ-a ku-endeʃa ʤi-kalu
1.VA-AUX.PRS **1.VA**-come.to.know-IPFV INF-ride 5-bicycle
'She's learning to ride a bicycle.' Tshiluba (Nov 10, 2016)

4.2 Why not nouns?

The Tshiluba partially agreeing participles do resemble adjectives in their morphology. However, they also resemble nouns. In fact, in his typology of intransitive predication in the world's languages, Stassen (1997:262) states that Tshiluba uses "nominal verb encoding" in perfective constructions. He notes how these perfective predicates in Tshiluba appear morphologically similar to nominal predicates, as seen in (31) below. The adjectival predicate *mwimpa* 'good' in (31a), the nominal predicate *mukaʒi* 'woman' in (31b), and the partially agreeing participle *muʤila* 'cried' in (31c) all take the class 1 (singular human) prefix *mu-*.

(31) *Comparison between predicate adjective, predicate noun, and partially agreeing participle*

a. Musau uʤi mwimpe
Musau u-ʤi **mu**-impe
Musau 1.VA-AUX.PRS **1.AA**-good
'Musau is beautiful.' Tshiluba (Mar 6, 2017)

b. Musau uʤi mukaʒi
Musau u-ʤi **mu**-kaʒi
Musau 1.VA-AUX.PRS **1**-woman
'Musau is a woman.' Tshiluba (Mar 6, 2017)

c. Musau uʤi muʤila
Musau u-ʤi **mu**-ʤil-a
Musau 1.VA-AUX.PRS **1.AA**-cry-IPFV
'Musau cried.' Tshiluba (Mar 6, 2017)

However, there are two major differences between Tshiluba nominal predicates and partially agreeing participles: nominal predicates do not agree with their subjects, and the morphology of nominal predicates differs from partially agreeing participles in certain noun classes.

4.2.1 Nominal predicates do not agree with their subject

While they may have the same prefixes that appear on adjectives and verbs, predicate nouns are unique in that they do not change their noun class prefix to agree with another noun. This makes them different from partially agreeing participles, which must agree with their subject.

As shown in (32), when a predicate noun has a different noun class from the subject of the sentence, the predicate noun (in this case *kabunʒi*) does not and cannot change its noun class prefix to agree with the subject (in this case *mwiːbi*).

(32) *Ungrammaticality of subject agreement on predicate nouns*

a. * mwi:bi u-ʤi mubunʒi
mu-i:bi u-ʤi **mu**-bunʒi
1-thief 1.VA-AUX.PRS **1**-squirrel

b. mwi:bi u-ʤi kabunʒi
mu-i:bi u-ʤi **ka**-bunʒi
1-thief 1.VA-AUX.PRS **12**-squirrel
'The thief is a squirrel.' Tshiluba (Dec 14, 2016)

In contrast, Tshiluba partially agreeing participles must agree with their subject, as show in (33) below, where (33a) is ungrammatical due to the lack of agreement between the subject *muluma* and the participle.

(33) *Partially agreeing participles must agree with the noun class of their subject*

a. * muluma uvwa kaibe
mu-luma u-vwa **ka**-ibe
1-man 1.VA-AUX.PST **12.AA**-steal

b. muluma uvwa muibe
mu-luma u-vwa **mu**-ibe
1-man 1.VA-AUX.PST **1.AA**-steal
'The man stole.' Tshiluba (Dec 13, 2016)

Just like the participles in (33) above, predicate adjectives must agree with their subject, as shown in (34). This provides evidence that participles behave more like adjectives than nouns in their agreement patterns.

(34) *Predicate adjectives must agree with the noun class of their subject*

a. * mwi:bi u-ʤi kala
mu-i:bi u-ʤi **ka**-la
1-thief 1.VA-AUX.PRS **12.AA**-tall

b. mwi:bi u-ʤi mula
mu-i:bi u-ʤi **mu**-la
1-thief 1.VA-AUX.PRS **1.AA**-tall
'The thief is tall.' Tshiluba (Dec 15, 2016)

4.2.2 Where nominal and adjectival prefixes differ

Further evidence for the adjectival status of partially agreeing participles can be found in a peculiarity in the noun class system. For most Tshiluba noun classes, the nominal prefix and the adjectival prefix are identical. However, classes 9 and 10 are unique in having different prefixes for nouns than adjectives. In both classes 9 and 10, the nominal prefix is a nasal consonant. The adjectival prefix for class 9 is *mu-* while the adjectival prefix for class 10 is *mi-*. Examples of the adjective forms are given in (35), where the adjective *-nena* 'big' agrees with subjects from class 9 and 10. Since the nominal prefix for both classes is identical, *mbwa* can mean either 'dog' (singular), as in (35a) or 'dogs' (plural), as in (35b).

(35) a. *Class 9 attributive adjective agreement*
ŋakumona mbwa munena
N-aku-mon-a N-bwa **mu**-nena
1SG.VA-ANT-see-IPFV 9-dog **9.AA**-big
'I saw a big dog.' Tshiluba (Mar 6, 2017)

b. *Class 10 attributive adjective agreement*
ŋakumona mbwa minena
N-aku-mon-a N-bwa **mi**-nena
1SG.VA-ANT-see-IPFV 10-dog **10.AA**-big
'I saw big dogs.' Tshiluba (Mar 6, 2017)

Their verbal subject prefixes, meanwhile, are distinct from both the nominal prefix and adjectival prefix. The verbal subject prefix for class 9 is *u-* while the verbal subject prefix for class 10 is *i-*, as shown in (36) below. In (36a), the verb *-kuluka* 'fall' agrees with class 9 subject *mbwa* 'dog' and takes the class 9 verbal prefix *u-*. In (36b), the verb *-kuluka* 'fall' agrees with class 10 subject *mbwa* 'dogs' and takes the class 10 verbal prefix *i-*.

(36) a. *Class 9 simple verb agreement*
mbwa wakukuluka
N-bwa **u**-aku-kuluk-a
9-dog **9.VA**-ANT-fall-IPFV
'The dog fell.' Tshiluba (Mar 6, 2017)

b. *Class 10 simple verb agreement*
mbwa jakukuluka
N-bwa **i**-aku-kuluk-a
10-dog **10.VA**-ANT-fall-IPFV
'The dogs fell.' Tshiluba (Mar 6, 2017)

These differing prefixes provide an ideal diagnostic for lexical category. In class 9, all nouns should start with the prefix *N-*, all adjectives should start with the prefix mu-, and all verbs should start with the prefix *u-*. Similarly, in class 10, all nouns should start with the prefix *N-*, all adjectives should start with the prefix mi-, and all verbs should start with the prefix *i-*.

What, then, does this diagnostic tell us about partially agreeing forms in auxiliary constructions? As can be seen in (37), in perfective auxiliary constructions, the partially agreeing form takes the adjectival prefix. In (37a), when the subject is class 9, the verb *-sume* 'bite' takes the prefix *mu-*, which is the adjectival prefix for class 9. In (37b), when the subject is class 10, the verb *-sume* 'bite' takes the prefix *mi-*, which is the adjectival prefix for class 10.

(37) a. *Class 9 partially agreeing participle*
mbwa uvwa musume poku
N-bwa u-vwa **mu**-sum-e poku
9-dog 9.VA-AUX.PST **9.AA**-bite-PFV mouse
'The dog bit the mouse.' Tshiluba (Mar 6, 2017)

b. *Class 10 partially agreeing participle*

mbwa	ivwa	misume	poku
N-bwa	i-vwa	**mi**-sum-e	poku
10-dog	10.VA-AUX.PST	**10.AA**-bite-PFV	mouse

'The dogs bit the mouse.' Tshiluba (Mar 6, 2017)

This evidence leads me to the conclusion that the partially agreeing forms in Tshiluba auxiliary constructions should in fact be considered adjectives.[19]

5 Lexical category and structure

As demonstrated in the previous section, the partially agreeing participles in Tshiluba auxiliary constructions seem to align most closely with adjectives. What, then, does being an adjective mean for agreement? Why is the person feature excluded from agreement in the adjectival participles but not the verbal participles? I propose that Baker's Structural Condition on Person Agreement (SCOPA) can answer these questions by giving a syntactic structural explanation for the agreement differences between verbs and adjectives. In this section, I introduce Baker's (2008) approach to lexical categories and syntactic structure, which are needed to support his SCOPA proposal.

5.1 Baker's lexical category definitions

A basic part of Baker's (2008) proposal is his definitions of the lexical categories noun, adjective, and verb. Drawing from data from a wide range of languages, Baker builds the category-theoretic infrastructure in (38). The category definitions are based on both structure (the possibility of a specifier) and lexical semantic properties (the presence of a referential index).

(38) *Baker's lexical category definitions*

a. **Verbs** are lexical categories that license a specifier.

b. **Nouns** are lexical categories that have a referential index.

c. **Adjectives** are lexical categories that have neither a specifier nor a referential index.

(Baker 2008:28)[20]

[19] In Bantuist literature, adjectives have been thought to be a small, closed class. For example, Dixon (1982:4) claims that all Bantu languages have a small class of adjectives with "less than 10 to forty or fifty" members. This small lexical class is usually assumed to only include descriptors of properties, such as 'large,' 'raw,' or 'bitter.' My claim that these verb-like participles in Tshiluba should analyzed as adjectives does not necessarily mean that this class should be expanded, because the adjectival participles I describe are not transparently descriptors of properties, nor have I found examples of them being used as attributive (DP-internal) adjectives. However, it does suggest that there are more elements in Bantu that are adjective-like in their morphology and structure but have not traditionally been included in the adjective class.

[20] The wording quoted here is from Baker (2008), but these definitions were originally published in Baker (2003).

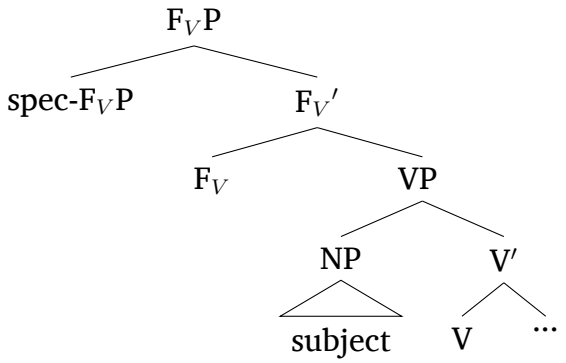
Baker's definitions of verbs and adjectives are especially pertinent to the discussion in this paper. By these definitions, a lexical category difference between partially and fully agreeing participles reveals a structural difference between them. Namely, fully agreeing participles, which behave like verbs, license a specifier, while partially agreeing participles, which behave like adjectives, do not.

5.2 Baker's syntactic structures

These lexical category definitions are used to propose basic structures for verb and adjective phrases. Later, in Section 7.2, I will build on Baker's approach to these structures to draw out the structures of Tshiluba auxiliary constructions and explain their agreement differences.

According to Baker, a lexical category (something like a VP or AdjP) is immediately dominated by a functional category. The lexical and functional category have the same categorical properties (the proposed properties for each lexical category are given in (38)), but the functional head is the locus of agreement. In verbal constructions, Baker has the VP immediately dominated by the verbal functional head, labeled F_V in (39).[21] He allows for higher functional heads in the case of auxiliary constructions (Baker 2008:37).

(39) *Baker's (2008) verbal structure*



5.3 Applying Baker's structures to auxiliary constructions

Baker (2008) includes a brief section on how auxiliary constructions should be analyzed with his structural assumptions. In it, he includes examples from both Bantu and Indo-European languages.

The Bantu examples he uses show the same kind of full agreement found in Section 3.1, where the auxiliaries and participle all show full phi-feature agreement. The Indo-European examples only show agreement on the auxiliary. As detailed in Section 6.2.2, Baker explains this difference by one major difference between Indo-European and Bantu languages in respect to the AGREE relation: Indo-European AGREE is Case-dependent, Bantu AGREE is not.

[21] This functional head is the equivalent of what is usually called TP.

Baker also brings up auxiliary constructions in Indo-European like the Serbian example in (40). He notes that they do show a kind of double agreement, where the auxiliary verb agrees in all phi-features while the lower verb agrees in only number and gender.

(40) *Serbian partially agreeing participle*

a. já sam čita-o/čita-la
I am read-M.SG/read-F.SG
'I was reading; I read.'

b. On/ona je čita-o/čita-la
he/she was read-M.SG/read-F.SG
'He/she was reading; he/she read.'

c. Mi smo čita-li/čita-le
we are.1PL read-M.PL/read-F.PL
'We were reading; we read.' Serbian (Magner 1991:268-9)

He says this only occurs when "the lower verb is an adjective-like participle" (Baker 2008:210), which seems to be an apt description for Tshiluba's partially agreeing verb forms as well. In this case, he analyzes the lower verb and its functional head as having the same characteristics that adjectives have: they have neither a specifier nor a referential index.

Although his analysis is limited to Indo-European constructions of this type, I see no reason why it cannot be extended to apply to Tshiluba auxiliary constructions. Given this, I propose an analysis here in which the partially agreeing forms are structurally the same as Baker's adjectives, while fully agreeing forms are structurally the same as Baker's verbs.

6 The AGREE relation

In addition to his lexical category definitions and structural assumptions, Baker's (2008) SCOPA proposal relies on assumptions about how syntactic agreement works. This section provides background on the AGREE relation in general and the modifications from the Bantuist literature that I adopt in order to account for the Tshiluba agreement facts.

6.1 An introduction to Chomsky's AGREE

Chomsky (2000) proposed the AGREE relation as part of his Minimalist program. This is a very large topic, but I will give a brief overview of the approach here.

Under the AGREE hypothesis, an element with uninterpretable and unvalued phi-features[22] called a *probe* can look down through its c-command domain to find the closest *goal* with interpretable phi-features. When the probe and goal enter the AGREE relation, the goal values the probe's phi-features with the values of its phi-features and the two

[22]For an overview of phi-features and what is meant by interpretable and valued, see Appendix C.

elements agree. One major change from previous approaches to agreement was the elimination of a special status for the relationship between a specifier and its head, which was thrown out along with the concept of government in the Minimalist program.

6.1.1 Constraints

Three major restrictions apply to the AGREE relation: the intervention constraint, the phase impenetrability constraint, and the activity condition.

The intervention constraint says that the probe can only agree with its goal if there is no intervening eligible goal. Formally, the constraint is:

(41) *Chomsky's intervention constraint*
$\alpha > \beta > \gamma$
*AGREE (α γ), α is a probe and β is a matching goal, and β is inactive due to a prior Agree with some other probe.
(Chomsky 2000)

The phase impenetrability constraint starts with the concept of a phase. According to Chomsky, phase heads are usually limited to C and transitive v, which are core functional categories with uninterpretable unvalued phi-features. In the AGREE relation, the probe cannot target as its goal anything within the complement of the next lower phase head. This limits the probe's domain in which it can find a goal. Formally, the constraint is:

(42) *Chomsky's phase impenetrability constraint*
In a phase α with a head H, the domain of H is not accessible to operations outside of α, only H and its edge are accessible to such operations.
(Chomsky 2000:108)

The final constraint on AGREE is **the activity condition**:

(43) *Chomsky's activity condition*
Goal as well as probe must be active for Agree to apply.
(Chomsky 2001:6)

Chomsky ties activity to Case. In order for the probe to be active, it must have uninterpretable phi-features. In order for the goal to be active, it must have an unvalued Case feature. Once its Case feature is valued, the element is no longer active, and thus no longer available as a goal.

The AGREE relation could be tied to movement, so an AGREE relation between a probe and a goal could motivate movement of the goal into the specifier position of the probe's phrase. The activity condition is used to explain why, in some languages, once the subject has raised to a position where it receives Case from a verb (as 'Charlotte' has received Case from 'likes' in (44a)), it cannot raise any further (as demonstrated by the ungrammaticality of (44b)). It is no longer active, so it cannot agree with any higher probe and be motivated to move higher.

(44) *Movement of subject is restricted by the activity constraint in English*
   a. It appears that Charlotte likes snow.
   b. *Charlotte appears that ~~Charlotte~~ likes snow.[23]

6.2 Applying AGREE to Tshiluba

When syntacticians have attempted to apply Chomsky's AGREE relation to Bantu languages like Tshiluba, they have found that modifications must be made in order to explain Bantu agreement patterns. These modifications have been proposed as parameters on the AGREE relation, essentially settings or switches that change how the rules of the AGREE relation work from language to language.

In this paper, in order to account for the Tshiluba agreement facts, I adopt two modifications to Chomsky's AGREE relation. The first is Baker's (2008) modification that allows for upward AGREE. The second is Carstens's (2011) modification to the activity condition which allows activity to be tied to gender rather than Case.

6.2.1 Parameterization of the direction of AGREE

The first modification I adopt in my analysis is a change to the direction of AGREE. Baker (2008) proposes that AGREE in Bantu is upward, rather than downward (Baker 2008:210). This means that the probe would look upwards in the syntactic structure to find an eligible goal, which is the opposite of Chomsky's proposal given in Section 6.1, which has the probe always looking down to find a goal.

Baker bases this claim on a variety of constructions in various languages in which downward agreement cannot account for the agreement patterns that appear, including a Bantu pattern called locative inversion. In a locative inversion construction, like Baker's example from Kinande in (45) below, the verb agrees with a pre-verbal locative noun rather than the thematic subject, which appears after the verb. According to Baker, this kind of construction is best explained by the verb (probe) searching upward for a goal to agree with, which would require AGREE to be upward.

(45) *Locative inversion in Kinande*
   oko-mesa kw-a-hir-aw-a ehilanga
   17-table **17.VA**-TNS-put-PASS-FV peanuts.19
   'On the table were put peanuts.' Kinande (Baker 2008:158)[24]

This kind of locative inversion also occurs in Tshiluba, as seen in (46), where the auxiliary *-ʤi* (present) and the verb *-kuluka* 'fall' agree with the locative *kumutʃi* 'in/from the trees' if the locative is pre-verbal (as in (46a)) but not if it is post-verbal (as in (46b)).

[23] A sentence like 'Charlotte appears to like snow' would be allowed because its lower T is non-finite and cannot assign Case, so 'Charlotte' remains active and free to move.

[24] The formatting of the glosses here has been altered to match the other glosses in this paper, but the content remains the same.

(46) *Locative inversion in Tshiluba*

a. kumutʃi kuʤi kukuluka mabeːʒi
ku-mu-tʃi **ku**-ʤi ku-kuluk-a ma-beːʒi
17-3-tree **17.VA**-AUX.PRS **17.VA**-fall-IPFV 6-leaf
literally: 'From the trees are falling leaves.'

b. mabeːʒi aʤi akuluka kumutʃi
ma-beːʒi **a**-ʤi **a**-kuluk-a ku-mu-tʃi
6-leaf **6.VA**-AUX.PRS **6.VA**-fall-IPFV 17-3-tree
'The leaves are falling from the trees.' Tshiluba (Oct 5, 2016)

Ultimately, Baker (2008) presents the revised version of the restraints on Chomsky's AGREE given in (47). The original conditions are modified to allow for upward and downward agreement.[25]

(47) *Baker's revised syntactic condition on agreement*:
F agrees with XP (a maximal projection), only if:

a. F c-commands XP *or* XP c-commands F.

b. There is no YP such that YP comes between XP and F and YP has ϕ features (the intervention constraint).

c. F and XP are contained in all the same phases (the phase impenetrability constraint).

d. XP is made active for agreement by having an unchecked Case feature (the activity condition).

(Baker 2008:48)

6.2.2 Parameterization of the activity condition

The second modification I assume in my analysis is a change to which feature makes a goal active. I use this modification to explain the grammaticality of hyper-agreeement in Tshiluba. Hyper-agreement is when the same noun agrees with more than one head, which is the case for all of the Tshiluba auxiliary constructions presented in this paper. For example, in (48) below, the subject *bâːna* 'children' is the agreement goal of both the auxiliary *-ʤi* and the participle *-baŋa* 'begin.'

(48) *Hyper-agreement in Tshiluba*
baːna baʤi babaŋa kalaːsa ʧiʤimu ʧilua
ba-ana **ba**-ʤi **ba**-baŋa ka-laːsa ʧi-ʤimu ʧi-lua
2-child **2.VA**-AUX.PRS **2.VA**-begin 12-school 7-year 7-next
'The children are beginning school next year.' Tshiluba (Nov 10, 2016 - HP)

[25]Since my analysis depends on Baker's (2008) approach to AGREE (which he uses to form SCOPA), I adopt his upward agreement analysis for the sake of consistency and simplicity. In the upward AGREE system proposed by Baker, MERGE feeds AGREE. This means that I assume in my analysis that an element moving into the specifier of a probe allows it to be a goal for that probe (rather than the movement being motivated by agreement). An analysis using downward agree, where AGREE feeds MERGE, may also be possible, but I leave that question open for further research.

Under Chomsky's original approach to activity as described in Section 6.1.1, (48) would be ungrammatical, because once *bâːna* agreed with the first probe, its Case feature would be valued and it would become inactive. According to the activity condition in (43), the goal must be active in order to agree, so *bâːna* would no longer be eligible to agree with the second probe.

In Carstens (2011), the grammaticality of hyper-agreement constructions like (48) is explained by changes to Chomsky's activity condition. Carstens proposes that, in Bantu, it is not an unvalued, uninterpretable Case feature that allows nouns to be active but an intrinsically valued yet uninterpretable gender feature that allows nouns to be active.

Under this approach, Bantu nouns' gender feature is considered uninterpretable because it lacks consistent meaning, and thus cannot be translated directly into semantics. While gender A (classes 1 and 2) does have some semantic consistency to its members (most are human), most grammatical genders in Bantu languages are essentially arbitrary, with things like the English language, baskets, oaths, and fingers all falling into the same grammatical gender in Kiswahili (Carstens 2011). Meanwhile, Bantu nouns' gender feature is considered intrinsically valued because it is part of their lexical listing, unlike number, which varies with meaning.

Unlike Case, gender never undergoes valuation and deletion, so goals never become inactive. This allows for the same noun to be reused as the goal for multiple heads, just as *bâːna* is used as the goal for both *-ʤi* and the *-baŋa* in (48).

Combining this modification and upward agree, my analysis assumes the modified syntactic condition on agreement given in (49) below.

(49) *Syntactic condition on agreement assumed for my analysis*:
F agrees with XP (a maximal projection), only if:
   a. F c-commands XP *or* XP c-commands F (allows for upward and downward agreement).
   b. There is no YP such that YP comes between XP and F and YP has ϕ features (the intervention constraint).
   c. F and XP are contained in all the same phases (the phase impenetrability constraint).
   d. XP is made active for agreement by having a valued, uninterpretable gender feature (the activity condition modified according to Carstens (2011)).

   (modified from Baker 2008:48)

7 Structural Condition on Person Agreement (SCOPA)

Baker's Structural Condition on Person Agreement uses his version of the AGREE relation given in (47) along with assumptions about the structure of adjectives and verbs to explain the salient generalization that verbs tend to agree in person while adjectives do not. This same pattern shows up in the two types of Tshiluba auxiliary constructions. The fully agreeing participles, which I analyze as verbs, agree in person while the partially agreeing participles, which I analyze as adjectives, do not. Baker argues that this pattern indicates

that person agreement is dictated by their structure, rather than peculiarities of lexical entries.

In verbal constructions, Baker has the subject originating in spec-VP (the specifier position of the lexical head). Then, the subject would move up to the spec-F_VP (the specifier of the functional head), where it would enter the AGREE relation with that functional head (Baker 2008:53). Meanwhile, the subject of an adjective cannot start in spec-AP or spec-F_AP, because both share the property of not licensing a specifier according to Baker's lexical category definitions given in (38). Instead, the subject starts in a higher position, one that does license a specifier.

This structural difference in where the subject NP can start is the basis for SCOPA. He brings back the importance of the spec-head relationship (previously dismissed by Chomsky) by stipulating that full person agreement can only occur when the functional head merges with the subject, which usually means that the subject must be in the spec position of the functional head phrase.

Baker explains that person agreement is "relatively fragile," and thus especially sensitive to locality constraints like SCOPA (Baker 2008:112). The kind of partial agreement that appears in Tshiluba auxiliary constructions, where one or more of the probe's phi-features are not valued by the goal, is often called 'failed agreement' (Preminger 2014). In failed agreement, the probe and the goal both start with a full set of phi-feature slots (whether valued or unvalued), but something prevents the goal's features from fully valuing the probe's features. This is the approach that I assume in my analysis.[26]

(50) *The Structural Condition on Person Agreement (SCOPA)*:
A functional category F can bear the features $+1$ or $+2$ if and only if a projection of F merges with an NP that has that feature, and F is taken as the label for the resulting phrase.
(Baker 2008:52)

7.1 A modification to SCOPA

In order to fully account for the agreement facts of Tshiluba auxiliary constructions, I must propose a change to SCOPA. Particularly, I propose that SCOPA should restrict not only first and second person agreement but also third person agreement. In this section, I lay out why this change is necessary.

7.1.1 SCOPA's implications for first and second person agreement

SCOPA nicely accounts for the lack of person agreement in Tshiluba first and second person partial agreeing auxiliary constructions. SCOPA's restriction explicitly limits first and second person agreement, which aligns with constructions like those in (51) where the same prefix *mu-* shows up on the participle regardless of the subject's person feature.

[26] Another possible analysis is that the probe is inherently deficient (phi-incomplete) and starts without a person feature or perhaps with a pre-valued default person feature. While that account may be workable here, the syntactic approach provided by SCOPA accounts for a wider range of phenomena where the person feature is restricted, as shown in Baker (2011).

(51) *Partial agreement in first and second person singular*

a. *Partial agreement in first person singular*

mvwa	muʤe	lo:sa
N-vwa	**mu**-ʤ-e	lo:sa
1SG.VA-AUX.PST	**1.AA**-eat-PFV	rice

'I ate rice.' Tshiluba (Oct 12, 2016)

b. *Partial agreement in second person singular*

uvwa	muʤe	lo:sa
u-vwa	**mu**-ʤ-e	lo:sa
2SG.VA-AUX.PST	**1.AA**-eat-PFV	rice

'You (singular) ate rice.' Tshiluba (Oct 12, 2016)

According to SCOPA, when I analyze *-ʤe* 'eat' as an adjective, its lack of a specifier position prevents its person feature from being valued by its goal (the subject, which is first person in (51a) and second person in (51b)). Crucially, SCOPA only restricts person agreement for first and second person subjects.

7.1.2 The problem of third person

Third person is not included in the constraints of SCOPA, probably because third person is often regarded as the default or even the absence of person (Kayne 2000). According to Baker (2008), the only reason that verbs and adjectives agree differently is that SCOPA restricts person agreement on adjectives. Therefore, since SCOPA does not restrict person agreement for third person subjects, we would expect there to be no difference between the agreement markers on verbs and adjectives when their subject is third person.[27] SCOPA should affect neither. This holds true for verbs and adjectives with third person plural class 2 subjects, both of which take the prefix *ba-*. However, as shown in (52), it does not hold true for singular subjects. Third person singular class 1 verbs take the prefix *u-* while third person singular class 1 adjectives take the prefix *mu-*.

[27]This is assuming that the only difference between verbs and adjectives is their structure. That is, there is nothing inherently verbal or adjectival that would result in a particular verb-specific or adjective-specific prefix being chosen during spell-out.

I go with this assumption because the participles in Tshiluba that I am analyzing can occur in the exact same environments and seem to come from the same root. For example, it seems odd to say that *-sek-* 'laugh' has two identical forms, one of which is inherently adjectival and one of which is inherently verbal. Instead, I assume that they only differ in their structure, so when *-sek-* is the head of a verb phrase, it licenses a specifier and is not restricted in its agreement by SCOPA, but when *-sek-* is the head of an adjective phrase, it cannot license a specifier and thus is restricted in its agreement by SCOPA.

This analysis is in-line with literature that uses Distributed Morphology, but it does diverge from Baker (2008), who mentions the possibility of category-less roots, but assumes that heads come "fully and intrinsically specified for syntactic category"(Baker 2008:38n11).

I regard nouns separately because they are defined by Baker by their semantic properties (having a referential index) and are also unique in being the only category with intrinsic phi-features (Baker 2008:31).

(52) *Verb and adjective with the same third person singular subject*

a. *Verb with prefix* u-

Musau wakupeta foto
Musau **u**-aku-pet-a foto
Musau **1.VA**-ANT-find-IPFV photo
'Musau found a photo.' Tshiluba (Nov 16, 2016)[28]

b. *Adjective with prefix* mu-

Musau uʤi mwimpe
Musau u-ʤi **mu**-impe
Musau 1.VA-AUX.PRS **1.AA**-good
'Musau is beautiful.' Tshiluba (Nov 11, 2016)[29]

The Tshiluba agreement facts support an analysis in which third person *is* regarded as a value, just as first and second person are. SCOPA should then be modified to restrict *all* person agreement (first, second, and third). This would also help account for the forms in (53) below, in which two auxiliary constructions with the same third person singular class 1 subject end up with two different agreement prefixes on their participle: *u-* in (53a) and *mu-* in (53b).

(53) *Two auxiliary constructions with the same third person singular subject*

a. *Participle with prefix* u-

mui:bi uʤi uɲema
mu-i:bi u-vwa **u**-ɲem-a
1-thief 1.VA-AUX.PST **1.VA**-run-IPFV
'The thief was running.' Tshiluba (Dec 15, 2016)

b. *Participle with prefix* mu-

mui:bi uvwa muɲeme
mu-i:bi u-vwa **mu**-ɲem-e
1-thief 1.VA-AUX.PST **1.AA**-run-PFV
'The thief ran.' Tshiluba (Dec 15, 2016)

Without the modification to SCOPA, even if (53a) and (53b) differ in structure, SCOPA predicts that both participles would bear the same agreement prefix. With the modification, I can account for this difference by asserting that *mu-* occurs with a third person singular subject when third person agreement is restricted by SCOPA, resulting in an unvalued person feature. Meanwhile, *u-* occurs with a third person singular subject when the probe's person feature is valued by the subject (and the resulting value is third person).

This modification explains why the prefix *mu-* occurs not only with third person class 1 subjects but with first person and second person subjects as well (as shown in (51)). The probe in each of these constructions is restricted from agreeing in person by SCOPA, so the probe ends up with an unvalued person feature. Since the other two features (number and gender) are the same across all of the subjects (singular and gender A), the features

[28]This example was elicited by Tom McCoy.
[29]This example was elicited by Jun Chen.

on the probe end up being identical. These features, which get spelled out as *mu-*, are:[30]

$$\left\{ \begin{array}{lcl} \text{person} & = & \text{(unvalued)} \\ \text{number} & = & \text{singular} \\ \text{gender} & = & \text{A} \end{array} \right\}$$

In order to fully account for the agreement facts, I propose the revised version of SCOPA in (54) below. My change is bolded.

(54) *The Structural Condition on Person Agreement (SCOPA) (Revised)*
A functional category F can bear **a valued person feature** if and only if a projection of F merges with an NP that has that feature, and F is taken as the label for the resulting phrase.
(modified from Baker 2008:52)

7.2 Proposed structures

7.2.1 Structure of fully agreeing auxiliary constructions

In my analysis of the kind of fully agreeing Tshiluba auxiliary constructions found in Section 3.1, I follow Baker (2008) in having the subject begin in the specifier position of the verb phrase, which is headed by the lexical verb. Agreement does not take place within the lexical category projection.

The subject then moves to the specifier position of the verbal functional head, where F_V probes upward to find its goal (the subject). The subject is an eligible goal because there is no intervening eligible goal, they are in the same phase, and they are both active. F_V is active as a probe because it has uninterpretable phi-features (person, number, and gender) while the subject is active as a goal because it has an uninterpretable (but valued) gender feature.

When F_V and the subject enter the AGREE relation, they agree in person, number, and gender. Person agreement is allowed by SCOPA because the subject NP has merged with the functional head F_V, and the resulting phrase is labeled F_VP. This agreement on F_V is realized morphologically as the subject prefix on the lexical verb.

After this agreement, the subject is still active, because it still has an uninterpretable gender feature, so it is free to move up further into the specifier of each of the auxiliaries.[31] When agreement occurs with each head, person agreement is again allowed by SCOPA, because the auxiliaries are verbal, so their corresponding functional heads license a specifier.

This whole movement and agreement process is drawn out in (56) for the sentence in (55).[32]

[30] For more explanation of how the features are realized as morphemes, see Section 7.3.

[31] The approach I take to auxiliaries, in which each auxiliary is a verbal projection selected by its own functional projection, is similar to that taken by Harwood (2013) when analyzing English auxiliaries.

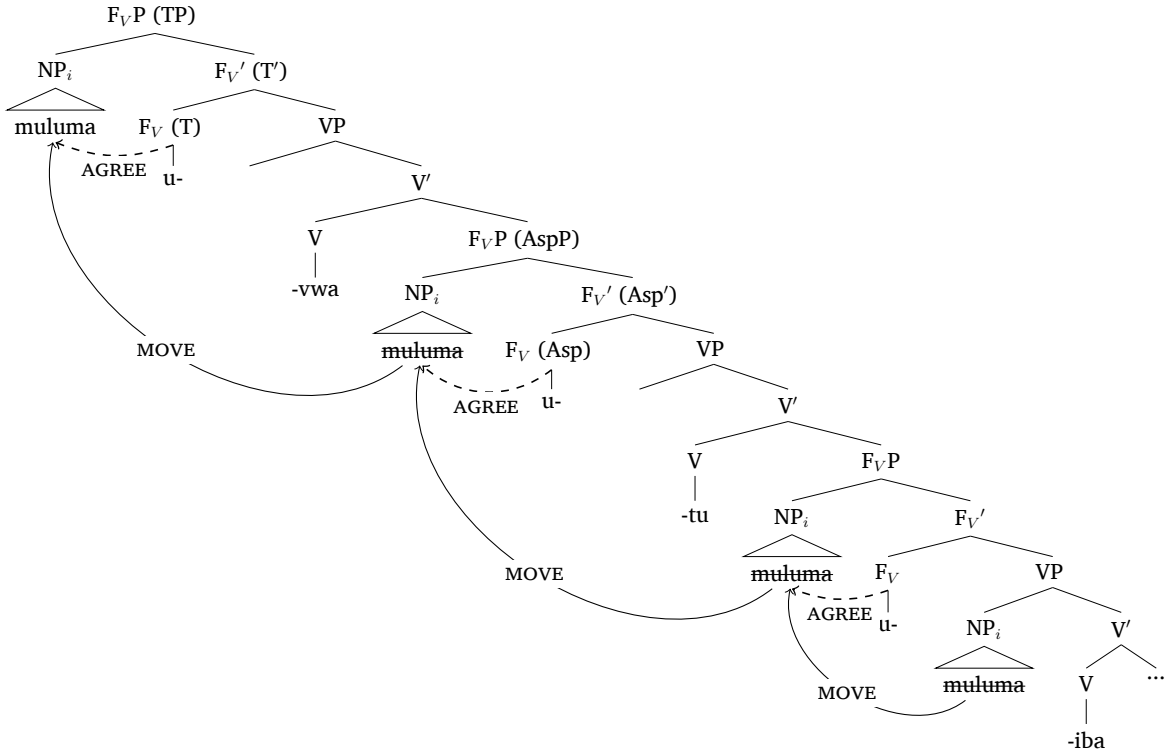
[32] Depending on the theory of movement, the subject may also move through the specifier positions of each VP. This variation is not relevant to my argument in this paper.

(55) *Fully agreeing auxiliary construction drawn out in tree (56)*

muluma	uvwa	utu	wiba
mu-luma	u-vwa	u-tu	u-ib-a
1-man	1.VA-AUX.PST	1.VA-AUX.HAB	1.VA-steal-IPFV

'The man used to steal (habitually).' Tshiluba (Dec 14, 2016)

(56) *Structure of fully agreeing auxiliary construction in (55)*



7.2.2 Structure of partially agreeing auxiliary constructions

In my analysis of the kind of partially agreeing Tshiluba auxiliary constructions found in Section 3.2, I treat the partially agreeing form as Baker (2008) treats adjectives, so neither it nor its functional head licenses a specifier. This means that the subject must start in the specifier position of the auxiliary.

The functional head F$_A$ would then probe upwards and select the subject as a goal. The subject is an eligible goal because there is no intervening eligible goal, they are in the same phase, and they are both active. F$_A$ is active as a probe because it has uninterpretable phi-features while the subject is active as a goal because it has an uninterpretable (but valued) gender feature.

When F$_A$ and the subject enter the AGREE relation, they agree in number and gender but NOT person. Person agreement is prohibited by SCOPA because the subject NP has not merged with a projection of the functional head F$_A$. This structural distance restricts F$_A$ from agreeing in the person feature, resulting in a prefix on the adjective which encodes only number and gender.

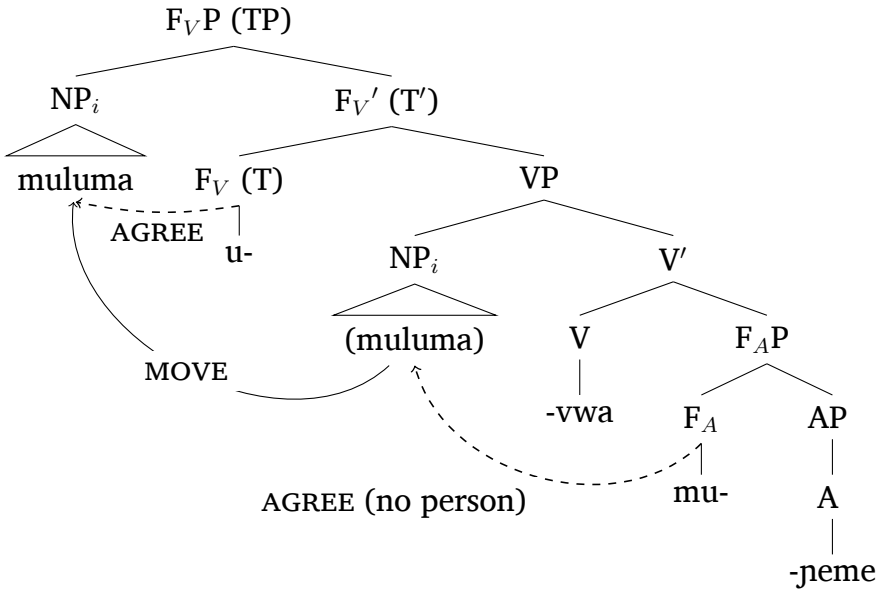
Just like in the fully agreeing constructions, after this agreement, the subject is still

active, so it is free to move up further into the specifier of the auxiliary. When agreement occurs with the auxiliary, person agreement is allowed by SCOPA, because the subject is in its spec position.

This whole movement and agreement process is drawn out for the sentence (57) in tree (58).[33]

(57) *Partially agreeing auxiliary construction drawn out in tree (58)*
Muluma uvwa muɲeme
mu-luma u-vwa mu-ɲem-e
1-man 1.VA-AUX.PST 1.AA-run-PFV
'The man ran.' Tshiluba (Mar 6, 2017)

(58) *Structure of partially agreeing auxiliary construction in (57)*



7.3 From syntax to morphology

In the above structures, I have used the agreement forms *u-* and *mu-* for simplicity, but I assume a late insertion model of agreement, so these agreement prefixes would not yet be spelled out into vocabulary items at the syntax level. Instead, they would start as feature bundles. These feature bundles would then be realized as vocabulary items according to morphological rules. The vocabulary insertion rules given in (59) show how the bundles of phi-features could be realized as the morphemes seen in Tshiluba auxiliary

[33]It may seem implausible to have the subject start in the specifier of the auxiliary (as I have done in (58)), as auxiliaries are not usually thought to select their subject. Adding extra functional layers (possibly a voice head) may fix this, but for the purposes of applying SCOPA to Tshiluba, the tree in (58) is adequate. I leave this for further research.

constructions.[34] For an overview of the principles behind vocabulary insertion rules, see Appendix D.

(59) *Tshiluba vocabulary insertion rules for agreement prefixes*

N-	↔	[1st]
u-	↔	[2nd]
u-	↔	[3rd, A/B/E]
mu-	↔	[A/B/E]
tu-	↔	[1st, PL]
nu-	↔	[2nd, PL]
ba-	↔	[PL, A]
i-	↔	[3rd, PL, B/E]
mi-	↔	[PL, B/E]
N-	↔	[REF, E][35]

Using these rules, we can look back at (55) and (57) (reproduced below) and see how the features are realized as agreement prefixes on the participles.

(55) *Fully agreeing auxiliary construction drawn out in tree (56)*

muluma	uvwa	utu	wiba
mu-luma	u-vwa	u-tu	u-ib-a
1-man	1.VA-AUX.PST	1.VA-AUX.HAB	1.VA-steal-IPFV

'The man used to steal (habitually).' Tshiluba (Dec 14, 2016)

In (55), the subject is *muluma* 'man,' which is third person, singular, and gender A. When the probe *-iba* 'steal' chooses *muluma* as its goal, it is not restricted by SCOPA, so the probe's features are valued with all the features of the goal: third person, singular, gender A. According to the vocabulary insertion rules in (59), the features [3rd, SG, A] are realized as the morpheme *u-*, so the resulting form is *u-iba*.

(57) *Partially agreeing auxiliary construction drawn out in tree (57)*

Muluma	uvwa	muɲeme
mu-luma	u-vwa	mu-ɲem-e
1-man	1.VA-AUX.PST	1.AA-run-PFV

'The man ran.' Tshiluba (Mar 6, 2017)

In (57), the subject is also *muluma* 'man.' When the probe *-ɲeme* 'run' chooses *muluma* as its goal, it is restricted by SCOPA, so the probe's features are valued with the goals' number and gender features but the person feature is left unvalued. The resulting features are singular and gender A. According to the vocabulary insertion rules in (59), the features [SG, A] are realized as the morpheme *mu-*, so the resulting form is *mu-ɲeme*.

[34]The vocabulary insertion rules in (59) only cover genders A, B, and E, because these are the genders that have different prefixes for adjectival subject agreement versus verbal subject agreement. The rules could be refined by changing the person features from 1st, 2nd, and 3rd to features like [−speaker] and [+participant] as proposed in Harley & Ritter (2002).

[35]In order to account for the difference between class 9/10 adjective and class 9/10 noun prefixes, I include here the feature REF for a referential index. Nouns, unlike adjectives and verbs, must have a referential index, as stated in Section 5.1.

The combination of the trees given in Section 7.2, the restrictions of SCOPA, and the vocabulary insertion rules in (59), should produce the morphemes found in the morpheme glosses of the elicited forms in Section 3.

8 Implications for analysis of other Bantu agreement phenomena

My application of Baker's SCOPA to the non-canonical agreement pattern found in Tshiluba auxiliary constructions, and my analysis of the participle as an adjective in particular, may be extended to develop alternative analyses of other Bantu agreement phenomena. Elements that have been thought to be verbs showing alternative or anti-agreement, especially involving person leveling, might be analyzed instead as adjectives showing the effects of SCOPA.

Anti-agreement is a general term for agreement patterns in which the movement of an argument (usually the subject) results in some kind of partial agreement. This often occurs with subject extraction, relatives, or wh- questions (Baier 2016). This pattern has been noted in various Bantu languages, including Kilega (Kinyalolo 1991), Lubukusu (Diercks 2010), Kinande (Schneider-Zioga 2007), and Bemba (Henderson 2013).

Bemba anti-agreement is one pattern that can be reanalyzed using SCOPA. Henderson (2013) shows that when a verb's subject is clefted or relativized, the verb bears an agreement prefix that is the same for all persons. Similar to the prefixes on Tshiluba partially agreeing participles, the prefixes do agree with the extracted subject in number and gender, so Henderson says that the verb "lacks traditional person values" (Henderson 2013:471). An example of this pattern is given in (60). The bolded morpheme *u-* is the agreement prefix that shows anti-agreement. It appears in relatives and subject clefting constructions when the subject is singular gender A, whether it is first person (60b), second person (60c), or third person (60d).

(60) *Bemba anti-agreement*

a. *Third person without anti-agreement*
Umulumendo **a**-ka-belenga ibuku
1.boy **1.VA**-FUT-read 5.book
'The boy will read the book' Bemba (Henderson 2013:454)[36]

b. *First person with anti-agreement*
Ni-ne u-**u**-ka-belenga ibuku
COP-1SG REL-**1.AA**-FUT-read 5.book
'It is I who will read the book' Bemba (Henderson 2013:475)

c. *Second person with anti-agreement*
Ni-we u-**u**-ka-belenga ibuku
COP-2SG REL-**1.AA**-FUT-read 5.book
'It is you (singular) who will read the book' Bemba (Henderson 2013:475)

[36]The formatting of the glosses here has been altered to match the other glosses in this paper, but the content remains the same.

d. *Third person with anti-agreement*
Umulumendo u-**u**-ka-belenga ibuku
1.boy REL-**1.AA**-FUT-read 5.book
'the boy who will read the book' Bemba (Henderson 2013:454)

In Tshiluba, the person-leveled gender A singular agreement prefix is *mu-*, which is not the same as either of the person-specified prefixes (*N-* for first person and *u-* for second and third person). However, in Bemba and some other Bantu languages (including Lubukusu as described by Diercks (2010)), the person-leveled class 1 prefix is the same as the second person singular gender A prefix. In Bemba, both of them are *u-*. This has been noted as being unusual because third person, not second person, is usually considered the default, which would appear when person was underspecified (Baier 2016). On this assumption, we would expect the Bemba person-leveled class 1 prefix to be *a-* rather than *u-*. The actual prefixes are given in (61).

(61) *Bemba gender A agreement prefixes* (Henderson 2013:475–476)

	Class	Number	Person	Prefix
Fully agreeing	1	SG	1st	n-
	1	SG	2nd	u-
	1	SG	3rd	a-
	2	PL	1st	tu-
	2	PL	2nd	mu-
	2	PL	3rd	ba-
Partially agreeing	1	SG		u-
	2	PL		ba-

This is indeed unusual if the partially agreeing forms are analyzed as verbs. However, if I apply my analysis of Tshiluba partial agreement to Bemba anti-agreement, the person-leveled forms should be analyzed as adjectives, which are structurally distinct from verbs and therefore restricted by SCOPA from agreeing in person. Further research is needed to confirm whether Bemba relativized adjectives resemble the person-leveled relativized "verbs" given in Henderson (2013).

In particular, translations of the sentences in (62) would help determine whether my analysis holds for Bemba and other Bantu languages with similar anti-agreement patterns.

(62) *Parallel sentences to be translated into Bemba*
a. It's me who runs.
b. It's me who's tall.
c. It's you (singular) who runs.
d. It's you (singular) who's small.
e. It's the boy who runs.
f. It's the boy who's good.

If all of the predicates in (62) take the same agreement prefixes (probably *u*-), the anti-agreement forms, which have been analyzed as verbs with a suppressed person feature, can be re-analyzed as adjectives that cannot agree in person due to the effects of SCOPA. This analysis would also rely on my modification to SCOPA discussed in Section 7.1, because SCOPA must restrict 3rd person agreement in order to get two different prefixes on forms with class 1 third person subjects: the *a*- prefix on fully agreeing verbs with third person subjects and the person-leveled *u*- prefix on anti-agreement forms with third person subjects.

9 Conclusion

In this paper, I have described an unusual agreement pattern found in Tshiluba auxiliary constructions, which I documented through elicitation sessions with a native speaker. In this pattern, the auxiliary agrees with its subject in person, number, and gender, but the participle agrees with its subject only in number and gender. This is shown by the same person-leveled prefix appearing on the participle even as the subject varies in its person feature.

In order to explain this unexpected pattern, I analyzed the participle as an adjective, which is structurally distinct from verbal participles because it cannot license a specifier. According to Baker's (2008) Structural Constraint on Person Agreement, this lack of a specifier position limits the adjectival participle from agreeing with its subject in first and second person. However, to fully account for the Tshiluba agreement facts, which show a distinction between 3rd person class 1 agreement and non-person class 1 agreement, I proposed a modification to SCOPA which would limit all person agreement.

I then gave vocabulary insertion rules (in the tradition of Distributed Morphology) that show how the phi-features acquired through agreement are realized as the agreement prefixes that appeared in my elicited examples.

My analysis not only serves as a possible answer to this agreement puzzle but also provides a novel line of analysis that may apply to other Bantu agreement puzzles, including anti-agreement. The questions that I have left open offer new avenues of investigation that can be pursued to better understand Bantu agreement patterns. With further research, these historically understudied languages can continue to enrich our theoretical understanding of the syntax of lexical categories and agreement.

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Appendices

A Gloss abbreviations

.AA	adjectival agreement prefix	FUT	future
.VA	verbal agreement prefix	FV	final vowel
1PL	first person plural	INF	infinitive
1SG	first person singular	IPFV	imperfective
2PL	second person plural	M	masculine
2SG	second person singular	PASS	passive
ANT	anterior	PER	persistive
AUX.HAB	habitual auxiliary	PFV	perfective
AUX.PRS	present tense auxiliary	PL	plural
AUX.PST	past tense auxiliary	PTCL	particle
COMPL	completive	REF	referential index
CONN	connective particle	REL	relative
COP	copula	SG	singular
F	feminine	TNS	tense

B Table of Tshiluba noun class prefixes

This table is built from a combination of the classes given in Kabuta (2012), Kamwangamalu (1985), and McCoy (2016). There are some nouns, often loan words, which do not have a noun class prefix. Their default subject agreement prefix seems to vary according to what lexical field they fall into (whether they are human, animal, fruit, inanimate object, small, etc.) (McCoy 2016; Kabuta 2012).

#	Gender	SG/PL	Noun prefix	Example noun	Noun translation	Adj prefix	Verb prefix	Note
1	A	SG	mu-	muntu	person	mu-	u-	mostly human
2	A	PL	ba-	bantu	people	ba-	ba-	mostly human
3	B	SG	mu-	mutʃi	tree	mu-	u-	
4	B	PL	mi-	mitʃi	trees	mi-	i-	
5	C	SG	ʤi-	ʤituku	day	ʤi-	ʤi-	
6	C	PL	ma-	matuku	days	ma-	a-	used for mass nouns
7	D	SG	tʃi-	tʃimuma	fruit	tʃi-	tʃi-	
8	D	PL	bi-	bimuma	fruits	bi-	bi-	
9	E	SG	nasal consonant	mbwa	dog	mu-	u-	
10	E	PL	nasal consonant	mbwa	dogs	mi-	i-	
11	F	SG	lu-	luesu	pot	lu-	lu-	
12	G	SG	ka-	kampusu	cat	ka-	ka-	can be diminutive
13	G	PL	tu-	tumpusu	cat	tu-	tu-	can be diminutive
14	H	SG	bu-	bulalu	bed	bu-	bu-	
15			ku-	kufunda	writing/to write	ku-	ku-	forms infinitive verb
16			pa-	pabulalu	on the bed	pa-	pa-	locative
17			ku-	kukalasa	at school	ku-	ku-	locative
18			mu-	munzubu	in the house	mu-	mu-	locative

C An overview of phi-features: valued versus unvalued, interpretable versus uninterpretable

When phi-features were first introduced in Chomsky's 1965 *Aspects of the Theory of Syntax*, it was proposed that each noun could have a feature matrix, including attributes of the noun like gender, number, person, and Case, each of which could have a value. For example, the feature *gender* might have the value *neuter* and the feature *number* might have the value *singular*. Depending on their position in the syntactic structure, syntactic operations could assign the values of a noun's features to another element, like an article or an adjective.

Decades later, when Chomsky proposed the AGREE relation, he expanded his theory of phi-features (Chomsky 2000). Under this proposal, in addition to nouns with inherently valued phi-features, other elements, like verbs, adjectives, and functional heads like T, also come with phi-features, which can come with or without values. As further detailed in Section 6, the Case feature also gained a special role and was no longer grouped with gender, number, and person as a phi-feature.

When an element comes with an unvalued phi-feature, this feature is uninterpretable, meaning it cannot make it beyond the level of syntax. When an uninterpretable feature reaches the interface with the next level of representation, there are no rules to translate these features. If the next level is semantics, these features cannot translate into meaning. If features are uninterpretable, they are stuck in the syntax and cannot cross the border into the realm of semantics. Even when a feature is valued (and may be visible phonologically), it can still be uninterpretable in the semantics.[37]

Examples of types of features

Let's take the sentence 'My dog eats bananas.' An example of a valued, interpretable feature in this sentence would be the number feature on the noun 'bananas.' This feature has a value (plural), is visible phonologically (shown by the final -s on 'bananas'), and translates to semantics (it must refer to more than one banana).

Since unvalued, uninterpretable features do not show up in the surface form (and in fact must be eliminated before reaching semantics), it is difficult to give an example of one, but one could imagine that, when building this sentence, we started with the verb 'eat.' At that point, 'eat' had a number feature (a slot where plural or singular could go), but the feature was unvalued. It was also uninterpretable because the presence of this number feature did not translate into any kind of meaning or truth value. Later on, 'eat' would enter an AGREE relation with the subject 'my dog,' at which point its unvalued features would become valued.

Finally, we can see an example of a valued, uninterpretable feature. The number feature on 'eats' has a value (singular) and is even visible phonologically (shown by the final -s on 'eats'), but it is uninterpretable because this singular number does not contribute to the meaning of the verb (or the sentence).

[37] Chomsky's approach maintains a connection between valuedness and interpretability, meaning that uninterpretable features are always unvalued (until valued through agreement) and interpretable features are always valued. See Section 6.2.2 for an overview of Carstens's (2011) modifications to Chomsky's approach to phi-features.

D Vocabulary insertion principles

In order to model the translation from phi-feature bundles (at the syntax level) to vocabulary items (at the morphology level), I use vocabulary insertion rules, which are commonly used in the Distributed Morphology framework as laid out in Halle & Marantz (1994). Vocabulary insertion rules follow two conditions: the Subset Principle and the Specificity Principle. Both are given below.

(63) *Subset Principle*
A vocabulary item V is inserted into a terminal node N iff (a) and (b) hold:
a. The morphosyntactic features of V are a subset of the morphosyntactic features of N.
b. V is the most specific vocabulary item that satisfies (a).
(from Baier (2016:7) based on Keine (2010:8))

(64) *Specificity*
A vocabulary item V_1 is more specific than a vocabulary item V_2 iff V_1 contains more morphosyntactic features than V_2.
(from (Baier 2016:7) based on Keine (2010:8))

Applying the principles

These principles dictate how to choose which rule applies to a node with a set of features. For example, we can work with the rules in (59) (reprinted below) and a node with the features [3rd, SG, E]. In other words, our node's person feature value is third person, its number feature value is singular, and its gender feature value is gender E (class 9/10).

Starting with (63a), we need to look for rules whose features are a subset of [3rd, SG, E]. This means all of the features given in the rule must also be features of our node. This narrows it down to rule 3 with the features [3rd, A/B/E] or rule 4 with the feature [A/B/E].

Then, we move onto (63b), which says that we need to choose the most specific rule. According to (64), the more specific rule will have more features. Since rule 3 has two features and rule 4 only has one, we need to choose rule 3. This means that our node with features [3rd, SG, E] should be realized as the vocabulary item *u-*.

(59) *Tshiluba vocabulary insertion rules for agreement prefixes*

1.	N-	↔	[1st, A]
2.	u-	↔	[2nd, A]
3.	u-	↔	[3rd, A/B/E]
4.	mu-	↔	[A/B/E]
5.	tu-	↔	[1st, PL, A]
6.	nu-	↔	[2nd, PL, A]
7.	ba-	↔	[PL, A]
8.	i-	↔	[3rd, PL, B/E]
9.	mi-	↔	[PL, B/E]
10.	N-	↔	[REF, E]