TWO BINDING PUZZLES IN MAYAN*

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This paper examines binding puzzles in two Mayan languages and proposes an analysis which unifies two otherwise different-looking constructions: the Chol applicative and the K'ichee' agent focus (AF). In both the Chol applicative and the K'ichee' AF, subjects are banned from binding object possessors. That is, the equivalents of English *Maria bought her own tortillas* or *It was Juan who burned his own foot* are impossible in the relevant constructions (though they are possible under a reading in which the subject and object's possessor are not coreferential). We propose that in both types of construction, binding of the object's possessor by the subject is blocked by an intervening *v* head. In the Chol (low) applicative, this is the head added to introduce the applied argument. In the K'ichee' AF, this is the head needed to introduce the subject; we may think of this as a type of high applicative. In this paper we show that the similar binding restrictions in these two different languages are easily accounted for under a theory which ties the availability of binding to locality with domains defined by *v* heads, such as the minimal pronoun approach of Kratzer (2009).

1. Introduction

Mayan languages have a rich set of voice alternations with varied morphosyntactic constraints on their application. From agent focus, to applicatives, to passives, Judith Aissen has thought more deeply than anyone else about the conditions under which these alternations can take place, as well as their subsequent effects on clause structure. In this paper we follow her lead by considering two different voice alternations in two different Mayan languages, each of which has a strikingly similar effect on the availability of intraclausal binding relations.

The languages in question are Chol and K'ichee'. We first consider Chol's *-be* applicative and its relation to binding. What we find is that 3rd person subjects must bind 3rd person possessors of direct objects (Aissen's (1999) *extended reflexive*) unless the verb takes *-be*, in which case, the object possessor must be free. The second construction we consider is Agent Focus (AF) in K'ichee', which detransitivizes a predicate without demoting either transitive argument. Crucially, predicates with AF morphology block binding from subject position. Just as in Chol, we see in K'ichee' that a voice alternation forces certain pronouns—which may be bound in plain transitive clauses—to be free.

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This paper provides an analysis that unites the behavior of these two constructions within a *minimal pronouns* approach to binding (Kratzer 2009). In this framework free variables are λ-bound by a local *v* (little "v") head and share features with the DP specifier of the binding head. What brings together the Chol applicative and the K'ichee' AF is that both alternations add arguments through additional clausal structure. This blocks binding by increasing the intraclausal distance between co-arguments that would have been otherwise able to support a binding relationship in a standard transitive clause.

Section 2 presents a detailed description of the binding facts in Chol and K'ichee'. Their analysis begins in §3. Here we sketch sketch an analysis of binding in terms of locality domains defined by *v*P domains, and use it to account for the behavior of binding in Chol extended reflexives in §3.1. Section 3.2 extends the analysis to binding in K'ichee' AF clauses. In §4 we show that the *Minimal Pronouns* approach of Kratzer (2009) correctly handles the Mayan facts. The paper concludes in section 5.

2. Two Binding Puzzles

This section presents the two binding puzzles from Chol and K'ichee' that form the empirical core of this work. In each case we find that binding relations that could hold in a plain transitive clause are blocked once the verb undergoes voice change. We first consider Chol *extended reflexives*, which are in complementary distribution with the *-be* applicative. We then introduce K'ichee' agent focus, which interrupts object binding from subject position.[1]

2.1. Chol Extended Reflexives

Chol is spoken by around 150,000 people in southern Mexico and belongs to the Tzeltalan branch of the Mayan language family. Like many languages, Chol has an applicative, *-be*, which promotes indirect objects to full (primary object) argument status, as shown in (1).[2] In the plain transitive in (1a) the recipient, *aläl* 'child', must be introduced by a preposition, *cha'añ*. In the applicative construction in (1b), the recipient is promoted to a full verbal argument—a "primary object" in the sense of Dryer 1986—which, like a regular transitive object, controls absolutive agreement on the verb (here null third person). The theme receives secondary object status; it does not control verbal agreement.

[1] Though both *-be* applicatives and agent focus constructions are common within the Mayan family, Chol does not have an agent focus and K'ichee' does not have a productive applicative. In Chol, both ergative and absolutive arguments may be freely extracted.

[2] Abbreviations used in glosses are: 1,2,3 – 1st, 2nd, 3rd persons; ABS – absolutive; AF – agent focus; APPL – applicative; CAUS – causative; CL – noun class clitic; CLF – cleft; CP – completive; DET – determiner; ERG – ergative; FOC – focus marker; ITV – intransitive; P – plural; PASS – passive; PL – plural; PERF – perfective participle; PRFV – perfective; REFL – relfexive; TV – transitive verb suffix.

(1) a. TRANSITIVE

Tyi	k-ch'äx-ä-$Ø_i$	ja'$_i$	cha'añ	aläl.
PRFV	ERG1-boil-TV-ABS3	water	for	child

'I boiled water for the child.'

b. APPLICATIVE

Tyi	k-ch'äx-**be**-$Ø_i$	ja'	aläl$_i$.
PRFV	ERG1-boil-APPL-ABS3	water	child

'I boiled the child water.'

What concerns us in this paper is the interaction between *-be* and binding between subject and object possessors. In a Chol transitive construction with two third person arguments, if the object is possessed by a third person, the possessor *must* be co-referential with the subject. This can be seen in sentences like those in (2). This contrasts with the English equivalents, where the gloss is ambiguous between co-reference and disjoint reference. Aissen (1999), discussing Tzotzil, labels this type of construction the *extended reflexive*.

(2) EXTENDED REFLEXIVES

a.

Tyi	i$_i$-boñ-o-Ø	y$_{i/*j}$-otyoty	jiñi	wiñik.
PRFV	ERG3-paint-TV-ABS3	ERG3-house	DET	man

'The man painted his (own) house.'
(cannot mean: 'The man painted his/her (someone else's) house.'

b.

Tyi	i$_i$-mäñ-ä-Ø	i$_{i/*j}$-waj	aj-Maria.
PRFV	ERG3-buy-TV-ABS3	ERG3-tortilla	CL-Maria

'Maria bought her (own) tortilla.'
(cannot mean: 'Maria bought his/her (someone else's) tortillas.')

The only way to break the binding relationship between the subject and the object possessor in (2) is to use the applicative morpheme *-be*. Example (4) shows that *-be* renders the possessor obligatorily disjoint from the subject, when it would otherwise have to be bound.[3]

(3) a.

Tyi	k-boñ-o-Ø	y-otyoty.
PRFV	ERG1-paint-TV-ABS3	ERG3-house

'I painted his house.'

b.

Tyi	k-boñ-be-Ø	y-otyoty.
PRFV	ABS1-paint-APPL-ABS3	ERG3-house

'I painted his house.'

[3] Interestingly, these facts only hold for clauses in which the transitive subject and the theme's possessor are both *third person*. In a construction in which the subject is first person and the theme's possessor is third person, for example, the applicative is possible but not obligatory. We do not address this issue here.

(4) APPLICATIVES

a. Tyi i$_i$-boñ-**be**-Ø y$_{*i/j}$-otyoty jiñi wiñik.
PRFV ERG3-paint-APPL-ABS3 ERG3-house DET man
'The man painted his/her (someone else's) house.'
(cannot mean: 'The man painted his own house.')

b. Tyi i$_i$-mäñ-**be**-Ø i$_{*i/j}$-waj aj-Maria.
PRFV ERG3-buy-APPL-ABS3 ERG3-tortilla CL-Maria
'Maria bought his/her (someone else's) tortillas.'
(cannot mean: 'Maria bought her own tortillas.')

Below we propose an analysis to account for why binding is obligatory in (2) and why it is blocked when the verb takes the *-be* applicative.

2.2. K'ichee' Agent Focus

The previous section showed that in Chol, verbal voice blocks otherwise obligatory binding. K'ichee' presents another case where voice, specifically agent focus, constrains binding. K'ichee' belongs to the K'ichean branch and is spoken in the highlands of Guatemala by close to one million people. Like many Mayan languages, K'ichee' does not allow the free extraction of transitive subjects (hereafter *agents*). If at least one argument of a transitive clause is third person, agent extraction requires the verb to appear in the special AF form. In some dialects of K'ichee', AF is a true antipassive voice. That is, the predicate becomes intransitive and the object is demoted (Mondloch 1981). In most dialects though, AF clauses differ from true antipassives in that the verb is rendered morphologically intransitive, while still retaining the ability to take two full DP arguments like standard transitive predicates. The construction is exemplified in (5a–5b).

(5) AGENT FOCUS

a. Jas x-Ø-chap-ow le wah?
who CP-ABS3-eat-AF DET tortilla
'Who touched the tortilla?'

b. Jas x-Ø-chap-ow-ik
who CP-ABS3-touch-AF-ITV
'Who touched it?'

Notice in (5a) that while the predicate takes two full arguments, there is only a single instance of absolutive agreement, as in intransitive clauses. Further evidence that the clause is morphologically intransitive is that the verb takes the intransitive status suffix *-ik* in (5b). This suffix is deleted when not phrase final, and is thus not present in (5a).

One way to think of AF clauses is that they present a way to express a transitive relation with intransitive morphology. The puzzle that arises is that the binding possibilities between transitive coarguments are dependent on whether the verb bears AF or standard transitive morphology. For instance, Mondloch (1981) shows that the agent of an AF clause cannot bind a reflexive object anaphor, as shown in (6). Instead, a standard transitive clause like (7) must be used.

That is, in (7), we find no AF despite the fact that the agent is focused.[4]

(6) *Aree jun kumatz b'aq'ati-**n**-aq r-iib' (Mondloch 1981, p.233)
FOC one snake roll-AF-PERF ERG3-SELF
'It was a snake that coiled itself (around the tree).'

(7) Aree jun kumatz u-b'aq'ati-**m** r-iib' (Mondloch 1981, p.233)
FOC one snake ERG3-roll-TV.PERF ERG3-SELF
'It was a snake that coiled itself (around the tree).'

Similarly, extended reflexives are impossible in AF clauses. Example (8) shows that the agent and an object possessor cannot be co-referential in an AF clause. Once again, this meaning can only be expressed with a standard transitive clause like (9).[5]

(8) Aree lee a Xwaan x-Ø-k'at-**ow** r-aqan. (Mondloch 1981, p.235)
FOC DET CF Juan CP-ABS3-burn-AF ERG3-foot
'Juan is the one who$_i$ burned his$_{*i/j}$ foot.'

(9) Aree lee a Xwaan x-Ø-u-k'at r-aqan. (Mondloch 1981, p.237)
FOC DET CF Juan CP-ABS3-ERG3-burn ERG3-foot
'Juan is the one who$_i$ burned his$_{i/*j}$ foot.'

To show that it is truly binding that is blocked in extended reflexives, example (10) presents the same fact with the quantifier *majun* 'no one'. A quantifier cannot bind an object possessor in an AF clause. Only the transitive clause in (11) permits the bound reading.

(10) Majun x-Ø-k'am-**ow** ulo r-ixayil.
No.one CP-ABS3-bring-AF hither ERG3-wife
No one$_i$ brought his$_{*i/j}$ wife.

(11) Majun x-Ø-u-k'am ulo r-ixayil.
No.one CP-ABS3-ERG3-bring hither ERG3-wife
No one$_i$ brought his$_{i/*j}$ wife.

The K'ichee' data present a similar effect as seen in Chol. Intraclausal binding relations are

[4] An important question, which we cannot answer here, is why examples like (7) are grammatical at all. If agent extraction forces agent focus, and binding is blocked in AF clauses, then sentences with both should be simply ineffable. The important fact is that there are other instances where AF is not required with agent focus, for example with two local person arguments (i.e. first person acting on second person). It seems that AF is only required in those cases where it is easy to confuse whether the extracted argument is the subject or the object. There is no such confusion with bound pronouns because they could not be bound unless the extracted argument was the subject. While this does not explain this synchronic fact of the grammar, the fact that (7) is grammatical fits within a wider pattern in the language.

[5] Note that the agent focus morpheme in (8) is different from that in (6). The reason is that root transitives, like the former, take the *-ow* suffix, while derived transitives take *-n*.

not stable under voice alternations. Specifically, subjects no longer make good binders once the verb takes AF morphology. The next section builds a unified analysis of Chol and K'ichee' that explains the distribution of bound pronouns and reveals the fundamental similarities between *-be* applicatives and AF.

3. Analysis

In this section we present our analysis of the Chol and K'ichee' constructions discussed above. In both we argue that the relevant voice construction involves the introduction of a *v* head, which blocks binding between the subject and the possessor in question. Defining binding domains in terms of *v* heads, we show, gives the correct result. In the section that follows, we show how Kratzer's (2009) *Minimal Pronouns* approach correctly captures these facts.

3.1. Chol Analysis

Recall that in Chol a third person subject must bind a third person possessor, as in (12), repeated from (2b). We can use examples like (12)—which we'll refer to as '3-3.POSS' clauses—to illustrate the first part of the analysis.

(12) Tyi i$_i$-mäñ-ä-Ø i$_{i/*j}$-waj aj-Maria.
PRFV ERG3-buy-TV-ABS3 ERG3-tortilla CL-Maria
'Maria bought her (own) tortilla.'
(cannot mean: 'Maria bought his/her (someone else's) tortillas.')

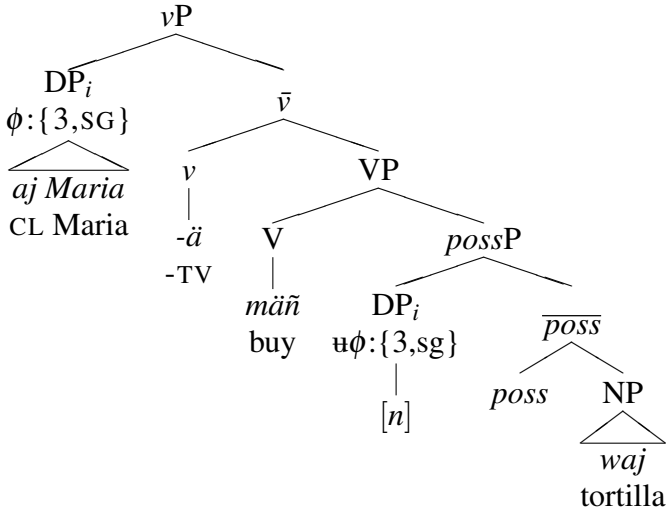
Assume that in 3-3.POSS clauses, the possessor pronoun must be an anaphoric pronominal element with unvalued ϕ-features.[6] In the framework of Kratzer 2009, discussed in section 4, we term all such elements *minimal pronouns* and represent them as $[n]$. This restriction is stated in (13).

(13) 3-3POSS RESTRICTION
In a clause with a third person subject and a third person object possessor, the possessor must be realized as a minimal pronoun, $[n]$.

A sentence like (12) has a structure like example (14). The agent is generated in the specifier of a transitive *v*, instantiated by the harmonic vowel "status suffix" *-ä* (Coon 2010a,b). The minimal pronoun possessor, $[n]$, is generated in the specifier a nominal projection, here labelled *Poss* (see Coon 2009 for more on Chol possessive constructions).

[6] We currently do not have an analysis of this constraint, though there are plausible directions for future research. For instance, Reinhart (1983, p.167) proposes a "pragmatic strategy" in which bound variables are uniformly preferred over non-bound pronouns to express the same meaning. If a 3.3POSS clause with a disjoint possessor expresses the same meaning as a 3.3POSS *-be* clause, then we should have to use the *-be* clause since it employs a bound pronoun. Crucially, we would have to say that this "pragmatic" competition between forms only comes into play when there is a ambiguity between bound and unbound interpretations for a pronoun, i.e., when both are 3rd person.

(14) EXTENDED REFLEXIVE



The minimal pronoun begins the derivation with unvalued ϕ-features ($u\phi$). It is bound by the agent and thus acquires the features {3,SG}. As a possessor we assume it will receive genitive case and be spelled out as the third person ergative morpheme *i-* in *i-waj* 'her tortilla'. The fact that object possessors in 3-3.POSS constructions must be anaphors gives us the result that third person subjects must bind and share features with third person possessors, which is precisely what we see with extended reflexives. The mechanics of this feature sharing are described in detail in §4.

With this basic framework in place, we now turn to the account of why the *-be* applicative blocks this otherwise obligatory binding relationship. Compare again the extended reflexive construction in (12) above with the applicative-bearing form in (15), repeated from (4b).

(15) Tyi i$_i$-mäñ-**be**-Ø i$_{*i/j}$-waj aj-Maria.
PRFV ERG3-buy-APPL-ABS3 ERG3-tortilla CL-Maria
'Maria bought his/her (someone else's) tortillas.'
(cannot mean: 'Maria bought her own tortillas.')

In addition to promoting indirect objects, *-be* also participates in *external possession* constructions (see Payne and Barshi 1999), in which it promotes the *possessor* of the theme to primary object status. In this construction, the theme's possessor is realized both via possessive (ergative) marking on the possessed NP, and also via absolutive morphology on the predicate, where it is interpreted as an *affectee*. Examples are given in (16).

(16) EXTERNAL POSSESSION

a. Tyi i-k'ux-be-**yoñ** **k**-ok jiñi ts'i'.
PRFV ERG3-bite-APPL-ABS1 ERG1-leg DET dog
'The dog bit my leg.'

b. Tyi k-tsäñ-sä-be-**yety** **a**-chityam.
PRFV ERG1-die-CAUS-APPL-ABS2 ERG2-pig
'I killed your pig.'

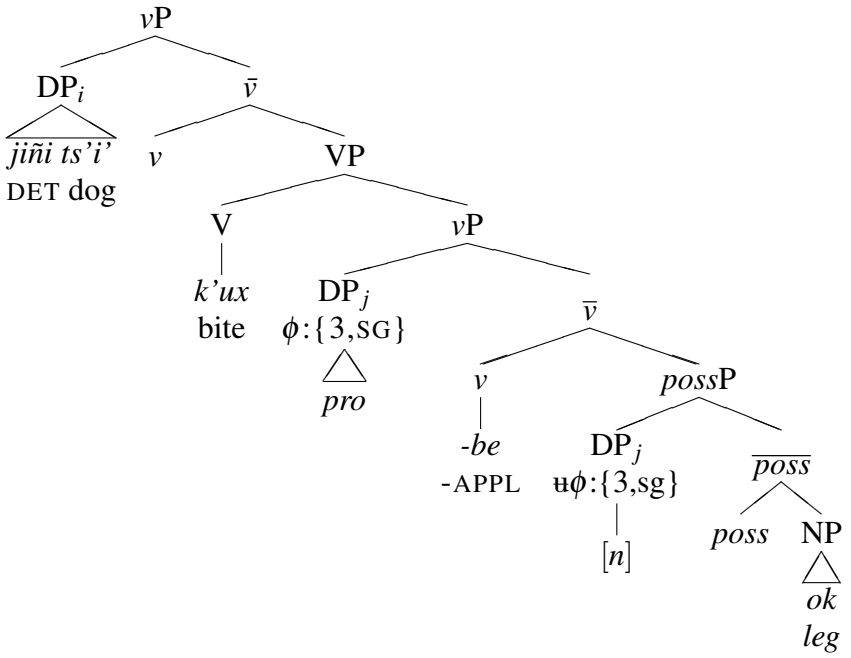
Returning now to the Chol binding constructions we began with, we see that the applicative used for disjoint reference in examples like (15) is simply another instance of external possession. In (17), as well as in (15) above, the absolutive agreement on the predicate tracks the applied argument (which is also marked as a possessor on the theme) just like in the constructions in (16). Recall that third person absolutive is null in Mayan languages.

(17)	Tyi	i-k'ux-be-Ø	y-ok	jiñi	ts'i'
	PRFV	ERG3-bite-APPL-ABS3	ERG3-leg	DET	dog

'The dog$_i$ bit his$_{*i/j}$ (someone else's) leg.'

Example (17) would have a structure like (18). We treat *-be* as the morphological realization of a little *v* head that introduces an applied argument in its specifier. This argument behaves as a primary object, for example, controlling verbal object agreement. The THEME argument is the complement of the *v* head hosting *-be*. The Chol *-be* is thus a *low applicative* in the sense of Pylkkänen 2002: it mediates a relationship between two nominal arguments.

(18)



Assume following (13) that a minimal pronoun is generated in the specifier of *poss*P, just as in the extended reflexive construction. The crucial difference is that with the addition of *-be* there is a new potential binder for this anaphor: the applied object *pro*. If we assume that binding of the minimal pronoun is limited to the smallest *v*P containing it, we correctly predict that the applied argument binds and shares features with the possessor [*n*]. This is exactly what we find with external possession constructions more generally. In particular, we generate the disjointness requirement for sentences like (15) and (17). The subject cannot bind the applied object (which in turn binds the minimal pronoun) without resulting in a Condition B violation.[7]

3.2. Extending the Analysis to K'ichee'

The previous section showed that binding is blocked in the applicative construction because the intervening functional structure forces the anaphoric possessor pronoun to be bound by the applied argument. By extension, we argue that the similar binding data in K'ichee' AF clauses is due to fact that they too involve an applicative head introducing an argument. This allows us to generate

[7] There is one way to achieve coreference between the subject and the possessor, namely, when the applied argument is the reflexive pronoun, *-bä* 'self'. The reflexive must be bound by the agent, and in turn binds the anaphoric possessor. If binding is limited to *v*Ps, we correctly predict that co-reference between the subject and the theme's possessor is possible in exactly those cases in which the binding relationship is mediated by an intervening element, as illustrated in (19).

(19) Tyi i-k'ux-be-Ø i-bä y-ok jiñi ts'i'.
PRFV ERG3-bite-APPL-ABS3 ERG3-SELF ERG3-leg DET dog
'The dog bit his own leg.'

the correct binding facts and leads to an important insight about the structure of AF clauses, which have few analogues cross-linguistically.

Recall that AF clauses are distinguished by containing two full arguments, but intransitive verbal morphology as below (repeated from (5a-5b)). As described in Aissen (1999), we may thus think of AF constructions as being morphologically intransitive, yet semantically transitive.

(20) AGENT FOCUS

a. Jas x-Ø-chap-ow le wah?
who CP-ABS3-eat-AF DET tortilla
'Who touched the tortilla?'

b. Jas x-Ø-chap-ow-ik
who CP-ABS3-touch-AF-ITV
'Who touched it?'

Prime evidence for the morphological intransitivity of AF clauses is the fact that the verb carries the intransitive status suffix *-ik*, as in (20b), which only appears with root and derived intransitives, as shown in (21) and (22b), respectively. For example, the transitive root *chap* 'touch' takes the transitive status suffix *-o* in (22a), but when it is passivized (22b), it takes the same status suffix as root intransitives like (21).[8]

(21) x-Ø-war-ik
CP-ABS3-sleep-ITV
'He slept.'

(22) a. x-Ø-u-chap-o
CP-ABS3-ERG3-touch-TV
'He touched it.

b. x-Ø-chaap-ik
CP-ABS3-touch.PASS-ITV
'He was touched.'

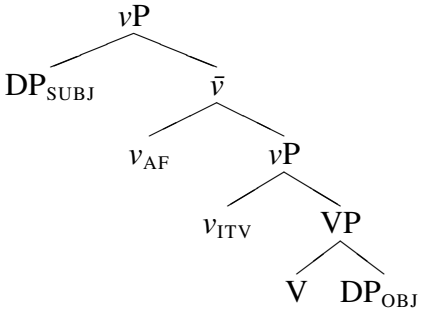
Crucially, the root *chap* takes the same intransitive status suffix with AF morphology as it does in the passive. Since all intransitives take *-ik*, and status suffixes can be analyzed as the realization of a little *v* head (see Coon 2010a,b), we take all intransitives, including AF clauses, to include an intransitive v_{ITV} shell. Since intransitive clauses license only one argument and therefore permit only absolutive agreement, we correctly predict that AF clauses should exhibit a single agreement morpheme.

What we need to understand now is how AF clauses allow two non-oblique arguments if the clause is built around an intransitive *v*. We propose that AF morphology has a crucial role to

[8] Historically, a CVC root transitive was passivized by the addition of the morpheme *-h-* to produce a CVhC syllable. The root passive is indicated by length in modern K'ichee' because of a sound change turning all CVhC syllables into CVVC syllables (Campbell 1977).

play here. Just as the *-be* applicative introduces a third argument in a ditransitive construction, we make the novel proposal that AF morphology is a *high applicative* in the terminology of Pylkkänen (1999, 2002), introducing the agent in its specifier and relating it to the event. The resulting structure is shown in (23).

(23) K'ICHEE' AGENT FOCUS

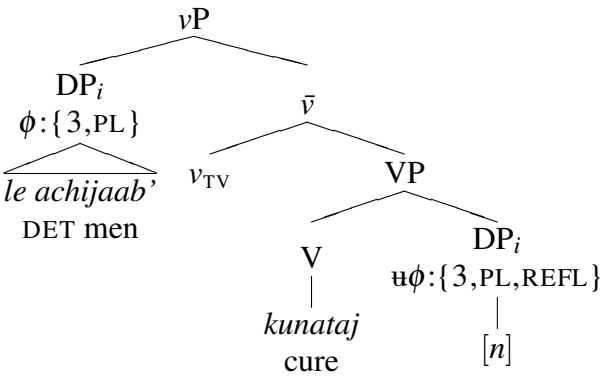


If the v_{AF} head is in charge of introducing the external argument and assigning it inherent AF case, then we correctly predict that AF clauses should exhibit intransitive verbal morphology, but permit two full semantic arguments.

Now consider the implications of this analysis for binding. In a normal transitive clause like (24), the subject sits in the specifier of a v_{TV}. Assuming as above that binding domains are defined by *v*P, the subject can thus bind a minimal pronoun in object position, shown in (**??**). Following Kratzer (2009), we assume that *v* heads introducing binders carry a reflexive feature, discussed below. The minimal pronoun comes to bear the features {3,PL,REFL} and will thus be spelled out as the third person plural reflexive clitic pronoun *kiib'*.

(24) Le achi-jaab' x-ki-kunata-j k-iib'
DET man-PL CP-ERG3P-cure-TV ERG3P-REFL
'The men cured themselves.'

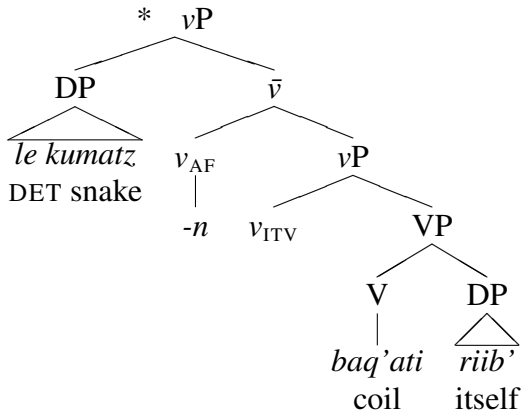
(25)



Now consider the ungrammatical case of an object reflexive in an AF clause. The agent is no longer introduced by the transitive v_{TV} head. Instead, it is an applied argument introduced by the higher v_{AF} head.

(26) *Aree jun kumatz u-b'aq'ati-**n**-aq r-iib'. (Mondloch 1981, p.233)
FOC one snake ERG3-roll-AF-PERF ERG3-SELF
'It was a snake that coiled itself (around the tree).'

(27)



With the syntax in (27), we correctly predict that binding should be blocked. Binding of the reflexive must take place within the minimal *v*P containing that reflexive, but in the AF clause, the minimal *v*P is v_{ITV}. This head, however, does not introduce the DP that would be required to antecede the object in (26). Instead the subject is introduced by the higher v_{AF} head, and is thus too far away to bind the object pronoun. In this situation we predict that all binding should be blocked—including in extended reflexives constructions like that in (8) above—which is the case.

4. Kratzer 2009

In the preceding section we presented an analysis of both Chol applicatives and K'ichee' AF constructions. By defining binding domains in terms of *v* heads, we correctly accounted for the binding facts discussed above, though only a sketch of the mechanism of binding and feature sharing was presented. In this section we spell out the details of this binding using the framework of Kratzer (2009) (which builds on ideas in Heim (1994); Kratzer (1998); von Stechow (2003)). The core difference from classical approaches is that binding is established through λ-operators associated with *v* heads. If we require binding to be established by a λ-operator associated with the closest *v* head, we replicate the correct predictions we saw above. First, it provides a straightforward analysis of binding in *-be* applicative clauses in Chol. By applying an argument, *-be* introduces another *v* head blocking binding from subject position. Turning to K'ichee', we saw that the AF construction also requires an additional *v* shell, but this time, to introduce the focused agent. This blocks the otherwise available binding relationship between subject and object, and shows the underlying similarity between the Chol and K'ichee' data: voice alternations that result in additional *v* structure alter binding relations.

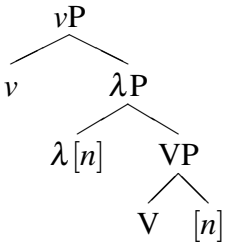
4.1. Minimal Pronouns and Binding

To illustrate the basic approach, we return to a Chol 3-3.POSS (*extended reflexive*) construction in (12) and (14) above. Traditional approaches to binding treat antecedent DPs as pronoun

binders. Through establishing the antecedent-pronoun binding relationship, the two come to be coreferential and must share features. On Kratzer's (2009) analysis, bound pronouns enter the derivation as indices impoverished of features. Variables accumulate features and achieve their surface forms by sharing features with other local DPs. Crucially, this feature-sharing only takes place under binding, which presents the second distinctive feature of Kratzer's minimal pronouns approach: all binding is done by *v* heads (Adger and Ramchand 2005; Reinhart and Reuland 1991, 1993). These *v* heads mediate feature sharing through Spec-Head agreement. We now spell out the approach in detail.

A bound pronoun enters the derivation as a bare index, which we represent with the numerical feature $[n]$. A binding *v* head will bear another instance of the feature $[n]$ and introduce a λ-operator at LF binding *n* as in (28).[9]

(28)



(29) a. $[\![V]\!]^g = \lambda x \lambda e.P(x)(e)$

b. $[\![[n]]\!]^g = g(n)$

c. $[\![VP]\!]^g = \lambda e.P(n)(e)$

d. $[\![\lambda P]\!]^g = \lambda x.[\![VP]\!]^{x/n} = \lambda x \lambda e.P(x)(e)$

Example (29) shows that a reflexive predicate is formed when a *v* head binds an object minimal pronoun, as expected. Normally a predicate of type $\langle e, \langle \varepsilon t \rangle \rangle$ would take a pronoun with index $[n]$ and yield a predicate of events. Since the variable is free, the entity satisfying the internal argument would be given by the assignment function, namely $g(n)$. The difference in (29) is that the *v* head introduces a λ-operator that rebinds the object variable. When this composes with the agentive *v* head, via predicate modification, we get the reflexive predicate in (30b).

(30) a. $[\![v]\!]^g = \lambda x \lambda e.\textbf{agent}(x)(e)$

b. $[\![vP]\!]^g = \lambda x \lambda e.P(x)(e) \wedge \textbf{agent}(x)(e)$

While λ-binding from *v* correctly generates the reflexive meaning for object bound pronouns we must add two more priniciples so that bound minimal pronouns can share features with the DP specifier of the binding *v* head. First we define the notion of ϕ-feature unification.

(31) **Definition: Unification** (Kratzer 2009, p.195)
Given feature sets $\phi_1, ..., \phi_n$ associated with expressions $a_1, ..., a_n$, define their unification

[9] To save space in trees, hereafter we do not show independent λ nodes, but annote the *v* head introducing the λ-operator as $v_{\lambda[n]}$

as $\bigcup\{\phi_1, ..., \phi_n\}$.

Unification permits the definition of Spec-Head feature agreement as in (32).

(32) **Definition: Spec-Head Agreement** (Kratzer 2009, p.196 ex.19)
When a DP occupies the specifier position of a head that carries a λ-operator, their ϕ-feature sets unify.

Given that a *v* head bearing a λ-binder will inherit the features of the DP in its specifier, we can define feature transmission under binding as in (33), which passes these features to the minimal pronoun.

(33) **Definition: Feature Transmission under Binding** (Kratzer 2009, p.195 ex.18)
The ϕ-feature set of a bound DP unifies with the ϕ-feature set of the verbal functional head that hosts its binder.

Although the *Minimal Pronouns* approach to binding was developed in particular to deal with bound indexicals, these same ideas also explain the behavior of binding in Chol *-be* applicatives and K'ichee' agent focus.

4.2. Chol

In the Chol *extended reflexive* in (12)–(14) above, the possessor of the theme originates as a minimal pronoun bearing the index feature $[n]$. Even though it is embedded within the theme argument and does not compose directly with the verb, it can be bound by a λ-binder introduced by the nearest *v* head. We translate the possessive head *poss* as in (34). It takes a predicate and the possessor and returns the unique individual that satisfies the predicate and stands in the contextually specified relation *R* with the possessor.[10]

(34) $[\![poss]\!]^g = \lambda P \lambda x \iota y.P(y) \wedge R(x)(y)$

Assuming the translation in (34), the interpretation of the VP is as in (35). Example (36) illustrates how the λ-binder introduced by *v* rebinds the possessor pronoun and introduces the external argument which will satisfy both the agent relation and the possessor relation, producing the extended reflexive meaning in (37).

(35) $[\![VP]\!]^g = \lambda e.buy'(\iota y.tortilla'(y) \wedge R([n])(y))(e)$

(36) $[\![\overline{v}]\!]^g = \lambda x \lambda e.buy'(\iota y.tortilla'(y) \wedge R(x)(y))(e)$

(37) $[\![vP]\!]^g = \lambda e.buy'(\iota y.tortilla'(y) \wedge R(maria)(y))(e) \wedge \mathbf{agent}(e)(maria)$

[10] We are not committed to this uniqueness analysis of the definiteness of possessed NPs. It is an approximation of convenience. What really matters for our purposes is the possessor does not satisfy the verbal predicate but the contextually given possessor relation.

After existential closure of the event argument, example (37) will be true just in case there is an event of buying the unique tortilla that stands in the *R* relation with Maria and Maria is the agent of that event.

Given that possessors in Chol 3-3.POSS clauses enter the derivation as minimal pronouns, we can account for the obligatory reflexive interpretation if *v* heads host λ-binders. We ensure that the possessor matches in features with its binding due to Spec-Head agreement and feature transmission under binding. Since the DP *ajMaria* sits in the specifer of a *v*-head hosting a λ binder, their feature sets unify. The minimal pronoun then inherits these features via feature transmission under binding as in (38).

(38)

ajMaria	$\leftrightarrow$	$v_{\lambda[n]}$	$\leftrightarrow$	$[n]$	
{3,SG}	Spec-Head Agr	{n}	ϕ-Transmission under binding	{n}	= {3,SG} $\cup$ {n}

Following the same logic, we correctly achieve the disjoint reference of the applicative constructions like the one illustrated in (18) above. Given that λ-binding takes place at the closest *v* head, only the applicative *v* head can host a λ-binder for the possessor pronoun. We therefore correctly predict that the applied argument must be bound and share features with the possessor.

4.3. K'ichee'

Turning now to K'ichee', we consider again the reflexive forms in (24) and (25) above. As before, the λ-operator forms the reflexive predicate in (39), which will compose with the subject to give the correct reflexive interpretation.

(39) $[\![\overline{v}]\!]^g = \lambda x \lambda e.cure(x)(e) \wedge \textbf{agent}(x)(e)$

As noted above, we assume that *v* heads introducing binders carry a reflexive feature. This makes sense since many languages morphologically mark reflexive predicates. For languages that have special reflexive pronouns, this feature will be transferred to the bound pronoun via feature unification, which will ensure that it is spelled out in the appropriate form. Example (40) gives the result of feature sharing under binding for the structure in (25) above.

(40)

le achijaab'	$\leftrightarrow$	$v_{\lambda[n]}$	$\leftrightarrow$	$[n]$	
{3,PL}	Spec-Head Agr	{n,REFL}	ϕ-Trans under binding	{n}	= {3,PL,REFL} $\cup$ {n}

The ungrammatical agent focus reflexive form in (27) above is correctly ruled out: the subject is introduced in a *v*P distinct from that containing the minimal pronoun, and binding is therefore impossible.

Finally, the analysis makes an important prediction that is borne out concerning the relationship between reflexive semantics and reflexive morphology. Notice that the two are slightly decoupled here. Namely, a *v* head hosting a λ-binder will bear a reflexive feature and transmit it to a minimal pronoun in binds. But a pronoun could also simply enter the derivation with a reflexive feature. In this case, binding would not be necessary for the realization of the reflexive pronoun and so we would predict that it should be able to appear in an AF clause. This is precisely what happens in the K'ichee' *urgent imperative*. Mondloch (1981) discusses examples like (41). The

verb bears imperative morphology, but the addition of the reflexive clitic pronoun *riib'* gives in the emphatic urgent interpretation.

(41) tij-ow r-iib' le a-wa
eat-AF ERG3-SELF DET ERG2S-food
'Eat your food quick!'

Crucially, the urgent imperative appears in the AF form. In precisely the case where semantic binding is not at issue we find that reflexive morphology can appear in AF clauses. Moreover, the reflexive can only appear in the third person singular form. This is predicted if third person singular features are unspecified. Since the pronoun can acquire no more features through binding, the pronoun will end up with the reflexive feature alone and be spelled out in the default third person reflexive form.

5. Conclusion

In this paper we began with two binding puzzles related to different voice constructions in the Mayan languages Chol and K'ichee'. In Chol we saw that an intervening *v* head (the applicative *-be*) introducing an applied object blocked binding from subject. In K'ichee' we saw that AF morphology also blocks object binding from subject. This lead us to propose a new analysis of AF clauses in which the external argument is introduced as a high applicative. By treating Chol *-be* clauses and K'ichee' AF clauses in this symmetric way (i.e., as low and high applicatives respectively), we were able to present a uniform analysis of their similar binding facts. Each type of applicative introduces a new *v* head. If binding domains are determined by locality within a *v* domain, the similar binding effects in Chol and K'ichee' make sense. We then implemented this idea in the *Minimal Pronouns* approach of Kratzer (2009), which ties binding to local λ-operators introduced by *v* heads, giving us the correct *v* head binding domains. Moreover, since this theory decouples the semantics of binding from its morphological reflex, it makes good predictions about those cases where semantic binding and bound pronoun morphology diverge, such as in the case of the K'ichee' urgent imperative.

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