Mayan animacy hierarchy effects and the dynamics of Agree[1]

Amy Rose Deal
ardeal@berkeley.edu

Justin Royer
justinroyer@berkeley.edu

October 21, 2023

Abstract

In many Mayan languages, combinations of subjects and objects are restricted by relative animacy hierarchy effects: objects must be at least as high as subjects in terms of animacy. Building empirically on a novel description of Chuj, as well as reported data for nine additional Mayan languages from across the family, we offer a new approach to these effects. Our analysis builds theoretically on recent work tracing person/animacy restrictions to the nature of featural representations and the operation Agree, bringing this literature together with current understandings of Mayan syntax and the high-/low-absolutive parameter. We argue that the cross-Mayan data—*relative* hierarchy effects holding *in the same way* across both high-absolutive and low-absolutive languages—is best handled by, and brings new support for, an interaction/satisfaction approach to Agree and hierarchy effects (Deal 2023). Our analysis also casts new light on key topics in Mayan syntax, including the proper analysis of ergativity and the nature of obviation effects (Aissen 1997).

[1]We are very grateful to our Chuj collaborators: Matin Pablo, Matal Torres, Petul Gómez, Xapin Torres, and Elsa Velasco. Many thanks to Judith Aissen, Jessica Coon, Carol Rose Little, Gilles Polian, Matt Tyler, Hugo Vázquez López, Tessa Scott, Michelle Yuan, Roberto Zavala, and the audiences of the Berkeley Syntax & Semantics Circle, the Seminario de Estudios de Lenguas Indígenas de México at CIESAS, WSCLA 2023, and WCCFL 2023 for their comments and feedback. Finally, we also thank the Banting Fellowships Program of the Social Sciences and Humanities Research Council of Canada for funding Royer's postdoctoral research.

1 Introduction

Many languages restrict combinations of arguments based on person or animacy hierarchies. Hierarchy effects in terms of animacy in particular have been broadly noted in Mayan languages, where subjects typically must be at least as high in animacy as objects (see e.g. Zavala 1992, 2007 on Akatek; Minkoff 2000, Pérez Vail 2014 on Cajolá Mam; Zavala 2007, Vázquez Álvarez 2011 on Ch'ol; Benito Pérez 2016 on Poqom; Pascual 2007 on Q'anjob'al; Curiel 2007 on Tojol-ab'al; Polian 2004, 2013 on Tseltal; Aissen 1997, 1999 on Tsotsil; Bohnemeyer 2009 on Yucatec). In Chuj, for instance, example (1a) with a human subject and an animal object is well-formed. The reverse situation, (1b) with an animal subject and a human object, is ungrammatical.[2]

(1) a. ✓ Ix-y-il nok' chan winh winak.
PFV-A3-see CLF snake CLF man
'The man saw the snake.' HUM > ANIM

b. * Ix-y-il winh winak nok' chan.
PFV-A3-see CLF man CLF snake
Intended: 'The snake saw the man.' ANIM > HUM

In this paper we propose an analysis of Mayan animacy hierarchy effects that connects these patterns to the broader phenomenon of person/animacy restrictions, as instantiated for instance in the person-case constraint (PCC) in ditransitives. Our work builds empirically on novel documentation of Chuj, an understudied language of the Q'anjob'alan sub-branch, as well as reported data for nine additional Mayan languages. It builds theoretically on much recent work that traces hierarchy effects to the nature of featural representations and the operation Agree (Béjar 2003, Nevins 2011, Coon and Keine 2021, Deal 2023, a.m.o.): in a grammatical context where one probe can access two goals, the grammatical sentences are those where the probe Agrees with both, whereas in ungrammatical sentences, given the features present on one or both arguments, Agree with both is not possible. As we will show, taking this type of approach to hierarchy effects in Mayan languages has theoretical consequences concerning the nature of Agree, bringing in particular new support for the interaction/satisfaction theory (Deal 2015, 2022, 2023). It also casts new light on the key topics in Mayan syntax, including the proper analysis of ergativity and the nature of obviation effects (Aissen 1997), i.e. constraints on coreference within and across clauses.

Two observations about the Mayan data are central to our account. The first is that the hierarchy effect of interest is inherently relative (a point emphasized by Aissen 1997). Across Mayan, it is not that subjects must be high in animacy, nor that objects must be low in animacy, but rather that an object *cannot be higher in animacy* than the subject of its clause. On the side of person restrictions in ditransitives, this type of pattern recalls the 'strictly descending' or 'ultrastrong' PCC, found for instance in Classical Arabic and for some speakers of Spanish and Catalan (Nevins 2007, Walkow 2012, 2013, Pancheva and Zubizarreta 2018). While the PCC data are well-known, competing theories derive slightly different generalizations about them. A standard Cyclic Agree account (e.g. Walkow 2013, building on Béjar 2003, Béjar and Rezac 2009) derives the generalization that one argument must be *higher* on the relevant hierarchy than the other: the indirect object must outrank the direct object on the person hierarchy $1 > 2 > 3$. Other recent work (Coon

[2]Here and throughout, we use the notation X>Y to indicate a combination of a subject of class X and an object of class Y.

and Keine 2021, Deal 2023) derives a different generalization: the indirect object must be *at least as high* as the direct object on the person hierarchy $1 > 2 > 3$. This difference is difficult to adjudicate in the person-based pattern found in Romance and Arabic ditransitives. Combinations of two second person arguments are independently ruled out by binding principles, and the nature of restrictions on 3rd person combinations remains contested.[3] A relative hierarchy pattern of the Mayan type, constructed in terms of animacy features, offers a clearer picture.[4] There is no reason (binding-theoretic or otherwise) that two nominals of the same animacy level cannot be co-arguments. Across Mayan, as we will see, examples with two equi-animate arguments are consistently well-formed (*ceteris paribus*, of course): the generalization is not that the subject must be *higher* than the object in animacy, but that it must be *at least as high*. This aspect of the data provides support for recent alternatives to the classic Cyclic Agree model, including the interaction/satisfaction theory (Deal 2023).

A second central observation allows for further comparisons to be made among these alternatives: the animacy hierarchy effect holds across a range of Mayan languages even though the clause structure of these languages is relatively diverse. In particular, as we will show, the hierarchy effect holds in exactly the same way in so-called 'high-absolutive' languages, including Chuj, and so-called 'low-absolutive' languages, including Tseltal. The split between these language types is proposed in much recent work to follow from the fact that objects move above subjects in high-absolutive languages but not in low-absolutive ones (see e.g., Coon, Mateo Pedro, and Preminger 2014, Coon, Baier, and Levin 2021, Royer 2022a, 2023, Tollan and Clemens 2022, Myers, Royer, and Coon to appear). The irrelevance of this movement for the animacy hierarchy effect suggests that the key ingredients to the hierarchy pattern arise relatively low in the structure, in a portion of clause structure that high- and low-absolutive Mayan languages share. This poses a challenge for theories that would require a relatively high probe in order to capture a Mayan-type subject/object hierarchy effect (Coon and Keine 2021, Foley and Toosarvandani 2022). By contrast, we show that the interaction/satisfaction theory as presented by Deal (2023) accounts straightforwardly for the Mayan data on the basis of independently proposed Agree relations holding at the vP level, and thus that these data provide new support for this theory of Agree and hierarchy effects.

Our analysis also casts light on several topics of special interest in the analysis of Mayan languages. The first is the nature of the ergative alignment found across the family, where one set of markers (Set A) indexes transitive subjects and possessors, whereas the other (Set B) indexes objects and intransitive subjects. Mayan Set A has been analyzed by Coon (2017, 2019) on an inherent-case type view, reflecting spec-head Agree between the transitive subject or possessor and v or n. We will show how our analysis, connecting with recent work by Clem and Deal (2023), opens up an alternative view according to which Mayan ergative is much conceptually closer to "dependent ergative" than previously thought. We propose that Mayan Set A vocabulary items are inserted whenever a probe ϕ-Agrees with a *second* goal. If this is right, our analysis predicts we should also find hierarchy effects in possessive constructions, holding between the possessor and the possessum. This prediction, as we will see, is borne out in Chuj.

The second is the nature of "obviation" effects. Influential work by Aissen (1997) has drawn

[3]See, for instance, Nevins (2007), Foley and Toosarvandani (2022) for morphological approaches to *3>3 restrictions, and Walkow (2012), Pancheva and Zubizarreta (2018) for syntactic approaches.

[4]The Mayan picture in fact turns out to offer a clearer picture of relative animacy hierarchy effects than the animacy-based pattern recently described in Sierra Zapotec (Foley and Toosarvandani 2022), owing to morphological factors that complicate the data in the latter case.

a theoretical connection between the animacy hierarchy pattern found in many Mayan languages and a set of restrictions on coreference that is very common not only in Mayan but in Mesoamerica more broadly (Roberto Zavala, p.c.). One of these restrictions is shown for Chuj in (2): no matter the position of R-expressions versus pronouns, the possessor of the subject can never be coreferent with the object. (Aissen 1997 calls this a 'genitive effect'; see also Craig 1977, Woolford 1991, Trechsel 1995 on this topic.)

(2) Genitive effect in Chuj

a. Ix-y-il waj Xun [$_S$ ix s-nun *pro*].
PFV-A3-see CLF Xun CLF A3-mother PRON
'His$_{1/*2}$ mother saw Xun$_2$.'

b. Ix-y-il *pro* [$_S$ ix s-nun waj Xun].
PFV-A3-see PRON CLF A3-mother CLF Xun
'Xun$_2$'s mother saw it$_1$/*him$_2$.'

Aissen connects this type of fact, along with animacy hierarchy effects, to the systems of obviation for which Algonquian languages are well-known. On her analysis, both animacy hierarchy effects and constraints on coreference of the kind in (2) reflect constraints on the mapping between syntactic structures and an independent level of analysis, the obviation tier. On our analysis, by contrast, hierarchy effects emerge from the nature of features and the workings of Agree, without appeal to a special level of analysis (a move that echoes recent work on obviation in Algonquian languages by Oxford 2019, to appear). Building on our central account of animacy hierarchies, we show how our Agree-based account can be augmented with a treatment of reference-related features to capture patterns like (2). A prediction of our approach is that animacy hierarchy effects and coreference restrictions of this kind should be typologically independent of one another, even though they happen to occur together in many Mayan languages. We present evidence that this prediction is correct from languages both within and beyond the Mayan family.

The paper is structured as follows. Sections 2-4 motivate, present, and situate our account in theoretical context. Section 2 is the empirical heart of the paper. We begin in 2.1 with a novel description of animacy hierarchy effects in Chuj, emphasizing the relative nature of the hierarchy effect as well as its limitation to active, transitive clauses (as compared to passives and agent-focus clauses). In section 2.2 we then contextualize these data in the broader landscape of animacy hierarchy effects in Mayan, noting that animacy hierarchy effects are found both in high-absolutive and low-absolutive Mayan languages. Section 3 presents our main theoretical proposals along with the key supporting assumptions we draw from previous research on Mayan syntax (in particular the high/low-absolutive distinction) and on the analysis of relative hierarchy effects (Deal 2023). We compare our theory to alternative analyses in section 4, arguing, as sketched above, that the interaction/satisfaction approach provides a superior account of *relative* hierarchy effects holding *in the same way* across both high-abs and low-abs Mayan languages.

Sections 5-8 extend the empirical reach of our view. In section 5, we consider variation across Mayan languages in terms of the articulation of the animacy scale along with the fact that in many Mayan languages, local person DPs do not participate in animacy hierarchy effects. Section 6 discusses why animacy hierarchy effects do not hold in passives or agent focus clauses in Chuj, and suggests that this might generally be the case across Mayan (some reported variation notwithstanding). Section 7 turns to the consequences of our analysis for Set A (ergative/possessive) agreement

morphology in Mayan. We discuss how our theory makes Set A relatively similar to dependent case as understood by Clem and Deal (2023): it occurs specifically when a probe Agrees with a second goal. We also take up the question of animacy hierarchy effects in the nominal domain, which turn out to behave as predicted by our account of Set A and animacy hierarchy effects in the verbal domain. In section 8, we discuss the status of "obviation" constraints on coreference in Mayan, in particular the genitive effect. Section 9 concludes.

2 Mayan animacy hierarchy effects

In this section we introduce the basic pattern of animacy hierarchy effects in Mayan, beginning with a close look at Chuj (San Mateo Ixtatán). These data show two central generalizations that we will seek to explain. First, animacy hierarchy effects are relative, rather than absolute: there is no ban on single elements of particular animacy in particular syntactic or thematic positions, but rather on *combinations* of arguments. Second, at the clausal level, animacy hierarchy effects hold only in syntactically transitive clauses, not in intransitives, even those that have two notional arguments (e.g. passives). We then broaden our investigation to a range of additional Mayan languages for which animacy hierarchy effects have been described, noting that the effect is found both in high-absolutive and in low-absolutive Mayan languages.

2.1 Animacy hierarchy effects in Chuj (San Mateo Ixtatán)

Chuj belongs to the Q'anjob'alan sub-branch of Mayan languages and is primarily spoken in Guatemala and Mexico, but also in diaspora communities across North America. It has approximately 70,000 to 80,000 speakers (Buenrostro 2013).[5] The data presented in this paper come from AUTHOR's in situ field research and online elicitiation with five speakers of the San Mateo Ixtatán dialect, using standard contextualized elicitation techniques for syntactic and semantic research (Matthewson 2004, Bowern 2008, Bochnak and Matthewson 2020).

Like other Mayan languages (England 2001, Coon 2016, Aissen, England, and Maldonado 2017), Chuj is a head marking, ergative-absolutive language, with verb-initial word order in discourse neutral contexts. The basic word order in the San Mateo Ixtatán dialect is VOS (Hopkins 1967; Maxwell 1982; Buenrostro 2013). Examples of basic intransitive and transitive sentences are provided below:

(3) a. Ix-y-il ix chichim ix Malin.
PFV-A3-see CLF elder.woman CLF Malin
'Malin saw the elder.'

b. Ix-way ix Malin.
PFV-sleep CLF Malin
'Malin slept.'

[5] For additional information about Chuj, including grammars, see Hopkins 1967, 2021, Maxwell 1982, García Pablo and Domingo Pascual 2007, Buenrostro 2013, and Royer, Mateo Pedro, Carolan, Coon, and Torres 2022. We note that San Mateo Ixtatán Chuj is one of two major dialects, the San Sebastián Coatán dialect being the other (Maxwell 1982; García Pablo and Domingo Pascual 2007).

Our glosses follow Mayanist tradition in using 'Set A'/'Set B' notation (see England 2001, Coon 2016, Aissen et al. 2017). Set A cross-references ergative arguments in the verbal domain and possessors in the nominal domain, whereas Set B tracks absolutive arguments. An example of Set A morphology in a possessive construction is provided in (4). In this case, the third person Set A morpheme *y-* cross-references the possessor *ix Malin* 'Malin'. Note that the Set A morphology appearing here is identical to that seen in (3a), where Set A tracks the external argument.

(4) winh **y**-unin **ix** **Malin**
CLF A3-child CLF Malin
'Malin's child'

Also important to note is that there is no overt instantiation of third person Set B morphology in Chuj, as is the case for many Mayan languages (Coon 2016). Glosses will thus not represent third person Set B morphology in cases where the absolutive is 3rd person, as for instance in (3b) above. An example with overt Set A and Set B morphology is provided in (22b).[6]

(5) Ix-**ach**-**w**-il-a'.
PFV-B2S-A1S-see-TV
'I saw you.'

Set A, however, is consistently overt in Chuj, as is also generally the case in Mayan languages. The paradigm of Set A and Set B marking in Chuj is given in (6).

(6) Chuj Set A and Set B morphemes (Royer 2022a, table 2.3)

	Set A (ergative/possessive)		**Set B** (absolutive)
	___C	___V	
1S	*(h)in-*	*w-*	*(h)in*
2S	*(h)a-*	*h-*	*(h)ach*
3S	*s-*	*y-*	Ø
1P	*ko-*	*k-*	*(h)onh*
2P	*(h)e-*	*hey-*	*(h)ex*
3P	*s-*	*y-*	Ø

With this background, we turn now to hierarchy effects. Combinations of third person arguments in Chuj active sentences are regulated by the following generalization:

(7) *Chuj animacy hierarchy effect*
Third person subjects must be at least as high as third person objects on the scale
HUMAN > ANIMATE > INANIMATE

A first example of the hierarchy effect was shown above in (1), repeated below as (8). In (8a), the object denotes a snake, lower on the animacy hierarchy than the referent of the subject, a man. Since the subject is at least as high in animacy as the object, the generalization in (7) is satisfied and the result is grammatical. In contrast, (8b), where the *nok' chan* 'the snake' is the subject and *winh winak* 'the man' is the object, is ungrammatical.

[6]The transitive status suffix, glossed "TV" in (22b), is absent in (3a). This is because status suffixes only arise at the edge of intonational phrases in Chuj (Royer 2022b). Allomorphy sensitive to intonational phrases is common in Mayan languages (Aissen 1992, Henderson 2012).

(8) a. ✓ Ix-y-il nok' chan winh winak.
PFV-A3-see CLF snake CLF man
'The man saw the snake.' HUM > ANIM

b. * Ix-y-il winh winak nok' chan.
PFV-A3-see CLF man CLF snake
Int. 'The snake saw the man.' ANIM > HUM

Evidence that these facts indeed reflect a relative hierarchy effect (rather than an absolute restriction on nominals of certain animacy properties in certain grammatical roles) comes from examples like (9), where the same nominal *nok' chan* 'the snake' is well-formed as a subject. The crucial difference here is that the object is no longer higher in animacy than the subject is.

(9) ✓ Ix-y-il nok' much nok' chan.
PFV-A3-see CLF bird CLF snake
'The snake saw the bird.' ANIM > ANIM

Similarly, there is no restriction on human objects *per se*; the problem arises only when the subject is lower in animacy than the object is.

(10) ✓ Ix-y-il ix chichim ix Malin .
PFV-A3-see CLF elder.woman CLF Malin
'Malin saw the elder.' HUM > HUM

An important detail of the hierarchy effect in Chuj, shared across many Mayan languages, is that the generalization in (7) only applies to *third* persons, and not first and second persons, which of course also happen to denote humans. As shown in (11a), *nok' chan* 'the snake' can be the subject of a transitive clause with a local person pronominal object. A third person pronominal object is also possible as well, as (11b) confirms, but cannot denote a human, in keeping with (7).

(11) a. ✓ Ix-{**in/ach/onh/ex**}-y-il *pro* nok' chan.
PFV-B1S/B2S/B1P/B2P-A3-see CLF snake
'The snake saw me/you/us/y'all.' ANIM > LOCAL

b. ✓ Ix-y-il nok'$_{obj}$ [nok' chan]$_{subj}$.
PFV-A3-see CLF CLF snake
'The snake saw it.' ANIM > ANIM

We now exemplify the remaining portions of the three-way animacy paradigm, contrasting human, animate, and inanimate. The verb *-il* 'see' is used throughout. Above, we have seen human subjects with human (10) and animate (8a) objects. Example (12) confirms that human subjects are also possible with inanimate objects.

(12) ✓ Ix-y-il k'en kamera waj Xun.
PFV-A3-see CLF camera CLF Xun
'Xun saw the camera.' HUM > INAN

We have seen that merely animate subjects are impossible with human objects, (8b); example (13) confirms that inanimate subjects, too, are impossible with human objects.[7] (As indicated in the translation of this and following examples with *k'en kamera* 'the camera' as the agent, *-il* can express the meaning of 'to film' as well as 'to see'.[8])

(13) * Ix-y-il waj Xun k'en kamera.
PFV-A3-see CLF Xun CLF camera
Int. 'The camera saw/filmed Xun.' INAN > HUM

Turning to merely animate subjects (i.e. those denoting non-human animals), which we saw in (8b) were ungrammatical with human objects, we see in the examples below that they are grammatical with similarly animate objects, (14a) (see also (9) above), and with inanimate objects, (14b).

(14) a. ✓ Ix-y-il nok' much nok' chab'in.
PFV-A3-see CLF bird CLF monkey
'The monkey saw the bird.' ANIM > ANIM

b. ✓ Ix-y-il k'en kamera nok' chab'in.
PFV-A3-see CLF camera CLF monkey
'The monkey saw the camera.' ANIM > INAN

Animates are ungrammatical as objects with inanimate subjects, however:

(15) * Ix-y-il nok' chab'in k'en kamera.
PFV-A3-see CLF monkey CLF camera
Int. 'The camera saw/filmed the monkey.' INAN > ANIM

Last, we come to inanimates. We have seen that inanimate subjects are ungrammatical with human objects, (13), and with animate objects, (15). Inanimate subjects are grammatical with inanimate objects, however:

(16) ✓ Ix-y-il elkal chi' k'en kamera.
PFV-A3-see robbery DEIC CLF camera
'The camera saw/filmed the robbery.' INAN > INAN

The table in (17) summarizes these data.

[7] The negative judgments in (13) and (15) were offered given the following contexts: (13) – *Xun stole some food and a camera saw him*; (15) – *A monkey stole some food and a camera saw it*. Chuj collaborators indicated that the sentences in (13)/(15) were unacceptable in these respective contexts.

[8] Another form that can be used to convey 'to film' is the partially borrowed verb *ak' filmar*. As expected, animacy hierarchy effects persist in such constructions:

(i) Context: Xun stole some food and a camera saw him.

* Ix-y-ak' filmar waj Xun k'en kamera.
PFV-A3-do film CLF Xun CLF camera
Intended: 'The camera filmed Xun.' INAN > HUM

(17) Animacy hierarchy effects for combinations of third person arguments in Chuj

SUBJ	OBJ		SUBJ	OBJ		SUBJ	OBJ	
HUM	HUM	✓ (10)	ANIM	HUM	✗ (8b)	INAN	HUM	✗ (13)
HUM	ANIM	✓ (8a)	ANIM	ANIM	✓ (9)	INAN	ANIM	✗ (15)
HUM	INAN	✓ (12)	ANIM	INAN	✓ (14b)	INAN	INAN	✓ (16)

How can the intended but unacceptable combinations of arguments in (17) be expressed in Chuj? Two main types of "repair" strategies have been discussed in the literature on Mayan languages (Aissen 1997, 1999; Zavala 2007, 2017), both of which involve detransitivitization. (We return in section 6 to the nature of this "repair".) The first is passive, shown for Chuj in (18); this is the strategy our consultants prefer. In the Chuj passive, the agent is demoted to an oblique position and passive morphology, either *-j* or *-chaj*, appears on the verb stem. Set A (ergative) morphology is absent, and intransitive morphology appears on the verb. (No overt Set B morphology is expected on the verb for the examples in (18), since, as noted above, third person Set B morphology is never overt.)

(18) Passive as "repair"

a. Ix-il-**j**-i winh winak [$_{\text{OBL}}$ yuj nok' chan].
PFV-see-PASS-IV CLF man by CLF snake
'The snake saw the man.' cf. (8b)
Lit: 'The man was seen by the snake.'

b. Ix-il-**j**-i waj Xun [$_{\text{OBL}}$ y-uj k'en kamera].
PFV-see-PASS-IV CLF Xun A3-by CLF camera
'The camera saw Xun.' cf. (13)
Lit: 'Xun was seen by the camera.'

c. Ix-il-**j**-i nok' chab'in [$_{\text{OBL}}$ y-uj k'en kamera].
PFV-see-PASS-IV CLF monkey A3-by CLF camera
'The camera saw the monkey.' cf. (15)
Lit: 'The monkey was seen by the camera.'

The second alternative strategy is the agent focus construction, broadly studied both internal to Mayan linguistics (Dayley 1981, Aissen 1999, 2017, i.a.) and as it relates to broader theoretical questions concerning agreement and syntactic ergativity (Stiebels 2006, Coon et al. 2014, Preminger 2014, Assmann, Georgi, Heck, Müller, and Weisser 2015, Erlewine 2016, Coon et al. 2021, Tollan and Clemens 2022, a.m.o.). In agent focus clauses, the agent appears pre-verbally in focus position, and agent focus morphology (*-an*) appears on the verb. Like the passive, these sentences are intransitive, lacking Set A (ergative) morphology.[9]

[9]The "status suffix" *-i* in Chuj, present in (18), is used exclusively with formally intransitive verbs (Hopkins 1967; Buenrostro 2013). As noted above in fn 6, status suffixes disappear in certain phonological environments (Royer 2022b). This is the case in the examples in (19). It is, however, possible to see *-i* overtly in agent focus clauses when prosodic conditions are met:

(19) Agent focus as "repair"

a. [$_{FOC}$ Ha nok' chan] ix-il-**an** winh winak.
FOC CLF snake PFV-see-AF CLF man
'The snake saw the man.' cf. (8b)
Lit:'It's the snake that saw the man.'

b. [$_{FOC}$ Ha k'en kamera] ix-il-**an** waj Xun.
FOC CLF camera PFV-see-AF CLF Xun
'The camera saw Xun.' cf. (13)
Lit: 'It's the camera that saw Xun.'

c. [$_{FOC}$ Ha k'en kamera] ix-il-**an** nok' chab'in.
FOC CLF camera PFV-see-AF CLF monkey
'The camera saw the monkey.' cf. (15)
Lit: 'It's the camera that saw the monkey.'

Like other focus constructions (see e.g., Aissen 2023), and like agent focus in general in Mayan, the Chuj agent focus construction triggers a presupposition, viz. that the information that is not in focus is already given or taken for granted. For example, (19a) presupposes that someone saw a man. We hypothesize that in Chuj this probably plays a role in speakers' choice between a passive or agent focus construction as a "repair" for animacy hierarchy effects.

To summarize, we have seen in this section that Chuj actives show a three-way relative animacy hierarchy effect among 3rd person arguments. This type of data is common across the Mayan family, as we will now show.

2.2 Mayan animacy hierarchy effects beyond Chuj

The large body of work on animacy hierarchy effects within the Mayan language family includes Zavala 1992, 2007 on Akatek; Zavala 2007 and Vázquez Álvarez 2011 on Ch'ol; Minkoff 2000 and Pérez Vail 2014 on Mam; Benito Pérez 2016 on Poqom; Pascual 2007 on Q'anjob'al, Polian 2004, 2013 on Tseltal; Aissen 1997, 1999 on Tsotsil; Curiel 2007 on Tojol-ab'al; Bohnemeyer 2009 on Yucatec Maya.[10] This sample of languages (indicated in bold below) represents nearly every major branch of the Mayan family tree, confirming the widespread distribution of animacy hierarchy effects in Mayan.

(i) Ha nok' chan ix-onh-il-an-**i**.
FOV CLF snake PFV-B1P-see-AF-IV
'It's the snake that saw us.'

[10] Zavala (1994, 2007, 2017) further shows person hierarchy effects in Huasteco, but animacy does not play a role in this system.

(20) The Mayan family tree (Royer 2022a, table 2.1, based on Kaufman 1974, Law 2014)

	Primary branch	Secondary Branch	Languages
PROTO MAYAN	Huastecan		Chicomuceltec (Kabil) Huastec (Teenek)
	Yukatekan		Itzaj (Itza'), Lacandon (Lakantun), Mopan, **Yucatec (Maya)**
	Western	Ch'olan-Tseltalan	**Ch'ol**, Ch'olti', Chontal (Yokot'an), Ch'orti', **Tseltal**, **Tsotsil**
		Q'anjob'alan	**Chuj**, **Akatek**, Mocho' Popti', **Q'anjob'al**, **Tojol-ab'al**
	Eastern	K'ichean	Achi, Kaqchikel, K'iche' **Poqom (Poqomam)**, Poqomchi', Q'eqchi' Sakapultek, Sipakapense Tz'utujil, Uspantek
		Mamean	Awakatek, Chalchitek Ixil, **Mam**, Tektitek (Teko)

Consistently noted across this literature are the following points, already exemplified with Chuj data above. First, the animacy hierarchy effect is relative rather than absolute. This point is emphasized in seminal work by Aissen, focusing on Tsotsil: "What is critical is not the absolute status of any argument with respect to grammatical function or animacy, but rather its status relative to other coarguments" (1997: 726). This can be seen in the contrast between well-formed (21a,b), where the arguments are equal in animacy (both inanimate or both human), as compared to ungrammatical (21c), where the object outranks the subject in animacy.[11]

(21) Tsotsil

a. I-s-mil Xun li Petul-e.
CP-A3-kill Juan the Pedro-ENC
'Pedro killed Juan.' (Aissen 1997: 724)

b. Li pok'-e lek ta s-mak li ventana-e.
the cloth-ENC well ICP A3-cover the window-ENC
'The cloth covers the window well.' (Aissen 1997: 726)

c. * Li pok'-e, lek ta s-mak li anima-e.
the cloth-ENC well ICP A3-cover the deceased-ENC

[11] Aissen (1999) notes a range of additional factors that can also play a role in the well-formedness of active transitives in Tsotsil, relating to discourse salience, (in)definiteness, and (non)individuation. The relative definiteness status of the subject with respect to the object has been claimed to play a role in the acceptability of active sentences in Chuj as well (Buenrostro 2013: 215-216). We concentrate only on animacy hierarchy effects here, though note that our theory does not rule out the relevance of other factors of this type.

Intended: 'The cloth covers the deceased well.' (Aissen 1997: 725)

Similar data is provided by Zavala (2007) for Ch'ol, Pérez Vail (2014) for Cajolá Mam, and Benito Pérez (2016: 228-230) for Poqom.

Second, the animacy hierarchy effect holds in active sentences. As noted above, the consistent relevance of animacy hierarchy effects for active clauses across Mayan is particularly notable in view of other kinds of syntactic diversity in the syntax of actives across the family. In particular, Mayan languages included in our sample fall on both sides of a deep syntactic parameter thought to be responsible for a constellation of points of variation in active morphosyntax, including the position of absolutive morphemes and whether or not ergative arguments are permitted to undergo A'-extraction (see e.g., Tada 1993, Coon et al. 2014, 2021, Aissen 2017, Royer 2022a, 2023, Tollan and Clemens 2022, Myers et al. to appear).[12] This is the split between *high-absolutive* (high-abs) versus *low-absolutive* (low-abs). In terms of the position of absolutive morphemes, in high-abs languages such as Chuj, Set B (absolutive) morphemes appear suffixed to tense/aspect morphology, (22).

(22) "High-absolutive" in Chuj

a. TAM – Set B (ABS) – Set A (ERG) – ROOT – (VOICE) – (SS)

b. Ix-**ach**-**w**-il-a'.
PFV-B2S-A1S-see-TV
'I saw you.'

We saw animacy hierarchy effects in the active sentences of high-abs Chuj in the previous section. Additional high-absolutive languages showing animacy hierarchy effects in actives are Akatek, Mam, Poqom, and Q'anjob'al.

In a low-abs Mayan language, such as Tseltal, Set B is suffixed to transitive verbs, (23).

(23) "Low-absolutive" in Tseltal

a. TAM – Set A (ERG) – ROOT – (VOICE) – (SS) – Set B (ABS)

b. La **jk**-il-**at**.
CMP A1-see-B2
'I saw you.' (Polian 2013: 143)

Animacy hierarchy effects in low-abs languages are reported at least for Tseltal, Ch'ol, and Tojolab'al. The following examples from Tseltal show again that the effect is relative: an animal object is possible with a human subject, (24a), but not with an inanimate subject, (24b).

(24) Animacy hierarchy effects in low-abs Tseltal

a. La s-mil te ts'i' te kerem=e
CMP A3-kill DET dog DET boy=DET
'The boy killed the dog.' (Polian 2004: 225) HUM > ANIM

[12] Other correlates include the availability of absolutive morphemes in non-finite clauses and the inversion of binding relations (object binds into the subject). See Aissen 2017 and Myers et al. to appear for recent overviews.

b. * La s-net' te ts'i' te te'=e
CMP A3-crush DET dog DET tree=DET
Intended: 'The tree crushed the dog' (Polian 2004: 223) INAN > ANIM

In the next section we provide an account of animacy hierarchy effects which captures the persistence of these effects across both high-abs and low-abs Mayan varieties. We return to the broader Mayan picture and some points of variation relevant to hierarchy effects in section 5.

3 Deriving the hierarchy effect

Our analysis in this section draws on much recent work in treating hierarchy effects as a result of Agree (see Anagnostopoulou 2003, 2005, Béjar 2003, Béjar and Rezac 2003, Nevins 2007, 2011, Adger and Harbour 2007, Walkow 2012, Pancheva and Zubizarreta 2018, Oxford 2019, to appear, Preminger 2019, Hammerly 2020, Stegovec 2020, Coon and Keine 2021, Coon et al. 2021, Foley and Toosarvandani 2022, Clem 2022, Clem and Deal 2023, Deal 2023, a.o.). In particular, our analysis builds closely on the analysis of the Person Case Constraint in Deal 2023, framed in the interaction/satisfaction model of Agree (Deal 2015 *et seq.*). We begin in section 3.1 with background assumptions about the syntax of Mayan active transitive clauses and the high-/low-abs distinction; this leads us to identify v as a probe that Agrees with two arguments across the Mayan family. We then review the interaction/satisfaction view of relative hierarchy effects outlined in Deal 2023 in §3.2. Analytical and theoretical tools assembled, in section 3.3 we present our central account of Mayan animacy hierarchy effects.

3.1 The syntax of transitives in Mayan

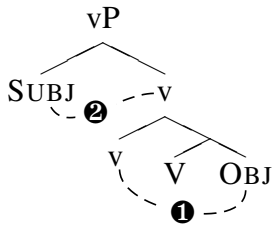
Central to most Agree-based accounts of hierarchy effects is the claim that such effects arise in configurations where one probe Agrees with multiple goals. To see how this setup arises in Mayan, let us first consider the basic syntax of actives across the family.

In common to Mayan languages is an ergative alignment. We assume following Coon et al. (2014), Coon (2017), and Coon et al. (2021) that, across Mayan, Set A (ERG) reflects Agree between v and the subject. (We return to this in section 7.) In section 2 we observed animacy hierarchy effects across both high-abs and low-abs Mayan languages. Recall that low-abs languages are those where Set B attaches to the transitive verb, (25). Following Coon et al. (2014) and Coon et al. (2021), we assume that Set B morphology in a language of this type reflects a probe on v, explaining its surface position low in the clause.

(25) Low-absolutive (e.g. Tseltal)
TAM – Set A (ERG) – ROOT – (VOICE) – (SS) – $\boxed{\text{Set B (ABS)}}$

The vP structure for a low-abs language can thus be schematized as in (26). The v probe Agrees both with the object (giving rise to a Set B morpheme) and with the subject (giving rise to a Set A morpheme). Following other work on Cyclic Agree (Rezac 2003, Béjar 2003, Béjar and Rezac 2009), we take the probe to Agree with the object first, reproject, and then Agree with the subject. This type of one-probe-two-goals structure, where v Agrees with the object before the subject, will prove central to our account of hierarchy effects.

(26) Low-absolutive vP syntax



(27) The role of v in a low-absolutive language:

a. Agrees with both the object (first) and the subject (second)

b. Assigns ABS to the object

c. Assigns ERG to the subject

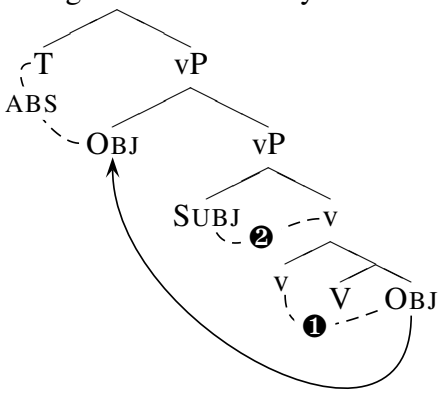
For high-abs languages, recall that Set B (absolutive) morphemes attach to tense/aspect morphology, (28). Again following Coon et al. (2014) and Coon et al. (2021), we assume that Set B morphology in a language of this type reflects a probe on T, thus explaining its high surface position.

(28) High-absolutive (e.g. Chuj)

TAM – $\boxed{\text{Set B (ABS)}}$ – Set A (ERG) – ROOT – (VOICE) – SS

High-abs languages may seem different from their low-abs counterpart in terms of whether v Agrees with the object. We suggest that this appearance is illusory. In order to Agree with T, objects in high-abs languages move past the subject (Coon et al. 2014). What drives this movement? Following Coon et al. (2021), we take the culprit again to be a probe on v.[13] This probe Agrees with the object and moves it to Spec,vP. This is the position from which Agree with T is possible, as shown in (29). This means that the first step of Agree for low-absolutive languages, ❶ in (26), remains present in high-absolutive languages, (29). The derivation once again involves multi-goal Agree for a probe on v, central to our account of hierarchy effects.

(29) High-absolutive vP syntax



[13] Coon et al. (2021) state that object movement is "driven by an [EPP] feature". We understand the EPP property as a second-order feature that may be attached to a ϕ-dependency: v does not move just anything to its specifier, but only the closest ϕ-bearing element (the object). For this reason, we take the postulation of an [EPP] feature to indicate the postulation of a probe on v.

(30) The role of *v* in a high-absolutive language:

a. Agrees with both the object (first) and the subject (second)

b. Attracts the object to its specifier

c. Assigns ERG to the subject

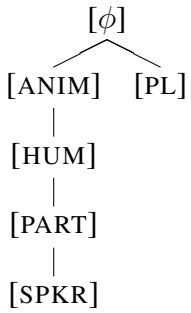
High-abs and low-abs Mayan languages are therefore different at the vP level not in terms of whether v Agrees with both arguments, but rather in terms of the precise morphosyntactic consequences of its Agree relation with the object. In low-abs languages, Agree between v and the object generates a Set B marker. Coon (2017) argues that this involves clitic-doubling, generally understood as a type of movement. In high-abs languages, Agree between v and the object leads the object to undergo standard phrasal movement to Spec,vP.

3.2 Relative hierarchy effects in an interaction/satisfaction theory

We now sketch the basic theoretical ingredients to our account, concerning features found on probes and goals.

The first ingredient concerns animacy features. We assume following much previous work that features are organized into geometries, which reflect entailment relationships (Harley and Ritter 2002, Béjar 2003, a.m.o.). The core feature geometry we assume is shown in (31) (see also Oxford 2019, Toosarvandani 2023 for discussion).[14] Basic featural representations of local persons as well as the three different animacy grades of 3rd persons are shown at right.

(31) A feature geometry for ϕ



3.INAN.SG = [ϕ]
3.ANIM.SG = [ϕ, ANIM]
3.HUM.SG = [ϕ, ANIM, HUM]
2SG = [ϕ, PART, ANIM, HUM]
1SG = [ϕ, PART, SPKR, ANIM, HUM]
...

Focusing on 3rd persons, key to this set of representations is the inclusion relation between the feature sets of inanimate, animate, and human DPs. Human 3rd persons have the most features; mere animates have a proper subset; inanimates have a proper subset of what animates have.

Turning to probes, we assume an interaction/satisfaction theory, according to which probes are relativized in two separate ways: for what they copy (interaction), and for the condition that makes them halt (satisfaction) (Deal 2015, 2022, 2023; see also Baier 2018, Clem 2019, 2022, 2023, Halpert 2019, Roversi 2020, Oxford to appear, Branan and Erlewine 2022, Mikkelsen 2023, Scott 2023, Clem and Deal 2023 for various applications and implementations). Deal (2022, 2023) provides probe specifications in the format of [INT:α, SAT:β]: such a probe copies the feature α

[14] While feature hierarchies are generally assumed to be universal (Harley and Ritter 2002), it is important to note that cross-linguistic variation can be captured by varying whether a feature is *active* for a given language. That is, not all features have to be active within the same language, explaining why animacy is not a necessarily an active grammatical category in all languages (see also Toosarvandani 2023). We return to this point in section 5.

and everything dominated by it in a feature geometry, halting only when it encounters a goal with feature β. While we make use of this notation here, we understand interaction specifications in a slightly (though importantly) different way: we assume that a probe specified [INT:α, SAT:β] copies *all* features from a goal bearing α. Thus a probe specified [INT:ANIM] copies all features, including number, from a goal bearing the feature [ANIM]. (See notes 16, 18 for further discussion.) Following previous work, as a special case of a satisfaction condition, a probe can be insatiable; a probe of this type will search its entire domain (see Clem 2019, Deal 2023, Clem and Deal 2023). We indicate insatiable probes as [SAT:-] (i.e., no satisfaction condition).

The central piece of Deal's (2023) analysis of relative hierarchy effects is the idea that probe specifications can change over the course of a derivation. In particular, certain goals interact with the probe *dynamically*: their features are not just copied to the probe (as interaction features generally are), but also copied *into the interaction specification of the probe*. Deal (2023), Clem (2022), and Clem and Deal (2023) apply this idea to the analysis of $1 > 2 > 3$ relative person hierarchies in various languages. Consider for instance the 'strictly descending'/'ultrastrong' PCC pattern discussed by Deal (2023), partially exemplified in (33) for Kabyle Berber.

(32) Strictly descending PCC
IO must be at least as high as DO on the hierarchy $1 > 2 > 3$

(33) Kabyle Berber (Baier 2020)

a. ye-sken =iyi =k
3SG.M-show =1SG.DAT =2SG.M.ACC
He showed you to me. 1 IO > 2 DO

b. * ye-sken =ak =iyi
3SG.M-show =2SG.M.DAT =1SG.ACC
Intended: he showed me to you. 2 IO > 1 DO

c. * ye-wwi =yas =kem
3SG.M-bring =3SG.M.DAT =2SG.F.ACC
Intended: he brought you to him. 3 IO > 2 DO

The crucially relative part of this hierarchy effect concerns second persons: they may serve as DO with a 1st person IO, (33a), but not with a 3rd person IO, (33c).[15] Deal (2023) captures this pattern on the assumption, reflected in the feature geometry in (31), that local persons bear a feature, [PART], which 3rd persons do not. The strictly descending PCC arises when [PART] interacts dynamically. Across the examples in (33a), a probe Agrees with the DO before it can Agree with the IO. Any type of DO is suitable for Agreement; the probe begins with interaction specification [INT:ϕ]. When the DO bears [PART], as in (33a,c), this specification on the probe changes to [INT:PART]. The result is that IO can Agree only if it itself is 1st or 2nd person.[16] When the IO is 1st person, this condition is met, and both objects successfully Agree, yielding (33a).

[15]This is together with a nonrelative effect concerning 1st person: in ditransitives regulated by a Strictly Descending PCC effect, 1st person can't be DO, explaining the ungrammaticality of (33b). As discussed by Deal (2023), this may be because the relevant probe bears [SAT:SPKR], or (in the terms discussed just below) because the feature [SPKR] interacts dynamically.

[16]The details of how Agree works with the IO depend on the precise way that interaction is understood. On the treatment in Deal 2022, 2023, a probe bearing [INT:PART] copies only the feature [PART] and features dominated by it in a feature geometry. It does not, for instance, copy number features. This is not obviously a problem for the Kabyle

When the IO is 3rd person, this condition is not met. The IO cannot Agree. This means that the object clitic for the IO cannot be generated and the structure shown in (33c) cannot be produced.

The overall effect of dynamic interaction in this example is to ensure that certain features found on the first goal are also found on the second goal. Note that this general pattern will derive a hierarchy effect in which arguments that are featurally equal are both able to Agree. It will only be in cases where the first goal has features than the second goal *lacks* where the relative hierarchy effect will crop up. Of course, in the realm of person, this type of prediction is difficult to test; a ditransitive where both arguments are second person is expected to trigger a Condition B violation. In the realm of animacy hierarchy effects, on the other hand, things are more clear. To capture this type of pattern, we will extend the proposal of dynamic interaction into the animacy-featural domain.

3.3 Capturing animacy hierarchy effects in Mayan actives

We are now in a position to understand why it is that examples that violate the animacy hierarchy, such as Chuj (34), are ungrammatical: the grammar has no way to generate them. Note that these examples have Set A (ergative) morphology, discussed above as a reflex of Agree between v and the subject. (Recall that in Chuj, like in other Mayan languages, Set A morphology is always overt.) We will show that in this type of sentence, where the object is higher on the animacy hierarchy than the subject, Agree between v and the object bleeds any further Agree relation between v and the subject. This prevents the generation of Set A morphology and therefore makes the examples in (34) impossible to derive.

(34) Some animacy hierarchy violations in Chuj

a. * Ix-y-il winh winak nok' chan.
PFV-A3-see CLF man CLF snake
Int. 'The snake saw the man.' ANIM > HUM

b. * Ix-y-il nok' chab'in k'en kamera.
PFV-A3-see CLF monkey CLF camera
Int. 'The camera saw/filmed the monkey.' INAN > ANIM

Recall that Chuj shows the three-way hierarchy in (35), repeated from (7).

(35) Third person subjects must be at least as high as third person objects on the scale
HUMAN > ANIMATE > INANIMATE

To account for this pattern, we propose that human and animate third person DPs bear dynamic features in this language. Specifically, we suggest that they exhibit the ϕ-sets in (36), where (fol-

Berber data, on the assumption that the object markers in this language are clitics adjoined to the Agreeing head, rather than realizations directly of the ϕ-features on this head. Thus we might maintain that the probe indeed only copies [PART] and possibly [SPKR] back to itself from the IO, but that this small amount of ϕ-Agree is still enough to trigger clitic-doubling. Assuming clitic-doubling is a type of movement, we would simply posit that the moved element contains number features, even if the movement of that element was not triggered by number directly. We will see that a similar analytical move is less attractive for Mayan, given that the second goal of Agree does not clitic-double. See note 18.

lowing Deal 2023) dynamically interacting features are marked with ↑.[17] (We will return to the status of local persons and the question of whether they also bear dynamic features in section 5.2.)

(36) ϕ-set of third person human and animate DPs in Chuj

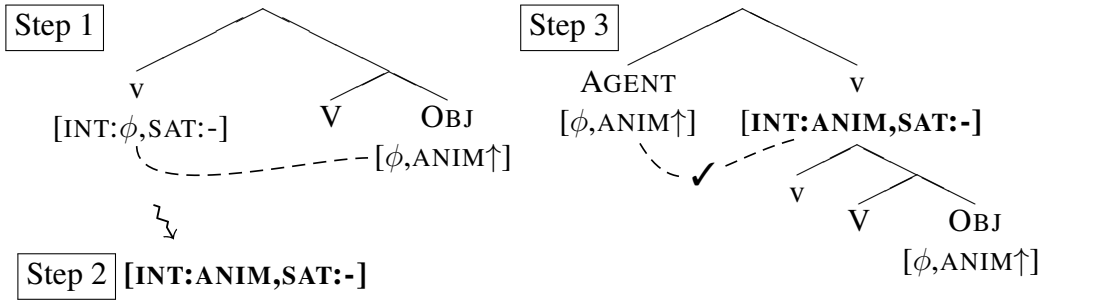
a. 3.ANIM = [ϕ, ANIM↑]

b. 3.HUM = [ϕ, ANIM↑, HUM↑]

Consider now the grammatical Chuj sentence in (37a), repeated from (9) above, along with the proposed derivation for the minimal vP in (37b). (We abstract away from movement of the object to Spec,vP.) This sentence conforms with the generalization in (35), as its subject and object have identical animacy features. Since v Agrees with both the object and subject, as discussed in 3.1, we propose that the probe on v is insatiable, and that it is initially specified to interact with any ϕ-bearing DP: [INT:ϕ, SAT:-].

(37) Chuj ANIM>ANIM active sentence

a. ✓ Ix-y-il nok' much nok' chan.
PFV-A3-see CLF bird CLF snake
'The snake saw the bird.' ANIM>ANIM

b. 

In derivation (37b), v Agrees first with the object (Step 1). Because the object bears [ANIM↑], a dynamic feature, the interaction specification on the probe is changed as a result of Agree. The new interaction specification is [INT:ANIM] (Step 2). Finally, v successfully Agrees with the subject, because the subject also bears an [ANIM] feature (Step 3). Following our treatment of high-abs syntax above (since Chuj is a high-abs language), we assume that v's Agree with the object drives object movement to the vP edge, and that v's Agree with the subject builds a Set A morpheme.[18] The example in (37a) is generated and thus correctly predicted to be grammatical.

Compare the above derivation with one containing an animacy hierarchy violation, e.g. (38a), repeated from (15). This sentence violates generalization (35), since the object (animate) outranks the subject (inanimate).

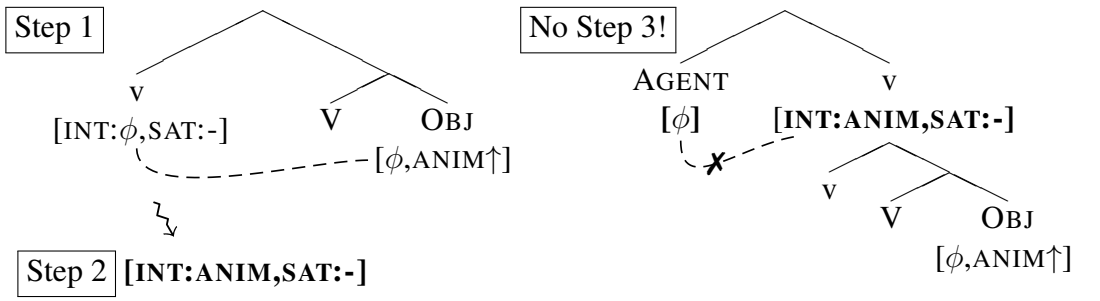
[17] Note that since ϕ is at the very top of the feature geometry in (31), whether or not it interacts dynamically has no empirical consequence.

[18] Here it becomes crucial how an [INT:ANIM] specification should be understood. We have proposed that a probe with this specification copies all features, *including number*, from any goal that bears [ANIM]. This delivers the right results: Set A morphemes index both person and number. On the assumption that Set A morphemes are not clitics (Coon 2017), this pattern would be surprising on the understanding of interaction in Deal 2022, 2023: we would expect only [ANIM] (and features dominated by it in the geometry) to be copied to the probe.

(38) Chuj INAN>ANIM active sentence

a. * Ix-y-il nok' chab'in k'en kamera.
PFV-A3-see CLF monkey CLF camera
Int. 'The camera saw/filmed the monkey.' INAN > ANIM

b.



The first two steps of the derivation here proceed as in (37b). In step 1, v Agrees with the object, which bears the dynamic feature [ANIM↑]. This alters the interaction specification of the probe to [INT:ANIM] (Step 2), eliminating the probe's ability to interact with non-[ANIM]-bearing goals. This has a crucial consequence in this case, where the subject is inanimate: Agree between the probe and the subject is impossible (i.e. there can be no Step 3). This means that the part of the derivation of (37b) that was responsible for producing Set A morphology there is not successful in (38b). The result is that the string in (38a) is not generated, and is thus correctly predicted to be ungrammatical.

This basic analysis extends to the remaining paradigm of animacy effects in Chuj, summarized above in table (17). For instance, if the object is a third person human, it will bear [HUM↑,ANIM↑,ϕ], limiting v to subsequent Agreement with a human subject.[19]

(39) 3rd person human objects bear [HUM↑,ANIM↑,ϕ], so the subject must be human

A	O		A	O		A	O	
HUM	HUM	✓	ANIM	HUM	✗	INAN	HUM	✗

If the object is merely animate, it bear [ANIM↑,ϕ]. This will in turn limit v to Agree with a subject that also bears an [ANIM] feature.

(40) 3rd person animal objects bear [ANIM↑,ϕ], so the subject must be human or animal

A	O		A	O		A	O	
HUM	ANIM	✓	ANIM	ANIM	✓	INAN	ANIM	✗

Finally, if the object is inanimate, v can Agree with a subject of any kind, (41). (Inanimates could either bear no dynamic feature at all (simply [ϕ]), or have their single feature be dynamic ([ϕ↑]. Since the feature geometry (31) entails that all nominal expressions carry [ϕ] by default, whether this feature dynamic or not carries no empirical consequence.)

[19] We assume following Deal (2023) that a goal G with multiple dynamic features changes the interaction specification of the probe to the most specific feature G bears (where specificity corresponds to degree of embedding in the feature geometry). Thus a goal bearing [HUM↑,ANIM↑] produces a probe with [INT:HUM].

(41) Inanimate [ϕ]: no restrictions

A	Obj		A	Obj		A	Obj	
HUM	INAN	✓	ANIM	INAN	✓	INAN	INAN	✓

While we have exemplified with Chuj data in this section, we note that the analysis extends beyond Chuj, including to low-abs Mayan languages such as Tseltal. High-abs and low-abs languages are alike in that v Agrees with both arguments, starting with the object. They are alike in that Set A agreement can thus only be generated when Agree with the object fails to bleed Agree with the subject. Our account thus readily extends to Mayan languages in the low-abs group.

4 Some theoretical comparisons

Before turning to some extensions and refinements of our basic analysis, in this section we briefly compare our analysis to three prominent alternative approaches to relative hierarchy effects. Two of these approaches (the Cyclic Agree approach of Béjar 2003, Béjar and Rezac 2009 and the feature gluttony approach of Coon and Keine 2021) have been developed primarily for person-based hierarchy systems such as the strictly descending PCC, shown above in §3.2 for Kabyle Berber. The third (Foley and Toosarvandani 2022) has been developed specifically for animacy hierarchy effects in a Mesoamerican language family, Zapotec.

Let us first consider an alternative account based strictly on Cyclic Agree (Béjar and Rezac 2009), as applied for instance to the person hierarchy effect in Georgian ϕ-prefixes by Béjar (2003) and to the strictly descending PCC by Walkow (2012).[20] On this approach, a $1 > 2 > 3$ hierarchy effect between a subject and an object can be derived as follows. The probe on v bears uninterpretable features corresponding to 1st, 2nd, and 3rd person, [uϕ-uPART-uSPKR]. A first person goal deletes all of these features from the probe; a second person goal deletes [uϕ-uPART]; a third person goal deletes merely [uϕ]. The probe Agrees with the object first. When the probe Agrees with a first person object, all of its uninterpretable features are deleted, and probing stops. It cannot Agree with the subject. When it Agrees with a second person object, [uϕ-uPART] are deleted but [uSPKR] remains active. This means that the probe can Agree again, but only if the subject (the probe's second goal) is 1st person. Lastly, when the probe Agrees with a 3rd person object, merely [uϕ] is deleted. Agree with either a 1st or a 2nd person subject is possible after that.

The basic translation of this approach from person to animacy is straightforward: instead of the v probe bearing several person-related features, e.g. [uPART] and [uSPKR], it would bear several animacy related features, e.g. [uϕ-uANIM-uHUM]. The central prediction of this theory, as Walkow (2012) writes, is that "one probe can Agree with two goals when (i) the first goal's features are a subset of those of the probe, and (ii) the second goal has a superset of the features of the first goal" (p. 251). The superset relation Walkow mentions must in particular be a *proper* superset relation: if the second goal had the same features as the first goal, the probe should not be able to Agree with it, as the relevant features have already been deleted from the probe by Agree with the first

[20] The analysis sketched here follows Béjar (2003) (esp. §3.6 on Georgian) in general terms, and draws on several core proposals of the Cyclic Agree literature (Rezac 2003, Béjar 2003, Béjar and Rezac 2009), including probe specification with multiple uninterpretable features. We emphasize that our approach also draws on elements of the broader Cyclic Agree approach, notably the idea that a probe on v Agrees with the object before the subject, but is crucially different in how it understands probe specifications.

goal. It is in view of this point that the Mayan data pose an empirical challenge. As we have seen, equi-animate arguments are possible in Chuj and other Mayan languages:

(42) Chuj

a. Ix-y-il ix chichim ix Malin .
PFV-A3-see CLF elder.woman CLF Malin
'Malin saw the elder.' HUM > HUM

b. Ix-y-il nok' much nok' chan.
PFV-A3-see CLF bird CLF snake
'The snake saw the bird.' ANIM > ANIM

Agree with both arguments is not expected here: in (42a), Agree with the object should delete the entire set of uninterpretable features from the probe, [uϕ-uANIM-uHUM], leaving no features left to Agree with the subject. And yet the subject does Agree, as we see by the presence of Set A morphology. In (42b), Agree with the object should delete [uϕ-uANIM] from the probe, leaving only [uHUM] to Agree with the subject. And yet the subject that Agrees in this example denotes an animal and lacks a [HUM] feature. These examples underscore that the hierarchy effect in Chuj, as elsewhere in Mayan, does not require the subject to actually outrank the object on the animacy hierarchy. The subject must merely be *at least as high* on the hierarchy as the object in order for Agree to succeed. We take the ability of our interaction/satisfaction account to capture this fact to favor our account over a strict Cyclic Agree alternative.

The second alternative we consider is the feature gluttony approach proposed by Coon and Keine (2021). For Coon and Keine, a $1 > 2 > 3$ hierarchy effect between a subject and an object would be derived as follows. The probe of interest is located above both arguments and Agrees with the subject first; its structure is [uϕ-uPART-uSPKR]. When the subject is 1st person, it matches and deletes all segments of the probe. A second, distinct (number) probe then Agrees with the object. When the subject is 2nd person, it matches and deletes [uϕ-uPART] on the probe, leaving a remaining [uSPKR] segment. When the object is 3rd person, this segment does not Agree, incurring no violation. When the object is 1st person, however, this remaining segment Agrees with the object, meaning that different segments of the same probe Agree with different arguments. This is the configuration Coon and Keine call 'feature gluttony'.

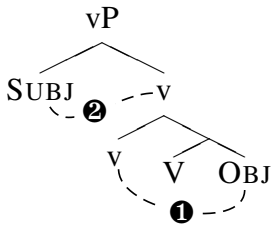
They propose that while gluttony by itself is not necessarily problematic, it may give rise to downstream effects that lead to ineffability. One of these concerns vocabulary insertion: if a probe Agrees gluttonously with two arguments which correspond to separate overt vocabulary items (VIs), no single VI can be selected to realize the probe and the derivation fails in the morphology. Another concerns clitic-doubling. If the probe is specified to trigger clitic doubling, every DP that has Agreed with a segment of that probe must clitic double. On the assumption that two required clitic-doublings cannot happen simultaneously, and cannot be ordered with respect to one another, this, too, leads to a conflict. Thus a gluttonous probe that triggers clitic doubling leads to derivation failure in the syntax.

For this type of view, like for the Cyclic Agree analysis, an adaptation to animacy rather than person requires changing the probe to [uϕ-uANIM-uHUM]. A key difference both from the Cyclic Agree analysis and from our interaction/satisfaction view is the order in which the probe accesses the goals. The probe first Agrees with the subject rather than the object, though of course it is able to Agree with both. (Adapting the terminology of Deal (2023), the theory requires a probe

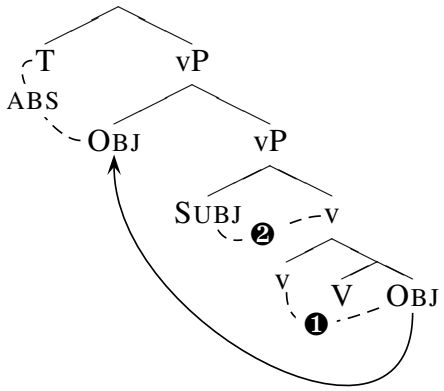
with *subject preference*.) A pattern of this type is most plausibly derived by positing a probe that merges above both arguments—in this case, above the vP level.

We note that previous literature on Mayan syntax does not identify a probe fitting this description. As reviewed in section 3.1, in low-abs languages, the only ϕ-probes are on v, which we expect following Rezac (2003), Béjar and Rezac (2009) to Agree with the object first, (43a). An additional probe, e.g. on T, would be needed for such languages. This would be the probe that would need to Agree in a crucially gluttonous way. Notably, to produce ineffability, this probe would either need to be subject to VI insertion (i.e., potentially able to expone a goal's ϕ-features) or else serve as a trigger of clitic doubling. We are not aware of any evidence that T shows either of these behaviors in low-abs languages.

(43) a. Low-absolutive vP syntax



b. High-absolutive vP syntax



In high-abs languages, while there is reason to think that T bears a probe, the problem is not resolved. On the standard view of high-abs syntax we have adopted, the ϕ-probe on T Agrees only with the object. Even if we adapted the view in (43b) to allow the T probe to Agree with multiple arguments, we expect it to Agree with the object first, given standard principles of locality. However, in Coon and Keine's (2021) system, allowing T to Agree with the object first, and then the subject, actually predicts a 'reverse' hierarchy effect (in terminology of Stegovec 2020): in a high-abs language, we would expect it to be case that the *subject* cannot exceed the *object* in animacy. Suppose, for instance, a probe bearing [uϕ-uANIM-uHUM] Agrees with the object first. When object bears [ϕ,HUM,ANIM], it matches and deletes all segments of the probe; a second, distinct (number) probe then Agrees with the subject. In this situation, there is no gluttony; this means that a human object should be acceptable with any choice of subject (contrary to fact; see e.g. (8b)). Similarly, when the object is merely animate, it matches and deletes [uϕ-uANIM] on the probe, leaving a remaining [uHUM] segment. When the subject is human-denoting, this remaining segment Agrees with it, meaning that different segments of the same probe Agree with different arguments, i.e. there is gluttony. This means that a merely animate object should be unacceptable with a human subject, again contrary to fact (see e.g. (8a)). We emphasize that these issues for the feature gluttony approach are grounded in its architecture for explaining hierarchy effects, according to which a hierarchical restriction arises when the *first* goal bears fewer features than the *second*. This is the reverse of the architecture employed by our interaction/satisfaction approach (and by the Cyclic Agree approach discussed just above), according to which the restriction arises when the *second* goal bears fewer features than the *first*. We note that this latter generalization finds support from the Mayan data: independently motivated probe-goal relations holding in Mayan clause structure are sufficient to predict the attested hierarchy effects, given our view.

Last, we consider an alternative based on Foley and Toosarvandani's (2022) recent work on what they call the 'gender case-constraint' in Sierra Zapotec languages. The version of this constraint operative in Yalálag Zapotec is notably close to what we have discussed for Chuj:

(44) Gender-Case Constraint (Yalálag) (Foley and Toosarvandani 2022: 16)
An object clitic pronoun cannot exceed a subject clitic pronoun on the gender hierarchy [elder > human > animate > inanimate]

Foley and Toosarvandani approach this pattern as follows. There is a head, call it F, located above both arguments, which Agrees with the closest argument (which is the subject) and copies features from it. This step of Agree does not create subject or object clitics; cliticization is a separate step conditional on the results of Agree. Whether the subject and object can cliticize to F is regulated by a Condition on Pronominal Clitization: the features of the clitic must be a subset of the features located on the head (gotten by Agree). If, for instance, the subject bears the features [HUM, ANIM], these features are transferred to F via Agree, and an object may cliticize to F if it contains these features or any subset thereof. But if a subject is lower in animacy, transferring merely [ANIM] to F via Agree, a [HUM, ANIM]-bearing object would not be able to cliticize to F. Problematically, it contains a [HUM] feature that the head it wishes to cliticize to (viz., F) lacks.

While this theory is different in various specifics from the feature gluttony approach, it faces a similar challenge: identifying a head with the relevant properties—in this case, always Agreeing only with the subject. For high-abs languages, both theories incorrectly predict that a T probe, encountering the object first, would lead to a 'reverse' hierarchy pattern. On the Foley and Toosarvandani view, this is because the closest argument to the probe is what Agrees with that probe, 'setting' it in terms of what can subsequently cliticize to it. An additional issue specific to this theory arises in low-abs languages. Here, a Foley and Toosarvandani (2022)-type theory not only requires a head that Agrees with the subject first, perhaps T, but furthermore requires that in hierarchy-obeying examples, the object actually *cliticizes* to this head. This leaves the linear order of Set B morphemes in low-abs languages unexplained.

5 Articulating and restricting the animacy scale

Person and animacy hierarchy scales have been noted to vary across languages both in the extent of their articulation (i.e., how many distinct categories are ranked) and in the breadth of their application (i.e., which elements are regulated by the hierarchy vs. exempted from it). Both of these types of variation are found in the Mayan family. In this section, we first discuss variation between Mayan languages in the articulation of animacy scales and show how this is accommodated on our theory. We then return to the question of local persons, which we saw above are exempt from the animacy hierarchy pattern in languages such as Chuj, and explore the consequences of their behavior for the distribution of dynamic features.

5.1 Accounting for variation in the articulation of the scale

A notable point of microvariation reported in the previous literature on Mayan animacy hierarchy effects concerns the articulation of the animacy scale. In section 2.1, we have seen that Chuj features a three-way scale: humans outrank all other animates, which in turn outrank inanimates.

While other languages closely related to Chuj seem to make use of similar three-way scales (e.g. Akatek, Zavala 1992; Q'anjob'al, Pascual 2007; Tojolab'al, Curiel 2007), this is not the case across the entire Mayan language family. Some Mayan languages make a greater number of animacy distinctions, and preliminary reports indicate that some may make fewer. In (45) we present a summary of scales reported for a sample of ten Mayan languages.[21] In many cases, hierarchy effects are reported, but the exact articulation of the scale is left unspecified by the authors. We indicate such cases with "n.s." in the table, all while establishing a minimal scale that can be inferred from the data provided by these works.

(45) The articulation of the animacy scale across Mayan languages

	scale n.s. = not specified	reference
Chuj	HUM>ANIM>INAN	(see data in §2.1)
Akatek	HUM>ANIM>INAN, other n.s.	Zavala 1992, 2007
Cajolá Mam	seven distinctions	Pérez Vail 2014
Ch'ol	HUM>ANIM>INAN	Zavala 2007; Vázquez Álvarez 2011
Poqom	ANIM>INAN	Benito Pérez 2016
Tseltal	HUM>BIG.ANIM>ANIM>INAN	Polian 2004, 2013
Tsotsil	HUM>NON.HUM	Aissen 1997, 1999
Tojol-ab'al	ANIM>INAN; other n.s.	Curiel 2007
Q'anjob'al	HUM>ANIM>INAN; other n.s.	Pascual 2007
Yucatec Maya	HUM>ANIM>INAN; other n.s.	Bohnemeyer 2009

Let us consider more closely the hierarchy effect in languages with a more articulated scale (relative to Chuj). Polian (2013) suggests that in addition to drawing a human-animate-inanimate distinction (like Chuj), Tseltal actually distinguishes between different kinds of animals: "big animals (dogs, horses, hens) are located higher than other smaller animals (insects) in the animacy scale" (Polian 2013: 250, translation ours). A concrete set of examples in this vein is provided by Pérez Vail (2014), who describes a seven-way hierarchy for the Cajolá dialect of Mam, which includes the following features (see also Minkoff 2000 who notes a 4 way scale for another dialect of Mam):[22]

[21] We note here that Zavala (2007) and Vázquez Álvarez (2011) differ in the way they report animacy hierarchy violations in Ch'ol. In particular, while Zavala (2007) reports examples that violate the hierarchy as ungrammatical (with an "*"), Vázquez Álvarez (2011) reports them consistently as degraded (with one "?"). Other work seems to coincide in reporting examples that defy animacy restrictions as ungrammatical (with "*").

[22] While England (2017, p. 519) notes that animacy hierarchies are a topic that requires further exploration in different Mam varieites, she states that "in the texts from [the dialect of] Ixtahuacán, all examples of clauses in which the agent is less animate than the patient (usually an animal acting on a human) have either an intransitive verb with an oblique agent (the preferred form) or a passive verb, usually the unmarked passive."

(46) Seven-way scale in Cajolá Mam (adapted from Pérez Vail 2014, chapters 4 & 5)

Local persons
Other humans
Infants
Other animals
Insects
Energetic inanimates
↓ Nonenergetic inanimates

We first exemplify this pattern in Cajolá Mam and then provide comparisons to Chuj, confirming that the hierarchy is indeed more articulated in the former language compared to the latter.

Cajolá Mam is unusual within the Mayan family in that the animacy hierarchy effect is not constrained to third persons. Rather, local persons outrank all other third persons. While local person subjects are acceptable with 3rd person objects, (47a,b), the reverse does not hold: third person subjects cannot be combined with local person objects, (47c,d).

(47) Cajolá Mam person hierarchy (Pérez Vail 2014: 139)

a. ✓ Ma kub' n-tzyu-'n=e' Leexh.
PROX DIR A1S-grab-DS=1S Andrés
'I grabbed Andrés.' (1>3)

b. ✓ Ma kub' t-tzyu-'n=a Leexh.
PROX DIR A2S-grab-DS=2S Andrés
'You grabbed Andrés.' (2>3)

c. * Ma chin kub' t-tzyu-'n=e' Leexh
PROX B1S DIR A3S-grab-DS=1S Andrés
Int. 'Andrés grabbed me.' (*3>1)

d. * Ma kub' t-tzyu-'n=a Leexh
PROX B1S DIR A3S-grab-DS=2S Andrés
Int. 'Andrés grabbed you.' (*3>2)

The effect remains a relative one: local person objects are acceptable so long as the subject is also local person. (We note that this makes this pattern akin to weak PCC in ditransitives.)

(48) Cajolá Mam person hierarchy: local/local cases (Pérez Vail 2014: 139)

a. ✓ Ma kub' n-tzyu-'n=a.
PROX DIR A1S-grab-DS=2S
'I grabbed you.' (1>2)

b. ✓ Ma chin kub' t-tzyu-'n=a.
PROX B1S DIR A2S-grab-DS=2S
'You grabbed me.' (2>1)

Examples of hierarchy effects among third person arguments with the different animacy ranks in (46) are found below. In each case, the intended translation can be achieved with the help of an intransitivizing repair strategy (e.g. passive; see Pérez Vail 2014, ch. 5, for full sets of examples).

(49) Illicit combinations of co-arguments in Cajolá Mam (Pérez Vail 2014: 187-190)

a. * Ma t-il ne'x xjaal.
PROX A3S-see baby person
Int. 'The baby saw the person.' (*infant > adult)

b. * Ma tz'-ok t-xjo-'n cheej tal k'waal.
PROX B3S-DIR A3S-kick-DS horse DET.AFE boy
Int. 'The horse kicked the boy.' (*animal > human)

c. * Ma b'aj-e'l k-ch'yo-'n xeeni'l waakx.
PROX DIR-DIR A3P-sting-DS mosquito cow
Int. 'The mosquitos stung the cow.' (*insect > other animal)

d. * Ma t-maq tze kyq'iq.
PROX A3S-block tree wind
Int. 'The tree blocked the wind.' (*non-energetic > energetic INAN)

We can again confirm that hierarchy effects are relative rather than absolute. All types of third person *can* be transitive subjects or transitive objects, so long as the object does not outrank the subject given the scale in (46) (see Pérez Vail 2014, chapters 4 and 5, for full sets of examples):

(50) Licit combinations of co-arguments in Cajolá Mam (Pérez Vail 2014: 188-189)

a. Jatoq kub' t-tzyu-'n Wana Li'y.
PFV DIR A3S-grab-DS Juana María
'Juana had grabbed María.' (human>human)

b. Ma t-il cheej wixh.
PROX A3S-see horse cat
'The horse saw the cat.' (animal > animal)

c. Ma b'aj k-ch'yo-'n ky'eq pu't.
PROX DIR A3P-sting-DS flea moth
'The flea stung the moth.' (insect > insect)

In sum, Cajolá Mam shows hierarchy effects across a wide range of nominal subtypes, revealing a highly articulated animacy hierarchy. We can confirm that such expansive hierarchies are not shared by all Mayan languages. In Chuj, only three animacy categories (humans, animates, and inanimates) seem to matter, and local persons are exempted from the hierarchy effect. Chuj allows third person subjects with local person objects, (51):

(51) Chuj: no restriction *local>3

a. Ix-in-s-yam waj Xun.
PFV-B1S-A3-grab CLF Xun
'Xun grabbed me.' 3 > 1

b. Ix-ach-s-yam waj Xun.
PFV-B2S-A3-grab CLF Xun
'Xun grabbed you.' 3 > 2

It also allows younger human subjects with older human objects (52a), insect subjects with large animal objects (52b), and presumed "non-energetic" inanimate subjects with "energetic" inanimate objects (52c).

(52) Chuj: licit third person combinations

a. Ix-y-il ix ix ix nene.
PFV-A3-see CLF woman CLF baby
'The baby saw the woman.' (compare (49a))

b. Ix-s-chi' nok' wakax nok' xe'en.
PFV-A3-eat CLF cow CLF mosquito
'The mosquito stung the cow.' (compare (49c))

c. Ix-s-mak ik' te' te'.
PFV-A3-block wind CLF tree
'The tree blocked the wind.' (compare (49d))

This contrast in animacy scales between Chuj and Cajolá Mam raises the question of whether there could be Mayan languages with a less articulated scale than in Chuj. This, indeed, has been reported to be the case for Tsotsil and Poqom, as noted in table (45), though we note that the crucial data requires further exploration for both languages. For Poqom, Benito Pérez (2016) proposes a two-way distinction, animate vs. inanimate. This suggests that human and merely animate (i.e. animal) arguments should be treated alike. The examples he provides present confounds, however; e.g. the animal is a mythical creature.[23] Writing of such examples, Benito Pérez notes that it is specifically the mythical creature's "characteristic of being a "non-normal" animal that places it in hierarchy over the human" (p 232). This may suggest that "normal" animal referents are indeed classified differently on the animacy hierarchy in Poqom as compared to humans, which in turn would suggest a three-way animacy hierarchy, as in Chuj.

Partially similar questions arise in connection with Tsotsil. For this language, Aissen (1997) initially proposed a two-way animate/inanimate contrast, whereas Aissen (1999) proposes a two-way human/non-human contrast. Data such as (53), contrasting HUM>HUM with INAN>HUM, are compatible with both theories.

(53) Tsotsil

a. I-s-mil Xun li Petul-e.
CP-A3-kill Juan the Pedro-ENC
'Pedro killed Juan.' (Aissen 1997: 724) HUM > HUM

b. * I-s-mil Xun li ton-e.
PFV-A3-kill Xun the rock-ENC
'The rock killed Juan.' (Aissen 1997: 725) INAN > HUM

Examples with merely animate (i.e. animal) arguments are required to differentiate between the animate/inanimate theory of Aissen (1997), the human/non-human theory of Aissen (1999), and an alternative theory on which the hierarchy in Tsotsil is in fact Chuj-like, three-way. We thank Judith Aissen (p.c.) for sharing some preliminary data suggestive of this last possibility. Example (54a) shows that an animate>inanimate hierarchy is insufficient: the combination of a merely animate subject with a human object is ruled out. Example (54b) suggests that a human>non-human hierarchy may be insufficient as well: the combination of an inanimate subject with a

[23] Examples with non-mythical animals discussed by Benito Pérez (2016) feature the noun meaning 'owner', which has special properties elsewhere in Mayan. In particular, as discussed in fn 35, this noun typically behaves as a grammatical inanimate, despite possibly referring to humans.

merely animate object is degraded. Further exploration is needed to probe whether the degradation is indeed different in the two cases, or whether both are equally ungrammatical.

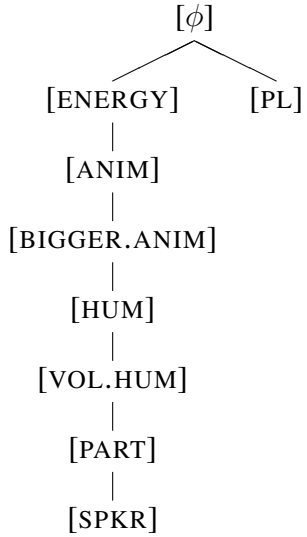
(54) Tsotsil (Aissen, p.c.; preliminary data)

a. * I-s-ti vinik li chon=e.
CP-A3-bite man DET snake=ENC
Intended: The snake bit the man. ANIM > HUM

b. ? I-s-tsules-an ka-etik li yi=e.
CP-A3-make.slip-PL horse-PL DET sand=ENC
Intended: The sand made the horses slip. INAN > ANIM

Having now seen at least some variation in the articulation of animacy scales across Mayan, we turn to our theoretical implementation. To begin, the highly articulated pattern in Cajolá Mam suggests a refinement of the basic feature geometry in (31), one which featurally distinguishes among sub-classes of animals and of humans. Starting from the bottom of the scale, we could posit the feature [ENERGY] to account for the observed distinction between "energetic" and "non-energetic" inanimates. The feature [BIG.ANIM] could also be added to make sense of the alleged distinction between small versus medium-sized or big-sized animals in Cajolá Mam, and also in Tseltal (Polian 2013).[24] Finally, we could add the feature [VOL.HUM], "volitional human", to capture the cut between infants and other humans. This yields the expanded geometry in (55). As for semantic entailment relations within the hierarchy, note that this hierarchy creates coherent sets of features. For instance, it is not semantically unreasonable to assume that all animate entities also carry the feature [ENERGY].

(55) Expanding the feature geometry



With this feature geometry in place, we can account for Cajolá Mam's hierarchy effects with dynamic features on most of the left-side nodes in (55). Specifically, we propose the ϕ-sets in

[24] These works do not provide a full list of animals that are included in this category, providing only examples with combinations of mammals and insects. Therefore, this feature is only hypothetical, and should be revised accordingly upon further research. For example, it could well be that the appropriate feature refers to the biological nature of the animal, such as [MAMMAL], rather than its size.

(56) for each relevant class of DP in the Cajolá Mam animacy scale. Recall here that Cajolá Mam does not draw a distinction between first persons and second persons in hierarchy effects, which we take as an indication that [SPKR] on first persons is not dynamic, (56g).

(56) ϕ-sets of third person human and animate DPs in Cajolá Mam

a. energetic inanimates = [ϕ, ENERGY↑]
b. smaller animals (e.g., insects) = [ϕ, ENERGY↑, ANIM↑]
c. bigger animals (e.g., cats, cows) = [ϕ, ENERGY↑, ANIM↑, BIG.ANIM↑]
d. infants = [ϕ, ENERGY↑, ANIM↑, BIG.ANIM↑, HUM↑]
e. other humans = [ϕ, ENERGY↑, ANIM↑, BIG.ANIM↑, HUM↑, VOL.HUM↑]
f. second person = [ϕ, ENERGY↑, ANIM↑, BIG.ANIM↑, HUM↑, VOL.HUM↑, PART↑]
g. first persons = [ϕ, ENERGY↑, ANIM↑, BIG.ANIM↑, HUM↑, VOL.HUM↑, PART↑, **SPKR**]

The question now becomes: why are some of these features but not others relevant for animacy hierarchy effects in other languages? Two types of answers are available. The first relates to the idea that languages vary in which of the overall set of features made available by UG they actually make use of in particular syntactic configurations. As Harley and Ritter (2002: 486) write, "in any given language a subset of the possible features will be active—most languages will only use a portion of the features available." For Chuj, then, a possible analysis is that the only animacy-related features that are actually *active* on DPs are [HUM] and [ANIM]. Other features such as [ENERGY] are never actually relevant for Chuj DP specifications. This type of theory preserves the hypotheses of section 3.3 concerning the featural representations of human and animate DPs in Chuj, repeated in (57).

(57) ϕ-sets of third person DPs in Chuj, option 1 (from (36))

a. inanimates = [ϕ]
b. animates = [ϕ, ANIM↑]
c. humans = [ϕ, ANIM↑, HUM↑]

A second approach would draw on the idea that features can be active in a language without interacting dynamically, as we saw for the feature [SPKR] in Cajolá Mam (56g). Cajolá Mam certainly grammatically distinguishes first and second person; we cannot say the feature [SPKR] is not active in the language. What is special about this feature in the context of Cajolá Mam grammar is that it does not interact dynamically: after Agreeing with a 1st person object, the v probe is free to subsequently Agree with a second person subject. This makes a second type of analysis possible for languages such as Chuj: it could be that animacy features other than [HUM] and [ANIM] are active in the language, but that they do not interact dynamically. Suppose, for instance, we found reason in the grammar of Chuj to differentiate non-energetic inanimates from other 3rd persons, showing that [ENERGY] is active in the language. Featural representations such as those shown in (58) would capture the presence of this feature without an impact on animacy hierarchy effects; similar proposals could be made for other animacy related features beyond [ENERGY].

(58) ϕ-set of third person human and animate DPs in Chuj, option 2

a. non-energetic inanimates: [ϕ]

b. energetic inanimates = [ϕ, ENERGY]

c. animates = [ϕ, ENERGY, ANIM$\uparrow$]

d. humans = [ϕ, ENERGY, ANIM$\uparrow$, HUM$\uparrow$]

The basic difference between (57) and (58) concerns whether features are *absent* versus *present but non-dynamic*. We leave to future work the question of which analysis is more appropriate for Chuj and other Mayan languages with non-maximally-articulated animacy hierarchy patterns (noting of course that the answers might vary across the family). In the next subsection, however, we show that a closely related set of choices is available for the analysis of local person DPs, and that in this case the data favor a theory of the second type.

5.2 On the status of local persons

Recall from section 2.1 that in Chuj, animacy hierarchy restrictions hold only when both arguments are third person. This is a very common pattern across the Mayan family; to our knowledge, Cajolá Mam is the only reported exception. This means that local person nominals fall outside animacy hierarchy effects, despite clearly denoting humans. Relevant examples that highlight this contrast are repeated in (59). As shown in (59a), local person objects are possible with non-human subjects. This starkly contrasts with the example in (59b), where we see that a 3rd person human object is incompatible with a non-human subject.

(59) Chuj local persons do not participate in hierarchy effects

a. ✓ Ix-{**in/ach/onh/ex**}-y-il nok' chan.
PFV-B1S/B2S/B1P/B2P-A3-see CLF snake
'The snake saw me/you/us/y'all.' ANIM > LOCAL

b. * Ix-y-il winh winak nok' chan.
PFV-A3-see CLF man CLF snake
'The snake saw the man.' ANIM > HUM

How, in the majority of Mayan languages, do local persons escape animacy hierarchy effects? As previewed just above, two possible approaches suggest themselves. First, it might be that local person DPs lack animacy-related features.[25] Crucially, under such an account, only third persons would carry [ANIM] and [HUM] features.

(60) Theory 1: local persons lack [ANIM] and [HUM] features (to be rejected)

a. 1st person: [ϕ,PART,SPKR]

b. 2nd person: [ϕ,PART]

c. 3rd person: [ϕ], [ϕ,ANIM$\uparrow$], or [ϕ,HUM$\uparrow$,ANIM$\uparrow$]

Critically, a theory like (60) predicts that local person DPs should behave equivalently to inanimate third person DPs for the purposes of animacy hierarchy effects. That is, if they lack the features [ANIM] and [HUM] altogether, local persons should not be possible as subjects when the

[25] Maintaining this theory would require some rethinking of feature geometries. A variant of this theory that avoids this issue would be one where local person DPs do contain animacy-related features but they are in some way shielded from Agree. The objection raised below for the "absent-features" theory also applies to this "hidden-features" variant.

object is a 3rd person human-denoting expression ([ϕ,HUM↑,ANIM↑]) or animal-denoting expression ([ϕ,ANIM↑]). This is because these objects bear dynamic features that constrain subsequent Agree: just as Agree with an inanimate subject is not possible, Agree with a local person subject should not be possible if that subject lacks [HUM] and/or [ANIM]. This makes the incorrect prediction that local person subjects should be impossible with 3rd person objects. Such examples are in fact well-formed, as shown in (61).

(61) Chuj

a. Ix-{**w/h/k/ey**}-il ix ix.
PFV-A1S/A2S/A1P/A2P-see CLF woman
'I/you/we/y'all saw the woman.' LOCAL>HUM

b. Ix-{**w/h/k/ey**}-il nok' tz'i'.
PFV-A1S/A2S/A1P/A2P-see CLF dog
'I/you/we/y'all saw the dog.' LOCAL>ANIM

In other words, given our proposal that animate and human objects dynamically interact—thereby requiring an [ANIM]/[HUM] feature on the subject in order for the subject to Agree—the data in (61) bring us to the conclusion that local persons in fact *do* carry animacy and human features that are accessible to Agree. We conclude that Theory 1 is not a viable solution for the behavior of local persons in Chuj and other relevant Mayan languages.

The second, more attractive possibility is that local persons have both [ANIM] and [HUM] features, but these features do not interact dynamically. This analysis, shown in (62), captures the fact that local persons behave like other human-denoting elements in terms of *when* they Agree. A probe with specification [INT:HUM] (e.g., having dynamically interacted with a [HUM↑] object) can Agree with a local person subject just like it can with a 3rd person human subject. This is the behavior we saw in (61).

(62) Theory 2: [ANIM] and [HUM] are not dynamic on local persons

a. 1st person: [ϕ,PART,SPKR,**HUM,ANIM**]

b. 2nd person: [ϕ,PART,**HUM,ANIM**]

c. 3rd person: [ϕ], [ϕ,ANIM↑], or [ϕ,HUM↑,ANIM↑]

What is different about local persons on this analysis is that they do not change the probe's interaction specification when they Agree. After Agree with a local person object, the probe remains specified [INT:ϕ], and a subject of any featural quality can Agree. The contrast in (59) arises because the choice of a local person object versus a third person object determines whether dynamic interaction will take place. When dynamic interaction does *not* take place, no hierarchy effect results.

It is often noted that variation across languages follows the same general principles as variation within them. The proposal in (62) can be thought of in this way, noting that the dynamic character of the features [ANIM] and [HUM] varies within one language in a way parallel to how the dynamic character of the feature [PART] varies across languages (dynamic in Cajolá Mam, non-dynamic in Chuj). Much further work is needed to probe the whole typological space of this variation across and within languages. We note, for instance, the connection drawn by Aissen (1997) between Mayan hierarchy effects and similar facts in Chamorro, an Austronesian language. A significant

difference with Mayan is that Chamorro hierarchy effects span across not only third persons, but also second persons, though crucially not first persons. This is schematized below (see Aissen 1997, section 5.2 for relevant examples):

(63) Chamorro person/animacy hierarchy (adapted from Aissen 1997: 736)
2 > ANIMATE > INANIMATE

In our system, a hierarchy like the one in (63) could be derived if third and second persons bore dynamic features, but not first persons. The Chamorro pattern thus shows a further instance of variation inside a language in terms of which pronouns bear dynamic features. Across languages, we conclude at least that dynamic features can be borne by DPs of all persons (Cajolá Mam), second and third persons (Chamorro), and just third persons (Chuj). Whether other possibilities are also attested cross-linguistically remains to be explored.

6 "Repair": passives and agent focus

When a hierarchy effect rules out the use of a particular construction for the expression of a particular pair of arguments—e.g. subjects and objects, as in our Mayan data, or direct and indirect objects, as in the data sets typically discussed for the PCC—the result, across languages, is typically not flat-out ineffability. Rather, an alternative syntactic means of encoding must be used to express the desired meaning. Such alternative means of encoding and their relationship to the hierarchy violation have often been studied under the heading of "repair" (Bonet 2008, Rezac 2008, 2011, Walkow 2012, 2013, Yokoyama 2019, Murphy 2019, Driemel, Özdemir, and Popp 2020, i.a.). We note that this literature uses the term in two different ways. In one sense of the term, a repair for a hierarchy violation found in some sentence S is a sentence S′ that expresses (at least approximately) the same meaning as S, but has a different syntax. We call this the *descriptive use* of the term 'repair'. In another sense of the term, a repair is a grammatical mechanism that arises in response to a hierarchy effect violation, *making alternative syntactic constructions possible*. We call this the *derivational use* of the term 'repair'. It should be clear that a sentence S′ might be a repair wrt sentence S in a descriptive sense without involving a repair in the derivational sense. This will be the case if the grammar generally allows for a given proposition to be expressed in multiple different ways without requiring any special mechanisms to be invoked. We will suggest that this is the general situation in Mayan in terms of the relationship between active, passive, and agent focus sentences.

We encountered the passive and agent focus constructions of Chuj in section 2.1. As noted there, these constructions are both intransitive: they lack Set A morphology, and under the right prosodic conditions can show the overt intransitive status suffix *-i* (see Royer 2022b). Contrast the active sentence in (64a) with the passive version, (64b), and the agent focus version, (64c).

(64) Active, passive, and agent focus in Chuj

a. Ix-y-il nok' chan winh winak.
PFV-A3-see CLF snake CLF man
'The man saw the snake.'

b. Ix-il-j-i nok' chan [$_{\text{OBL}}$ yuj winh winak].
PFV-see-PASS-IV CLF snake by CLF man
'The snake was seen by the man.'

c. [$_{\text{FOC}}$ Ha winh winak] ix-il-an nok' chan.
FOC CLF man PFV-see-AF CLF snake
'It's the man that saw the snake.'

All three sentences describe the same basic state of affairs: a man saw a snake. The fact that all three are grammatical shows us that passive and agent focus are unlikely to arise strictly via derivational repairs to active sentences. Rather, these are simply ways of building sentences that are independently available in Chuj, hierarchy violation or no. The apparent "repair" quality of the passive and agent focus comes from the fact that these syntactic encodings remain available regardless of the relative animacy rank of the two arguments. We see this by comparing (64), where the agent is higher in animacy than the patient, with the sentences in (65), where the thematic roles are reversed. The active version (65a) becomes ungrammatical, but the passive (65b) and agent focus (65c) versions remain well-formed.

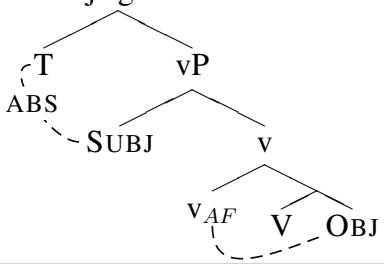
(65) a. * Ix-y-il winh winak nok' chan.
PFV-A3-see CLF man CLF snake
Int. 'The snake saw the man.'

b. Ix-il-**j**-i winh winak [$_{\text{OBL}}$ yuj nok' chan].
PFV-see-PASS-IV CLF man by CLF snake
'The man was seen by the snake.'

c. [$_{\text{FOC}}$ Ha nok' chan] ix-il-**an** winh winak.
FOC CLF snake PFV-see-AF CLF man
'It's the snake that saw the man.'

The absence of hierarchy effects in passive and agent focus clauses in Chuj fits well with their intransitive syntax. For agent focus (AF) clauses, we suggest following Coon et al. (2021) that the AF morpheme realizes a v head syntactically different from that found in actives. AF clauses are characteristic of high-abs languages, wherein objects move past subjects at the vP level in active clauses (see (29)). Recall that we connected this movement to the probe specification of the v head found in active transitives. AF clauses lack this inversion: the object remains in situ, paving the way for the subject to A' extract. To capture this behavior along with the absence of Set A morphology in AF clauses, we assume that v_{AF} is different from active transitive v in two ways. First, it does not trigger movement of the object. Second, it *only* Agrees with the object, never the subject. We thus propose that v_{AF} bears a probe specified [INT:ϕ,SAT:ϕ].[26] Without the ability to Agree with two goals, the hierarchy-creating potential of the v head is removed. The pattern of Agree in a Chuj AF clause is schematized in (66).

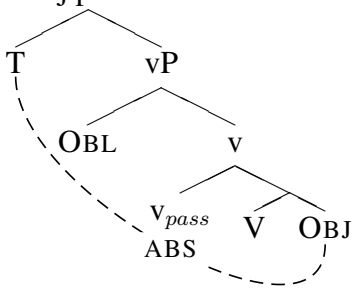
(66) Chuj agent focus



[26]By contrast, the probe of Chuj active v, in the notation of Deal (2022), is [INT:ϕ^{M},SAT:-]; the $^{\text{M}}$ attached to the interaction specification is a movement trigger, indicating that all interacting elements *move*.

Turning to passives, we again assume an alternation in Voice represented at the vP level. In a Chuj passive, the agent is realized as a PP (if overt at all) and no Set A is possible. It is not clear whether passive subjects (patients) move out of vP, or even to the vP edge, in Chuj. Making the simplifying assumption that they do not, we assume that the v_{pass} head bears no ϕ-probe.[27] The T head Agrees with the only DP argument, namely the underlying object. The agent, ensconced in an oblique structure, is not accessible to Agree.

(67) Chuj passive[28]



It is again the case in this structure that no single head can ϕ-Agree with multiple goals. Accordingly, hierarchy effects do not arise.

We note that not all previous research on Mayan languages has likewise concluded that passive and agent focus clauses lack animacy hierarchy effects. While data similar to what we just saw for Chuj have been discussed for Cajolá Mam (Pérez Vail 2014) and Poqom (Benito Pérez 2016), a different pattern has been reported for Ch'ol (Zavala 2007, Vázquez Álvarez 2011), Tsotsil (Aissen 1997, 1999), and Tojol-ab'al (Curiel 2007). For Tsotsil, for instance, Aissen reports that animacy hierarchy effects hold both in the active and in the passive. The passive is degraded when the patient (passive subject) is less animate than the agent (oblique).

(68) Tsotsil (Aissen 1997: 728)

a. I-s-man nukul li Xun-e.
CP-A3-buy skin the Juan-ENC
Juan bought the skin.

b. ?? I-man-at yu'un Xun li nukul-e.
CP-buy-PASS by Juan the skin-ENC
The skin was bought by Juan.

The degradation of sentences like passive (68b) is generally reported by Aissen (1997) as weaker than the degradation of hierarchy-violating actives (?? vs. *). We suggest that both the contrast in (68) and the relatively weak nature of the violation in (68b) might be best explained pragmatically. The passive is not the default, pragmatically unmarked encoding for the expression of a two-participant event. Its use must be motivated in some way. Topicality of the patient is a typical motivation; against the backdrop of a language with animacy hierarchy restrictions in the active, avoiding an animacy hierarchy violation is another. When the patient is higher in animacy than the

[27] The non-movement analysis of the passive requires that passive vP not be a phase. Conversely, evidence that vP is always a phase, including in passives, would require that passive subjects in Chuj move at least to the vP edge. This would suggest that at least some ϕ-probing takes place.

[28] We set aside here the additional fact that PPs must extrapose in Chuj (Royer 2022a, 2023).

agent, the active sentence is ungrammatical, and the passive emerges as a natural alternative way of expressing the same proposition. (See for instance Chuj (65).) When this is not the case, as for instance in (68b), speakers may find the use of the passive unmotivated, and accordingly disprefer it. Their dispreference would be motivated not by the ungrammaticality of the structure, but rather by their general preference to use an active except when clearly motivated to do otherwise. If this is so, we predict that the judgment in (68b) will be highly context dependent. It may, for instance, emerge as perfectly well-formed in the context of a story whose central character is not Juan but rather the skin.[29]

7 On the status of Set A and hierarchy effects in the nominal domain

In addressing the syntax of transitive clauses, we have assumed, following previous work, that Set A morphology reflects Agree between v and the external argument. In this section we dig deeper into two aspects of this analysis. The first concerns the question of how it is that the external argument's features in particular are singled out for exponence on v, given the assumption (crucial for our treatment of hierarchy effects) that v also Agrees with the internal argument. In contrast to prior work on Mayan that has emphasized connections to the notion of inherent case (Aissen 2010, Coon 2017, 2019), we suggest an answer to this question that falls conceptually closer to the idea of dependent case (cp. Yip, Maling, and Jackendoff 1987, Marantz 1991, Bittner and Hale 1996, Baker 2015). In particular, we advance the following thesis about the distribution of Set A morphology in Mayan, relating it to recent work seeking to capture dependent case patterns via Agree (Clem and Deal 2023):

(69) *Proposal about Set A morphology in Mayan*
Set A morphology arises whenever a probe enters into ϕ-Agree with a second goal.

This opens the door to a second extension of our analysis, relating to the structure of possessed nominals. We noted in section 2.1 that in Chuj, the same head-marking morphology is used for possessors as for transitive subjects. This type of pattern holds across the Mayan family.

(70) Set A in transitive clauses and possessives (Chuj)

a. Ix-**y**-il ix chichim ix Malin.
PFV-A3-see CLF elder.woman CLF Malin
'Malin saw the elder.'

b. winh **y**-unin ix Malin
CLF A3-child CLF Malin
'Malin's child'

Given (69) as a general thesis about Set A morphology, possessive constructions too must involve a single probe Agreeing with multiple nominals—the configuration in which we expect hierarchy

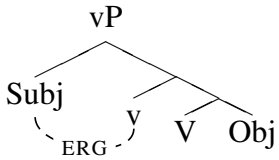
[29] Similar hypotheses can be applied to agent focus, which likewise is reported to show hierarchy effects in Tsotsil (Aissen 1999). The use of agent focus requires focus on the transitive subject, and at least in some Mayan languages (Aissen 2023), carries a presupposition of givenness for material other than the transitive subject. There are thus important differences of meaning between an active and an AF clause. It is plausible that speakers would disprefer an AF clause on pragmatic grounds when they are not sure these conditions are met, especially when an ordinary active clause is grammatically available.

effects to arise. We show that possessor-possessum pairs indeed show hierarchy effects in Chuj, in exact parallel to the patterns found in transitive clauses, as predicted by our analysis.

7.1 Set A and the notion of dependent case

Mayan languages are strongly head-marking: ϕ-features of nominals are indexed on heads, whereas nominals themselves are never overtly inflected for morphological case. In presenting the syntax of Mayan transitives in section 3.1, we followed previous literature that has sought to understand head-marking patterns as following from the same general mechanisms as dependent-marking systems, in particular, abstract case. Transitive subjects receive abstract ergative case from v; objects receive abstract case either from v (low-abs languages) or from T (high-abs languages). In recent work on Mayan (Aissen 2010, Coon 2017, 2019), the idea that abstract ergative is assigned by v has been connected to the idea of ergative as an inherent case, one assigned specifically in a spec-head manner by a θ-marking head such as v (Woolford 1997, Aldridge 2004, Legate 2008, among many others). Set A agreement, on such a theory, is a morphological reflection of the special spec-head Agree relation by which inherent ergative is assigned.

(71) Inherent analysis of Mayan Set A

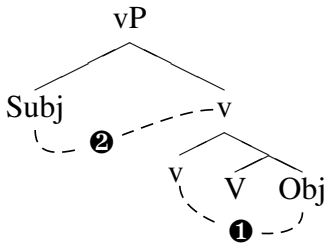


This view of ergative generally, and Mayan Set A in particular, can be contrasted with an alternative view, according to which ergative is a dependent case.[30] The core idea of dependent case is that ergative appears not due merely to a spec-head relation with a certain head but rather in virtue of the presence of another nominal in the relevant syntactic domain. Such approaches have been formalized in different ways (Yip et al. 1987, Marantz 1991, Bittner and Hale 1996, Baker 2014, 2015, Poole 2023, Clem and Deal 2023). We will now show how our treatment of hierarchy effects makes it particularly natural to understand Mayan Set A in connection with the Agree-based treatment of dependent case explored in Clem and Deal 2023, offering an alternative to inherent case-based views.

Crucial to our account is that the spec-head relation between v and the subject is not the first or only ϕ-Agree relation the v probe enters into in a transitive clause. (Thus the step of Agree shown in (71) is only part of the picture.) Rather, the probe on v must first Agree with the object, which then may (depending on the object's dynamic features) bleed Agree with the subject. Following previous work on Cyclic Agree (Rezac 2003, Béjar 2003, Béjar and Rezac 2009), we have proposed to treat Agree between v and the subject not as a special, distinctly spec-head type of agreement, but rather as the natural consequence of a ϕ-probe that may cyclically expand.

[30] We use the term 'dependent case' here as a cover term for a class of theories according to which certain cases depend on the presence of another nominal in the domain. We distinguish this from the particular formal rules used to produce such cases in configurational case theories, e.g. Baker 2010, Baker and Vinokurova 2010, Levin and Preminger 2015.

(72) The one-probe-two-goals configuration in active vPs



As we discussed in section 3.1, the result of the first step of Agree (❶) in (72) is not uniform across Mayan: it produces Set B in low-absolutive languages but object raising in high-absolutive languages. However, the second step of Agree (❷) *is* uniform: across all relevant Mayan languages, it produces Set A (ergative) agreement.

We suggest that this picture invites a new theory of Set A in Mayan—one where the key factor underlying Set A morphology is not a spec-head relationship but rather the fact that the transitive subject ϕ-Agrees *second*. The connection between ergativity and grammatical properties of second goals is explored by Clem and Deal (2023) in their treatment of ergative morphological case. Adapting their proposal to a head-marking system, we propose that Set A morphology in Mayan arises from morphological interpretation of the basic syntax in (72). When the v probe has Agreed with two arguments, it comes into the morphological component with two ϕ-bundles. Set A vocabulary items are insertable only when two ϕ-bundles are present. This means that Set A cannot be inserted in a context when only one argument Agrees—the central move in capturing the intuition that Set A is *dependent*. In addition, in a context where two sets of features are present on Mayan v (and, as we will see, Poss), the language chooses to expone those obtained *last*. This means that subject features are chosen for realization over object features.[31] Grishin and Deal (2023) call this type of behavior 'expone outermost', suggesting that the syntactic representation of probes after Agree is such that features obtained by a probe earlier are structurally projected inside those obtained by the probe later. This proposal leads us to posit vocabulary items for Set A morphemes along the lines of (73).[32] The context of insertion for these VIs records that another, more internal, set of ϕ-features must be present in order for these items to be inserted.

(73) Sample VIs for Chuj Set A

a. /w-/ $\leftrightarrow$ [ϕ,PART,SPKR] / [_ [ϕ
b. /h-/ $\leftrightarrow$ [ϕ,PART] / [_ [ϕ
c. /y-/ $\leftrightarrow$ [ϕ] / [_ [ϕ

Support for this proposal as compared to the inherent case approach comes from the behavior of unergative verbs in Mayan. Notably, Mayan languages do not seem to possess unergative constructions that both are intransitive and contain Set A (see Zavala Maldonado 2017 for discussion). Instead, notional unergatives either involve a dummy transitive verb (see e.g., Gutiérrez Sánchez 2004; Osorio May 2005, 2016; Coon 2012; Zavala Maldonado 2017), as shown in (74a) for Ch'ol,

[31] We refer here specifically to exponence of the features on v itself, not any potential clitics adjoined to it. Building on Coon 2017, we assume that Set B is a clitic rather than the direct realization of the v head. Thus in a low-abs language, Set A morphemes realize v itself, whereas Set B morphemes realize clitics adjoined to it.

[32] Recall that Set A in Chuj shows phonological allomorphy conditioned by consonant/vowel status of the following segment. We abstract away from this here; the Set A forms shown here are those that appear before a vowel.

or special morphology with Set B agreement (Coon 2019; Coon and Royer 2020), as shown in (74b) for Chuj.

(74) Ch'ol and Chuj notional unergatives

a. Tyi k-cha'l-e soñ.
PFV A1-do-TV dance
'I danced.' (lit: 'I did dancing'). (Ch'ol, Coon 2012: 243)

b. Ix-onh-chanhal-w-i.
PFV-B1P-dance-AG-IV
'We danced.'

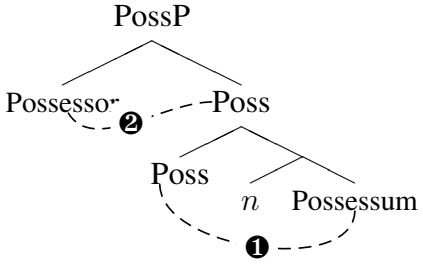
The presence of Set A morphology in a Ch'ol sentence such as (74a) is expected under both inherent and dependent approaches to Mayan ergative. For a dependent approach, the key factor is that this construction involves a (dummy) transitive verb with *two* syntactic arguments. As Coon (2012) argues, *soñ* 'dance' in (74a) is a nominal that serves as the object of the transitive verb *cha'le* 'to do'. Assuming that a probe on v enters into Agree with this nominal first, the availability of Set A follows from our generalization (69), since the subject is the second goal to Agree with v in this case. As for Chuj (74b), Coon (2019: 38) argues that the agentive suffix *-w* is a special v/Voice head that introduces the external argument in its specifier, without assigning ergative case (Set A). On an inherent case theory such as the one assumed by Coon (2019), particular v heads must be individually stipulated to assign or not assign ergative case. There is no deep reason why ergative should be assigned in transitive clauses and not in intransitive ones. We note by contrast that on a dependent approach, the absence of Set A in truly intransitive constructions follows automatically: since no object is present in (74b), the v head cannot collect the two sets of ϕ-features that would be needed in order to insert Set A VIs such as (73). The proposal in (73) being a particular theoretical implementation of the generalization in (69), we note also the broader point that the generalization in (69) explicitly predicts that Set A should be unavailable in (74b).

7.2 Hierarchy effects in Chuj possessive constructions

A key test of our treatment of Set A morphology comes from possessive constructions. In a possessive construction, features of the possessor are indexed on the possessum using Set A morphology. If Set A is the result of a second step of Agree with a ϕ-goal, as we proposed in (69), then possessors, too, must serve as the second ϕ-goal for some probe. The obvious candidate for the first ϕ-goal of the relevant probe is the possessum. Given our analysis of active sentences in section 3, it follows that possessa should not be able to outrank possessors on the animacy hierarchy. In just the same way as Agree with an object can bleed Agree with a subject in the transitive clause, Agree with a possessum should be able to bleed Agree with a possessor in a possessive nominal. This prediction is borne out in Chuj, providing not only additional support for our dependent analysis of Set A, but also for an approach to hierarchy effects that employs dynamic interaction.

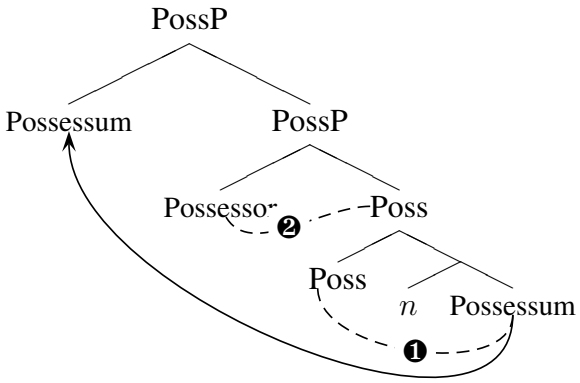
We begin with a basic proposal for the syntax of Mayan possessive constructions. Following Coon (2017), we assume that Set A in the nominal domain reflects Agree between a Poss head and a DP in its specifier. As before, we assume that spec-head Agree reflects cyclic expansion (Rezac 2003). The Poss head must first probe its original c-command domain before it can access its specifier. This leads to Agree with a lower goal first: the possessum. A basic syntax for PossP that reflects these assumptions is shown in (75).

(75) Syntax of possessive phrases in Mayan (preliminary)



What is the contribution of the first step (❶) of Agreement in (75)? A clue comes from word order: as far as we know, all Mayan languages place possessors to the right of possessa. Therefore, we suggest that, like for the v probe in high-absolutive languages (see section 3.1), the Poss probe attracts its goal to its specifier.[33] We note that this not only derives the correct order of possessors and possessa across Mayan, but it is consistent with recent analyses that have sought to derive Mayan word order without resorting to right-branching specifiers (see e.g., Coon 2010; Clemens and Coon 2018; though see Aissen 1992 and Little 2020 for competing accounts). Our final proposal for the syntax of possessive phrases is given in (76). Since the syntax of possessive constructions seems to be quite consistent across the family, we assume that this structure is shared by all relevant Mayan languages.

(76) Syntax of possessive phrases in Mayan (final)



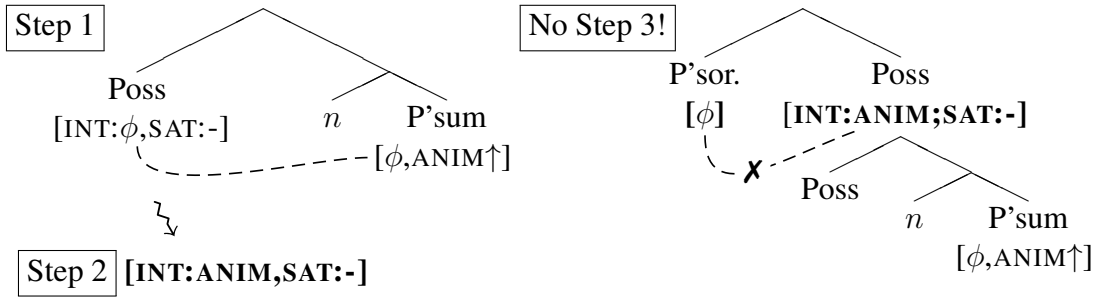
We now turn to the crucial prediction made by our theory for a one-probe-two-goals setup: hierarchy effects. In capturing the hierarchy effect in transitive clauses in section 3, and restricting it to third persons only in section 5, we made crucial use of the idea that dynamic features are borne by goals (DPs). A third-person human-denoting object bears the feature [HUM↑], meaning that a probe that Agrees with this goal changes its interaction specification to [INT:HUM]. A local person object bears the non-dynamic version [HUM]: it does not change the interaction specification of a probe. The crucial role of goal features in determining dynamic interaction can thus be seen in transitive clauses by contrasting 3rd persons with local persons. We hold fixed that the probe is v and vary the particular arguments that the probe Agrees with. Extending the analysis to possessive constructions allows us to run the opposite type of experiment: we hold fixed the arguments and vary the choice of probe. So long as a probe is able to Agree with multiple arguments (i.e., it does

[33] Contrary to the verbal domain, however, the relevant movement is found across all relevant Mayan languages (i.e., all Mayan languages show a "high-possessum" configuration in the nominal phrase).

not have [SAT:ϕ]), we predict that a third-person human-denoting DP as its first goal will have the same effect as in transitive clauses, i.e. changing the probe's interaction condition to [INT:HUM]. This follows because the trigger for dynamic interaction is borne not by the probe but by the goal.

Our theory thus predicts a hierarchy effect in possessives of the following type: the possessor will need to be at least as high in animacy as the possessum. The example schematized in (77) shows that inanimate nouns should not be suitable possessors of animate possessa, since animate possessa change the probe specification to [INT:ANIM]:

(77) Predicted hierarchy effect in Mayan possessives:



The examples in (78)-(80) show that this is prediction is borne out in Chuj: in standard possessive constructions, possessa cannot outrank possessors. (All examples were tested within full sentences, but we provide only possessive phrases here for purposes of illustration.)

(78) Chuj possessive: ✓HUM>INAN, *INAN>HUM

a. ✓ te' s-pat heb' unin
CLF A3-house PL child
'the children's house' (HUM p'sor, INAN p'sum)

b. * heb' y-unin te' pat.
PL A3-child CLF house
Int. 'the house's children' (INAN p'sor, HUM p'sum)

(79) Chuj possessive: ✓ANIM>INAN, *INAN>ANIM

a. ✓ te' s-pat nok' tz'i'
CLF A3-house PL child
'the dog's house' (ANIM p'sor, INAN p'sum)

b. * nok' s-tz'i' te' pat.
CLF A3-dog CLF house
Int. 'the house's dog' (INAN p'sor, ANIM p'sum)

(80) Chuj possessive: ✓HUM>ANIM, *ANIM>HUM[34]

a. ✓ nok' s-tz'i' winh winak
CLF dog CLF man
'the man's dog' (HUM p'sor, ANIM p'sum)

[34]We note that the example (80b) relates to the Chuj cultural concept of *moj spixan*, which are non-human mystical entities that can possess humans. While it is certainly possible to discuss a puma that possesses a person in this way, the standard possessive syntax cannot be used to do so (due to the hierarchy effect).

b. * heb' s-winak nok' choj.
PL A3-man CLF puma
Int. 'the puma's men/people' (ANIM p'sor, HUM p'sum)

Just like animacy hierarchy effects in the verbal domain are relative, so are those in possessive phrases. That is, the restrictions in the (b) examples above cannot be simply attributed to a ban on certain types of possessa. In fact, any kind of nominal expression can serve as the possessor in Chuj, as long as the possessum does not outrank it. This is shown in the following set of examples, in which the possessor and possessum are equally ranked in animacy.

(81) Chuj possessive: nominals equally ranked

a. ✓ s-kuxinu te' pat
A3-kitchen CLF house
'the house's kitchen' (INAN p'sor, INAN p'sum)

b. ✓ nok' y-une' nok' kaxlan
CLF A3-child CLF hen
'the hen's chicks' (ANIM p'sor, ANIM p'sum)

c. ✓ ix s-nun winh winak
CLF A3-mother CLF man
'the man's mother' (HUM p'sor, HUM p'sum)

Notice that the pattern for possessives above is, remarkably, exactly the same as the one observed for Chuj actives in section 2.1, and for active hierarchy effects in other Mayan languages.[35] The summary table for animacy effects in the active voice can thus be replicated for possessives,

[35] A *prima facie* exception are possessive constructions headed by the noun *ajal*, often translated as 'owner', which *can* be possessed by inanimate entities:

(i) winh y-ajal te' pat
CLF A3-authority CLF house
'the house's owner'

We note though that *ajal* can also mean 'authority' or 'government', and can therefore be used to refer to nonhuman entities. We therefore suggest that this noun should be treated as grammatically inanimate, and not syntactically equipped with the feature [HUM]. This proposal receives further support from the behavior of *ajal* in active sentences. Exactly like inanimate nouns, it is possible as an object with a nonhuman subject, (ii), but impossible as a subject with a human object, (iii).

(ii) Ix-y-il winh y-ajal nok' tz'i'
PFV-A3-see CLF A3-authority CLF dog
'The dog saw its owner.'

(iii) * Ix-y-il ix ix winh y-ajal nok' tz'i'.
PFV-A3-see CLF woman CLF A3-authority CLF dog
Intended: 'The owner of the dog saw the woman.'

These data have significant consequences for a previous interpretation of sentences with the cognate noun *ajval* in Tsotsil (as well as for the granularity of the hierarchy in Poqom; see fn 23). Aissen (1997, section 4.5), glossing *ajval* as 'owner', uses data based solely on *ajval* as support the claim that Tsotsil does not have animacy hierarchy effects in possessives. The inanimate behaviour of the cognate form in Chuj seen above, and the presence of hierarchy effects in Chuj possessives in (78)-(80), suggests that these conclusions might need to be revisited.

as in (82). In other words, much like objects cannot outrank subjects on Chuj's animacy scale (HUM>ANIM>INAN), possessa also cannot outrank possessors on this scale.

(82) Animacy effects for possessor/possessum combinations in Chuj

P'SOR	P'SUM		P'SOR	P'SUM		P'SOR	P'SUM	
HUM	HUM	✓ (81c)	ANIM	HUM	✗ (80b)	INAN	HUM	✗ (78b)
HUM	ANIM	✓ (80a)	ANIM	ANIM	✓ (81b)	INAN	ANIM	✗ (79b)
HUM	INAN	✓ (78a)	ANIM	INAN	✓ (79a)	INAN	INAN	✓ (81a)

Importantly, these hierarchy effects in the nominal domain—which have gone unnoticed in work on Mayan animacy effects in the verbal domain—follow as an immediate consequence of our dynamic approach to hierarchy effects from section 3, combined with our proposal that the one-probe-two-goals configuration also holds of possessive constructions in Mayan (which explains the use of Set A to cross-reference both ergatives and possessors).[36] As already schematized in (77), our system predicts that the first goal to Agree with Poss should never be able to outrank the second goal to Agree with Poss on Chuj's animacy hierarchy.

We note in closing that the repair strategies (in, again, the descriptive use of the term 'repair') found in Chuj possessives are of interest as well for what they can tell us about the distribution of dynamic features. While we have identified several kinds of repairs, the most common is certainly the use of the nominal suffix *-il/al*, attached to the possessum. We gloss this morpheme as "INAL" below.[37]

(83) "Repair" strategy for animacy hierarchy effects in Chuj possessives

a. y-unin-**al** te' pat
A3-child-INAL CLF house
'the house's children' (cf. (78b))

b. s-tz'i'-**al** te' pat
A3-dog-INAL CLF house
'the house's dog' (cf. (79b))

c. s-winak-**il** nok' choj
A3-man-INAL CLF puma
'the puma's men' (those whose *moj spixan* is a puma) (cf. (80b))

[36] See Hofling 1990, Lehmann 1998, and Ortmann and Handschuh 2004 on animacy effects within possessive phrases in Itzaj and Yucatec Maya. Ortmann and Handschuh (2004: 6) specifically state that "the suffix *il*"—the same form used as a repair strategy in Chuj (83)—"occurs whenever the possessor is lower in animacy than the possessee" with respect to the scale HUMAN>ANIMATE>INANIMATE. Though we are not aware of any discussion of animacy hierarchy effects the Itzaj verbal domain, our analysis would predict that Itzaj should also show such effects in active sentences.

[37] Our glossing reflects the fact that in many Mayan languages, the suffix *-il/al* is associated with alienability distinctions (see e.g., Freeze 1976; Hofling 1990; Lehmann 1998; Ortmann and Handschuh 2004; Polian 2013; Coon 2016), though the particular role of the suffix is not obviously always the same. In Chuj, while inalienably possessable nouns often appear with this suffix, alienably possessable nouns do not (see Maxwell 1982, Buenrostro 1996, and Royer et al. 2022 for relevant discussion). The suffix can also be used when an inherently inalienable noun (like a body part term) exceptionally appears unpossessed (Royer 2023). (In some Mayan languages, this appears to be the main function of cognates of this suffix; see Coon 2016.) While it remains to be determined how broadly across Mayan languages *-il/al* functions as a hierarchy "repair" for possessives, Gilles Polian (p.c.) indicates that this strategy is also employed in Tseltal whenever the possessum outranks the possessor.

While *-il/al* is required to express the intended meanings in (83), it is optional in cases in which hierarchy effects are not at issue:

(84) Optional uses of *il/al* in Chuj

a. heb' y-unin-(al) ix ix
PL A3-child-INAL CLF woman
'the woman's children' (HUM p'sor, HUM p'sum)

b. s-kuxinu-(al) te' pat
A3-kitchen-INAL CLF house
'the house's kitchen' (INAN p'sor, INAN p'sum)

Notice that Set A agreement is preserved in all of the examples in (83)-(84). This makes for a notable difference as compared to repairs for transitive clauses, where (passive and agent focus) repairs involved the complete absence of Set A morphology.

Our discussion in section 5 points to two ways we could go about explaining the availability of Set A in *-il/al* possessives. On the one hand, we could propose that the suffix, combining with a possessum noun, conceals or deletes all features that bear a dynamic diacritic on the noun, making *-il/al*-bearing nominals effectively behave like inanimates. Alternatively, we could propose that the suffix overrides only the dynamic diacritics on features. These two options are schematized below. In both cases, a possessum noun bearing *-il/al* would be expected never to bleed further Agree with a possessor, either because it formally lacks animacy features, or because it lacks animacy features that are dynamic.

(85) Two options for the syntactic contribution of *il/al*

a. Option 1: [α, $\beta\uparrow$, $\gamma\uparrow$] $\rightarrow$ [α]

b. Option 2: [α, $\beta\uparrow$, $\gamma\uparrow$] $\rightarrow$ [α, β, γ]

In section 5.2, consideration of a parallel option space for local person DPs led us to the conclusion that local persons do indeed have animacy features, but not dynamic ones. The same argument is applicable to *-il/al*-bearing possessum nouns, favoring option 2. If possessum nouns with *-il/al* behaved as inanimates, we would expect them to be impossible as subjects when the object is animate. But they are perfectly possible in this environment:

(86) Ix-y-il ix Malin heb' y-unin-al waj Xun.
PFV-A3-see CLF Malin PL A3-child-INAL CLF Xun
'Xun's children saw Malin.' (Chuj)

By contrast, under the proposal that the *-il/al* suffix overrides only *dynamic* diacritics on nouns, as in (85b), inalienably marked nouns like *uninal* in (86) are expected to be viable subjects of active sentences with human objects. Suffixation with *-il/al* yields a noun that still bears [ϕ, ANIM, HUM], and will thus still be able to Agree with v after v Agrees with an object bearing the features [ϕ, ANIM$\uparrow$, HUM$\uparrow$]. We thus take the behavior of *-il/al* nominals in Chuj as initial evidence that the grammar may manipulate not just ϕ-features, but specifically the dynamic behavior thereof.

8 Obviation and Mayan animacy restrictions

In this section we explore the perspective our theory lends on the connection between animacy hierarchy effects and reference tracking systems such as the obviation patterns of Algonquian languages. As noted in the introduction, work by Aissen (1997, 1999) has been influential in making a connection of this type. In the Mayanist literature, the impact of Aissen's proposals can be seen both in the way that animacy hierarchy effects are frequently discussed (i.e. under the heading of 'obviation effects'), and in the types of patterns discussed alongside animacy hierarchy effects. These generally include documentation of what Aissen calls the "genitive effect", shown for Chuj and Ch'ol in (87): in Mayan, the possessor of the subject generally cannot co-refer with the object.[38]

(87) The genitive effect in Chuj and Ch'ol

a. * Ix-y-il waj Xun [$_S$ ix s-nun *pro*].
PFV-A3-see CLF Xun CLF A3-mother PRON
Intended: 'His$_1$'s mother saw Xun$_1$.' (Chuj)

b. * Tyi i-tyaj-a *pro* [$_S$ i-ñox'a *pro*] tyi Yermosaj.
PFV A3-find-TV PRON A3-husband PRON PREP Villahermosa
Intended: 'Her$_1$ husband found her$_1$ in Villahermosa.' (Ch'ol)
(Vázquez Álvarez 2011: 349)

On Aissen's analysis, both the genitive effect and animacy hierarchy effects reflects constraints on the mapping between nominals and the *obviation tier*, understood as an obviation-specific level of linguistic representation. The obviation tier contains the roles PROXIMATE and OBVIATIVE. In the direct/inverse systems found in Algonquian languages, direct voice is required whenever the subject maps to PROXIMATE on the obviation tier and the object maps to OBVIATIVE; otherwise, inverse voice is required. In Tsotsil, correspondingly, Aissen proposes, active voice is required when the subject maps to PROXIMATE and the object maps to OBVIATIVE. Otherwise, passive is required.

While Mayan languages (in contrast to Algonquian languages) do not show any direct morphological evidence of obviation-related features, Aissen (1997, 1999) argues that the postulation of a covert obviation system in Mayan allows for three types of facts about Mayan languages to be explained. First, similar to how proximates in Algonquian are generally more topical or definite than obviatives (see Oxford to appear and references therein), subjects are typically more definite or topical than objects in Tsotsil (Aissen 1999). This could, however, simply reflect the general topicality and definiteness of subjects across languages. Second, as we have discussed at length, Mayan languages have animacy hierarchy effects. Algonquian languages do as well; animacy distinctions among third persons are part of larger person/animacy hierarchy effects in these languages. On Aissen's analysis, both language families' hierarchy effects work in a way that references the obviation tier (see Aissen 1997, esp. §3.3 and 4.3). In this connection it is perhaps telling that recent analyses of obviation effects and hierarchies in Algonquian do not involve reference to an obviation tier, but rather reference the workings of Agree; see in particular Oxford

[38]Both Aissen's work and the literature inspired by it also often considers other coreference patterns as well, including some that cross clauses. We focus here on the genitive effect for simplicity. We suggest that the remarks concerning the genitive effect here extend to other restrictions on coreference discussed in connection with obviation.

(2019, to appear), who analyzes these effects by means of the interaction/satisfaction theory we have also invoked. Third, given a few additional assumptions, the obviation-based analysis allows us to capture the genitive effect, (87), which both Mayan and Algonquian languages share in general terms. Of particular note for Aissen is the fact that both the genitive effect and the animacy hierarchy effect are restricted in Mayan to 3rd person arguments, whereas in Algonquian they apply to all persons. The following Chuj and Ch'ol examples show the 3rd person restriction: local person subject possessors can corefer with objects.

(88) No genitive effect with local persons

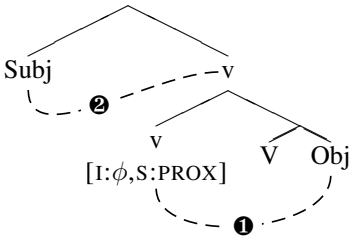
a. Ix-in-y-il ix hin-nun.
PFV-B1S-A3-see CLF A1S-mother
'My mother saw me.' (Chuj)

b. Tyi i-ts'äk-ä-y-oñ k-alo'b-il.
PFV A3-cure-TV-EPEN-B1 A1-son-NML
'My son cured me.' (Ch'ol, Zavala 2007: 77)

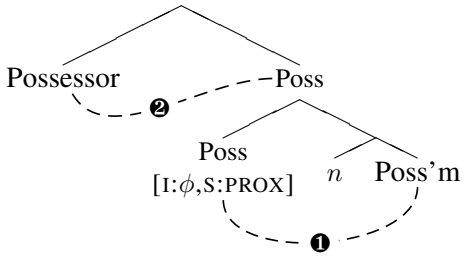
For Aissen, the special behavior of local persons in Mayan reflects a Mayan-specific participant/obviation hierarchy that leaves local persons unranked. The absence of an obviation rank for local persons means that both the genitive effect and the animacy hierarchy effect are confined to 3rd persons.

How might our theory of animacy hierarchy effects in Mayan relate to the genitive effect? As it stands, our theory does not predict a constraint on coreference in examples like (87). (In those examples, the arguments are of equal animacy both within the possessive and in the transitive clause, so no animacy hierarchy violation is incurred.) Something additional is needed. We suggest the following as a working hypothesis. First, while we do not adopt an obviation tier as a level of representation, we posit a feature [PROX] as an element of the possible feature make-up of a DP. We suggest that what we previously analyzed as an insatiable probe on v and Poss should instead be treated as [SAT:PROX]—the probe halts when it encounters a goal bearing the [PROX] feature. This rules out structures with Set A agreement and either proximate objects or proximate possessa, as either of these bleeds the further Agree needed to generate Set A.

(89) a. vP



b. PossP



Second, we follow Aissen (1997: 710) in assuming that the [PROX] feature tracks nominal reference (a point ideally to be derived from its proper semantics):

(90) *Obviation tracks reference*
If two expressions co-refer, they must match wrt the feature [PROX].

Third, we follow Pancheva and Zubizarreta (2018) in assuming that the distribution of the [PROX] feature is conditioned by the number of (referentially distinct) third persons in the domain. That is, the essential function of [PROX] is third person dissimilation:

(91) *Third person dissimilation*
If there are two third persons in a clause, one must bear the feature [PROX].

These assumptions together derive the genitive effect. Consider again the examples in (92):

(92) The genitive effect in Chuj and Ch'ol

a. * Ix-y-il waj Xun [$_S$ ix s-nun *pro*].
PFV-A3-see CLF Xun CLF A3-mother PRON
Intended: 'His$_1$'s mother saw Xun$_1$.' (Chuj)

b. * Tyi i-tyaj-a *pro* [$_S$ i-ñox'a *pro*] tyi Yermosaj.
PFV A3-find-TV PRON A3-husband PRON PREP Villahermosa
Intended: 'Her$_1$ husband found her$_1$ in Villahermosa.' (Ch'ol)

Given Set A agreement in the clause and the possessive DP, neither the object nor the possessum can bear the feature [PROX]. For (92a), this rules out proximate status for *Xun* and *nun* 'mother'. These elements cannot bear [PROX] because, if they did, Set A agreement would have been impossible in the clause and in the nominal, respectively. What about the pronominal possessor? It cannot bear [PROX] due to (90): it corefers with an element that lacks [PROX], so it too must lack [PROX]. The result is that no argument bears [PROX], which violates (91): there are two third persons but no [PROX] feature.

On this analysis, local persons are outside the genitive effect pattern because of the formulation of (91), stated specifically as *third person* dissimilation. We suggest that this might form part of a broader pattern of dissimilation effects arising specifically in 3>3 contexts, both within Mayan and beyond. In Tsotsil, for instance, Aissen (1999) reports that agent focus is available only when both subject and object are third person. The effect of agent focus is to disambiguate which argument has been extracted.[39] Dissimilation among third persons outside of the Mayan family is discussed by Nevins (2007) and Foley and Toosarvandani (2022). We note as well that while animacy hierarchy effects in Mayan are typically confined to 3rd persons, we have seen in section 5 that this is not always the case; local persons also participate in animacy hierarchies in Cajolá Mam.

The view we have just outlined leads us to expect that hierarchy effects and genitive effects should be typologically independent of one another. For the relative hierarchy effect, the crucial factor is the dynamic nature of certain features on DP goals. In a language without dynamic features, we expect no such relative hierarchy effect to arise. For the genitive effect, the crucial factor is the [SAT:PROX] specification of the relevant probes. In the absence of probes with this particular specification we do not expect a genitive effect, even if principles like (90) and (91) remain in place. We thus expect four different language types, as schematized below:

[39]We note of course that this restriction does not hold in all Mayan languages. In Chuj, for example, agent focus constructions can involve a local person object (see footnote 9 above). (See also Coon et al. 2021, section 2.3.)

(93) Hierarchies and genitive effects: four predicted language types

	Dynamic ϕ-features	No dynamic ϕ-features
[SAT:PROX] probes	I	II
no [SAT:PROX] probes	III	IV

Chuj is a language of Type I, showing both a relative hierarchy effect and a genitive effect. French is a language of type IV, showing no relative hierarchy effect and no genitive effect.[40] What of Types II and III? A Type II language has a genitive effect but no hierarchy effect. Discussion of Kaqchikel in Broadwell (2000) suggests that this language is Type II. The genitive effect is seen in (94a); the absence of a hierarchy effect is seen in the well-formedness of both (94b) and (94c).

(94) Kaqchikel (Broadwell 2000)

a. * N-u-kanoj r-ixjayil a Manuel rija.
CON-3SA-look:for 3SA-wife CL Manuel s/he
Intended: 'Manuel$_i$s wife is looking for him$_i$.'

b. Ri kär x-u-yawarisaj ri w-ixjayil.
the fish COM-3SA-make:sick the 1SA-wife
'The fish made my wife sick.'

c. X-u-yawarisaj ri kär ri w-ixjayil.
COM-3SA-make:sick the fish the 1SA-wife
'My wife made the fish sick.' OR 'The fish made my wife sick.'

Beyond Mayan, a potential Type III language is Kawahíva, a Tupian language of Brazil. Like many other Tupi-Guarani languages, Kawahíva shows a relative person hierarchy effect in transitive clauses; the subject can Agree only when it is at least as high as the object on the hierarchy $1 > 2 > 3$ (dos Santos 2023). Thus the subject Agrees in $1 > 2$ example (95a) and $2 > 3$ example (95c), but not in $2 > 1$ example (95b). (This is the Strictly Descending person hierarchy pattern, discussed above in connection with the introduction of dynamic interaction in Deal (2023).) This type of pattern can be captured if the features [PART] and [SPKR] interact dynamically in this language.

(95) Kawahíva (Tupian; dos Santos 2023)

a. a-hepia ji nde.
1SG.A-eat 1SG 2SG
I saw you.

b. ji=repia nde.
1SG.B=see 2SG
You saw me.

c. ere-hepia ki nde ga
2SG.A-see PST 2SG 3SG.M
You saw him.

The absence of a genitive effect in Kawahíva is seen in (96).

[40] We provide French as an example here because French does allow at least some probes to Agree with multiple arguments, giving rise to PCC patterns; see Rezac (2011) for discussion of ditransitives and causatives. In (standard European) French, these patterns are of the strong PCC type, meaning they are not *relative*.

(96) O-mboahy ga(j)='='y=hēa ga(j)
3-miss 3SG.M=mother=fem 3SG.M
His mother misses him. (Wesley dos Santos, p.c.)

Beyond Kawahíva (where the $1 > 2 > 3$ pattern occurs between subjects and objects in transitive clauses), we note in general that languages with a Strictly Descending PCC or a Weak PCC in ditransitives also call for dynamic features, but that languages with these patterns (incl. varieties of Spanish, Italian, Catalan, and Arabic) are not generally reported to show genitive effects. This is to be expected on our theory, where relative hierarchy effects reflect dynamic interaction features on goals, whereas genitive effects reflect the distribution of [PROX] features in the context of [SAT:PROX] probes. An overall observation is that relative hierarchy effects reflect *interaction* whereas genitive effects reflect probe *satisfaction*.

9 Conclusion

In this paper, we have proposed a new analysis of animacy restrictions that accounts for a notably uniform pattern of hierarchy effects across member languages of the syntactically diverse Mayan family. Hierarchy effects arise when a single probe is able to Agree with two goals. The cyclicity of the derivation is key: a probe on v always Agrees with the object first, and this step of Agree can bleed a further step of Agree between v and the subject. When v does not Agree with the subject, Set A morphology cannot be generated and a standard Mayan transitive clause cannot be built. The common core of subject-object hierarchy effects in Mayan emerges from the shared core vP structure, where v Agrees with both arguments in its domain. It is not crucial whether v moves the object to its Spec, as in high-abs languages, or instead clitic-doubles it, as in low-abs languages. The hierarchy effect comes from the syntax of Agree, *not* from details of cliticization nor from object movement.

We have proposed that the crucial animacy-related factor bleeding Agree with certain subjects in Mayan is the process of dynamic interaction (Deal 2023): features borne by earlier goals can change the specifications that probes carry forward into Agree with later goals. Appeal to dynamic interaction allows us to capture three important aspects of the Mayan pattern. First, equi-animate argument pairings are grammatical—the subject does not need to be *higher* than the object in animacy, but merely as *at least as high*. This follows from the fact that a goal must have a certain feature, e.g. [ANIM], in order for it to transfer that feature into the interaction specification of a probe. Thus a merely animate (animal-denoting) goal can change the probe such that it interacts subsequently only with bearers of [ANIM]—but cannot change it to require the presence of some more specific feature, e.g. [HUM]. Second, in most Mayan languages, animacy hierarchy effects hold only in the third person. This follows from the fact that dynamic features are borne by goals, that is, DPs—and some classes of DPs may bear dynamic features in a language, whereas others do not. In Chuj, for instance, we have argued that third person human-denoting nominals bear dynamic [HUM↑], whereas local person pronouns bear the non-dynamic, "simple" version, [HUM]. Third, the very same animacy hierarchy effect holding between subjects and objects also holds between possessors and possessa. This follows again from the locus of dynamic features on goals. In a language where multiple probes allow multi-goal Agree, we expect to see the same patterns of dynamic interaction emerging. Our novel data from transitives and possessives in Chuj provides

initial confirmation that this prediction is correct.[41]

Our analysis suggests new avenues for typological and theoretical study within and beyond the Mayan family. We have proposed, for instance, that the ergative morphology of Mayan languages, i.e. Set A, may be thought of as reflecting not that the subject is an external argument/agent (an inherent case-type view), but rather than it is the second ϕ-goal for the probe. Set A arises when a probe has Agreed with another ϕ-goal first. This brings our understanding of Set A closer to theories of dependent case, which typically treat ergative as arising when an object can serve as a "case competitor". Such a theory naturally extends to other instances of ergative agreement, opening up new possibilities of analysis for a variety of ergative languages. We have also suggested that patterns of coreference regulation such as Aissen's "genitive effect" arise from a source separate from relative hierarchy effects *per se*. We expect to find further instances of languages that have relative hierarchy effects but not the genitive effect, and vice versa. In terms of the mechanics of Agree, one question made particularly pressing in view of our analysis is: what principles, if any, constrain the distribution of dynamic features across a nominal inventory? We have seen that many Mayan languages make use of dynamic animacy features only for 3rd persons, but not for local persons. Further typological work is needed to learn whether the opposite pattern also occurs.

References

Adger, David, and Daniel Harbour. 2007. Syntax and Syncretisms of the Person Case Constraint. *Syntax* 10:2–37.

Aissen, Judith. 1992. Topic and focus in Mayan. *Language* 68:43–80.

Aissen, Judith. 1997. On the syntax of obviation. *Language* 73:705–769.

Aissen, Judith. 1999. Agent focus and inverse in Tzotzil. *Language* 75:451–485.

Aissen, Judith. 2010. Depictives and serialization in Tzotzil. In *Hypothesis A/Hypothesis B*, eds. Donna B. Gerdts, John C. Moore, and Maria Polinsky, Current Studies in Linguistics, 1–17. Cambidge, MA: MIT Press.

Aissen, Judith. 2017. Correlates of ergativity in Mayan. In *Oxford Handbook of Ergativity*, eds. Jessica Coon, Diane Massam, and Lisa Travis. New York: Oxford University Press.

Aissen, Judith. 2023. Documenting topic and focus. *Language Documentation and Conservation* 26.

Aissen, Judith, Nora C. England, and Roberto Zavala Maldonado. 2017. *The Mayan Languages*. Routledge Language Famliy Series. New York: Routledge.

Aldridge, Edith. 2004. Ergativity and word order in Austronesian languages. Ph.D. dissertation, Cornell University, Ithaca, NY.

Anagnostopoulou, Elena. 2003. *The Syntax of Ditransitives: Evidence From Clitics*. Berlin: Mouton de Gruyter.

Anagnostopoulou, Elena. 2005. Strong and Weak Person Restrictions: A feature checking analysis. In *Clitic and Affix Combinations: Theoretical Perspectives*, eds. Lorie Heggie and Francisco Ordonez, volume 74 of *Linguistics Today*, 199–235. Amsterdam: John Benjamins.

[41] We note that the Chuj data provide particularly clear evidence of this pattern not only because there are multiple probes that engage in multi-goal Agree, but also because those probes are similar in their satisfaction conditions. The pattern would not be so immediately apparent if, for instance, one probe had satisfaction condition [ANIM].

Assmann, Anke, Doreen Georgi, Fabian Heck, Gereon Müller, and Philipp Weisser. 2015. Ergatives move too early: On an instance of opacity in syntax. *Syntax* 18:343–387.

Baier, Nico. 2018. Anti-Agreement. Ph.D. dissertation, University of California, Berkeley.

Baier, Nico. 2020. The Person Case Constraint in Kabyle. *McGill Working Papers in Linguistics* 26:1–23.

Baker, Mark. 2010. On parameters of agreement in Austronesian languages. In *Austronesian and Theoretical Linguistics*, eds. Raphel Mercado, Eric Potsdam, and Lisa deMena Travis, 345–374. John Benjamins.

Baker, Mark C. 2014. On Dependent Ergative Case (in Shipibo) and its Derivation by Phase. *Linguistic Inquiry* 45:341–379.

Baker, Mark C. 2015. *Case: Its Principles and its Parameters*. Cambridge Studies in Linguistics. Cambridge: Cambridge University Press.

Baker, Mark C., and Nadya Vinokurova. 2010. Two Modalities of Case Assignment: Case in Sakha. *Natural Language and Linguistic Theory* 28:593—642.

Béjar, Susana. 2003. Phi-syntax: A theory of agreement. Doctoral dissertation, University of Toronto.

Béjar, Susana, and Milan Rezac. 2003. Person Licensing and the Derivation of PCC Effects. In *Romance Linguistics: Theory and Acquisition*, eds. Ana Teresa Perez-Leroux and Yves Roberge, 49–62. Amsterdam: John Benjamins.

Béjar, Susana, and Milan Rezac. 2009. Cyclic Agree. *Linguistic Inquiry* 40:35–73.

Benito Pérez, José Gonzalo. 2016. Orden básico y pragmática de las voces en poqom. Master's thesis, CIESAS, México.

Bittner, Maria, and Ken Hale. 1996. The Structural Determination of Case and Agreement. *Linguistic Inquiry* 27:1–68.

Bochnak, Ryan, and Lisa Matthewson. 2020. Techniques in complex semantic fieldwork. *Annual Review of Linguistics* 6:261–283.

Bohnemeyer, Jürgen. 2009. Temporal anaphora in a tenseless language. In *The expression of time in language*, eds. W. Klein and P. Li, 83–128. Berlin: Mouton de Gruyter.

Bonet, Eulalia. 2008. The person-case constraint and repair strategies. In *Agreement Restrictions*, eds. Roberta D'Alessandro, Susann Fischer, and Gunnar Hrafn Hrafnbjargarson, 103–128. Amsterdam: De Gruyter.

Bowern, Claire. 2008. *Linguistic Fieldwork: A Practical Guide*. New York, NY: Palgrave MacMillan.

Branan, Kenyon, and Michael Yoshitaka Erlewine. 2022. A'-probing for the closest DP. *Linguistic Inquiry* .

Broadwell, George Aaron. 2000. Word order and markedness in kaqchikel. In *Proceedings of the LFG00 Conference*, 44–62.

Buenrostro, Cristina. 1996. Algunos aspectos semánticos de la posesión en chuj. In *Análisis semánticos*, ed. Josefina García Fajardo, 37–51. El Colegio de México.

Buenrostro, Cristina. 2013. La voz en Chuj de San Mateo Ixtatán. Ph.D. dissertation, El Colegio de México, Mexico City.

Clem, Emily. 2019. Object-sensitive switch-reference and insatiable probes. In *NELS 49: Proceedings of the forty-ninth annual meeting of the North-East Linguistics Society*, eds. Maggie Baird and Jonathan Pestesky, volume 1, 173–186. Amherst, MA: GLSA Publications.

Clem, Emily. 2022. Accounting for parallels between inverse marking and the PCC. In *NELS 52:*

Proceedings of the Fifty-Second Annual Meeting of the North East Linguistic Society, eds. Özge Bakay, Breanna Pratley, Eva Neu, and Peyton Deal, 149–162. Amherst, MA: GLSA.
Clem, Emily. 2023. Cyclic expansion in Agree: Maximal projections as probes. *Linguistic Inquiry* 54:39–78.
Clem, Emily, and Amy Rose Deal. 2023. Dependent case by Agree: Ergative in Shawi. Ms. UCSD and UC Berkeley.
Clemens, Lauren Eby, and Jessica Coon. 2018. Deriving verb initial order in Mayan. *Language* 94:237–280.
Coon, Jessica. 2010. VOS as Predicate Fronting in Chol. *Lingua* 120:354–378.
Coon, Jessica. 2012. Split ergativity and transitivity in Chol. *Lingua* 122:241–256.
Coon, Jessica. 2016. Mayan morphosyntax. *Language and Linguistics Compass* 10:515–550.
Coon, Jessica. 2017. Little-v agreement and templatic morphology in Ch'ol. *Syntax* 20:101–137.
Coon, Jessica. 2019. Building verbs in Chuj: Consequences for the nature of roots. *Journal of Linguistics* 55:35–81.
Coon, Jessica, Nico Baier, and Theodore Levin. 2021. Mayan Agent Focus and the ergative extraction constraint: Facts and fictions revisited. *Language* 97:269–332.
Coon, Jessica, and Stefan Keine. 2021. Feature Gluttony. *Linguistic Inquiry* 52:655–710.
Coon, Jessica, Pedro Mateo Pedro, and Omer Preminger. 2014. The role of case in A-bar extraction asymmetries: Evidence from Mayan. *Linguistic Variation* 14:179–242.
Coon, Jessica, and Justin Royer. 2020. Nominalization and selection in two Mayan languages. In *Nominalization: 50 years on from Chomsky's Remarks*, eds. Artemis Alexiadou and Hagit Borer, 139–168. Oxford University Press.
Craig, Colette Grinevald. 1977. *The Structure of Jacaltec*. Austin, TX: University of Texas Press.
Curiel, Alejandro. 2007. Estructura de la información, enclíticos y configuración sintáctica en tojol 'ab'al. Master's thesis, CIESAS, México.
Dayley, Jon. 1981. Voice and ergativity in Mayan languages. *Journal of Mayan Linguistics* 2:3–82.
Deal, Amy Rose. 2015. Interaction and satisfaction in ϕ-agreement. In *The proceedings of the 45th North-Eastern Linguistic Society (NELS 45)*, eds. Thuy Bui and Deniz Ozyildiz, 179–192. Amherst, MA: GLSA.
Deal, Amy Rose. 2022. Current models of Agree. Ms. UC Berkeley.
Deal, Amy Rose. 2023. Interaction, satisfaction, and the PCC. *Linguistic Inquiry* .
Driemel, Imke, Ahmet Bilal Özdemir, and Marie-Luise Popp. 2020. A repair for PCC and inverse contexts in Adyghe. In *Proceedings of NELS 50*, eds. Mariam Asatryan, Yixiao Song, and Ayana Whitmal, 183–196. Amherst: GLSA Publications.
England, Nora. 2001. *Introducción a la Gramática de los Idiomas Mayas*. Guatemala: Cholsamaj.
England, Nora C. 2017. Mam. In *The Mayan Languages*, eds. Judith Aissen, Nora C. England, and Roberto Zavala Maldonado, 500–532. Routledge.
Erlewine, Michael Yoshitaka. 2016. Anti-locality and optimality in Kaqchikel Agent Focus. *Natural Language and Linguistic Theory* 34:429–479.
Foley, Steven, and Maziar Toosarvandani. 2022. Extending the person-case constraint to gender: Agreement, locality, and the syntax of pronouns. *Linguistic Inquiry* 53:1–40.
Freeze, Ray. 1976. Possession in K'ekchi' (Maya). *International Journal of American Linguistics* 42:113–125.
García Pablo, Gaspar, and Pascual Martín Domingo Pascual. 2007. *Stzolalil Sloloni-Spaxtini heb' Chuj: Gramática Descriptiva Chuj*. Academia de Lenguas Mayas de Guatemala.

Grishin, Peter, and Amy Rose Deal. 2023. Realizing multiple valuation. Ms., MIT and UC Berkeley.
Gutiérrez Sánchez, Pedro. 2004. Las clases de verbos intransitivos y el alineamiento agentivo en el chol de Tila, Chiapas. M.A. thesis, CIESAS, México.
Halpert, Claire. 2019. Raising, unphased. *Natural Language & Linguistic Theory* 37:123–165.
Hammerly, Christopher. 2020. Person-based prominence in Ojibwe. Ph.D. dissertation, University of Massachusetts Amherst.
Harley, Heidi, and Elizabeth Ritter. 2002. Person and Number in Pronouns: A Feature-Geometric Analysis. *Language* 78:482–526.
Henderson, Robert. 2012. Morphological alternations at the intonational phrase edge: The case of K'ichee'. *Natural Language and Linguistic Theory* 30:741–787.
Hofling, Charles A. 1990. Possession and ergativity in itzá maya. *International Journal of American Linguistics* 56:542–560.
Hopkins, Nicholas. 1967. The Chuj language. Ph.D. dissertation, University of Chicago, Chicago, IL.
Hopkins, Nicholas A. 2021. *Chuj (Mayan) Narratives: Folklore, History, and Ethnography from Northwestern Guatemala*. Boulder, CO: University Press of Colorado.
Kaufman, Terrence. 1974. *Idiomas de Mesoamerica*. Guatemala: Editorial Jose De Pineda Ibarra.
Law, Danny. 2014. *Language contact, inherited similarity and social difference: The story of linguistic interaction in the Maya lowlands*. Amsterdam: John Benjamins.
Legate, Julie Anne. 2008. Morphological and Abstract Case. *Linguistic Inquiry* 39:55–101.
Lehmann, Christian. 1998. *Possession in Yucatec Maya*. LINCOM Europa.
Levin, Theodore, and Omer Preminger. 2015. Case in Sakha: Are two modalities really necessary? *Natural Language and Linguistic Theory* 33:231–250.
Little, Carol-Rose. 2020. Mutual dependencies of nominal and clausal syntax in Ch'ol. Ph.D. dissertation, Cornell University.
Marantz, Alec. 1991. Case and Licensing. In *Proceedings of the 8_{th} Eastern States Conference on Linguistics (ESCOL 8)*, eds. German Westphal, Benjamin Ao, and Hee-Rahk Chae, 234–253. Ithaca, NY: CLC Publications.
Matthewson, Lisa. 2004. On the methodology of semantic fieldwork. *International Journal of American Linguistics* 70:369–415.
Maxwell, Judith. 1982. How to talk to people who talk *chekel* 'different': The Chuj (Mayan) solution. Ph.D. dissertation, University of Chicago, Chicago, IL.
Mikkelsen, Line. 2023. Hyperraising in Kalaallisut. Ms. UC Berkeley.
Minkoff, Seth. 2000. Animacy hierarchies and sentence processing. In *The Syntax of Verb Initial Languages*, eds. Andrew Carnie and Eithne Guilfoyle, 201–212. Oxford University Press.
Murphy, Andrew. 2019. Resolving conflicts with violable constraints: On the cross-modular parallelism of repairs. *Glossa* 4:1–39.
Myers, Willie, Justin Royer, and Jessica Coon. to appear. Correlates of object raising in Mayan. In *Move & Agree*, eds. Hermann Keupdjio, James Crippen, and Rose-Marie Déchaine. John Benjamins Publishing Company.
Nevins, Andrew. 2007. The representation of third person and its consequences for Person-Case effects. *Natural Language and Linguistic Theory* 25:273–313.
Nevins, Andrew. 2011. Mulitple agree with clitics: person complementarity vs. omnivorous number. *Natural Language and Linguistic Theory* 939–971.

Ortmann, Albert, and Corinna Handschuh. 2004. Semantic factors of valence-changing processes with nouns: possession in the Mayan languages. Paper presented at the Twenty-sixth Annual Meeting of the Deutsche Gesellschaft für Sprachwissenschaft (DGfS).

Osorio May, José del Carmen. 2005. Análisis de la morfología verbal del yokot'an "chontal" del poblado de tecoluta, nacajuca, tabasco. Master's thesis, CIESAS, México.

Osorio May, José del Carmen. 2016. Temas de la sintaxis del yokot'an "chontal" de Tecoluta, Nacajuca, Tabasco. Ph.D. dissertation, Centro de Investigaciones y Estudios Superiores en Antropología Social, Ciudad de México.

Oxford, Will. 2019. Inverse marking and Multiple Agree in Algonquian: Complementarity and variability. *Natural Language and Linguistic Theory* 37:955–996.

Oxford, Will. to appear. Probe specification and agreement variation: Evidence from the Algonquian inverse. *Linguistic Inquiry* .

Pancheva, Roumyana, and Maria Luisa Zubizarreta. 2018. The Person Case Constraint: The syntactic encoding of perspective. *Natural Langauge and Linguistic Theory* 36:1291–1337.

Pascual, Adán F. 2007. Transitividad y dependencia sintáctica y discursiva en Q'anjob'al. Master's thesis, CIESAS, México.

Pérez Vail, José Reginaldo. 2014. La inversion y obviación en mam de Cajolá. Master's thesis, CIESAS, México.

Polian, Gilles. 2004. Éléments de grammaire du tseltal. Ph.D. dissertation, Université Paris III.

Polian, Gilles. 2013. *Gramática del tseltal de Oxchuc*. Publicaciones de la Casa Chata. México: Centro de Investigaciones y Estudios Superiores en Antropología Social.

Poole, Ethan. 2023. Dependent-case assignment could be Agree. Manuscript, UCLA.

Preminger, Omer. 2014. *Agreement and Its Failures*. Cambridge, MA: MIT Press.

Preminger, Omer. 2019. What the PCC tells us about "abstract" agreement, head movement, and locality. *Glossa* 4(1):13.

Rezac, Milan. 2003. The fine structure of Cyclic Agree. *Syntax* 6:156–182.

Rezac, Milan. 2008. The syntax of eccentric agreement: The Person Case Constraint and Absolutive Displacement in Basque. *Natural Language and Linguistic Theory* 26:61–106.

Rezac, Milan. 2011. *Phi-features and the modular architecture of language*. Dordrecht: Springer.

Roversi, Giovanni. 2020. How to satisfy probes: person/number hierarchy effects in äiwoo. In *Proceedings of NELS 50*, eds. Mariam Asatryan, Yixiao Song, and Ayana Whitmal, volume 3, 99–112. Amherst, MA: GLSA Publications.

Royer, Justin. 2022a. Elements of (in)definiteness and binding: A Mayan perspective. Ph.D. dissertation, McGill University, Montréal, QC.

Royer, Justin. 2022b. Prosody as syntactic evidence: The view from Mayan. *Natural Language & Linguistic Theory* 40:239–284.

Royer, Justin. 2023. Binding and anti-cataphora in Mayan. *Linguistic Inquiry* .

Royer, Justin, Pedro Mateo Pedro, Elizabeth Carolan, Jessica Coon, and Matal Torres. 2022. Atz'am k'ik' atz'am: The story of Xuwan and a grammatical sketch of Chuj. *Tlalocan* 27:215–286.

dos Santos, Wesley. 2023. Asymmetries among person indexes in Kawahíva. To appear, *International Journal of American Linguistics*.

Scott, Tessa. 2023. Pronouns and agreement in San Juan Atitán Mam. Ph.D. dissertation, University of California, Berkeley.

Stegovec, Adrian. 2020. Taking case out of the person-case-constraint. *Natural Language &*

Linguistic Theory 38:261–311.
Stiebels, Barbara. 2006. Agent focus in Mayan languages. *Natural Language and Linguistic Theory* 24:501–570.
Tada, Hiroaki. 1993. A/A-bar partition in derivation. Ph.D. dissertation, MIT, Cambridge, MA.
Tollan, Rebecca, and Lauren Clemens. 2022. Syntactic ergativity as a constraint on crossing dependencies: The perspective from mayan. *Linguistic Inquiry* 53:459–499.
Toosarvandani, Maziar. 2023. The interpretation and grammatical representation of animacy. Ms. UCSC.
Trechsel, Frank R. 1995. Binding and coreference in Jakaltek. In *Grammatical Relations: Theoretical approaches and empirical questions*, eds. Clifford S. Burgess, Katarzyna Dziwirek, and Donna Gerdts, 449–471. Chicago University Press.
Vázquez Álvarez, Juan J. 2011. A grammar of Chol, a Mayan language. Ph.D. dissertation, University of Texas Austin, Austin, TX.
Walkow, Martin. 2012. Goals, big and small. Ph.D. dissertation, University of Massachusetts Amherst.
Walkow, Martin. 2013. Locating variation in person restrictions. *University of Pennsylvania Working Papers in Linguistics* 19:247–256.
Woolford, Ellen. 1991. VP-internal subjects in VSO and non-configurational languages. *Linguistic Inquiry* 22:503–540.
Woolford, Ellen. 1997. Four-way case systems: Ergative, nominative, objective and accusative. *Natural Language and Linguistic Theory* 15:181–227.
Yip, Moira, Joan Maling, and Ray Jackendoff. 1987. Case in tiers. *Language* 63:217–250.
Yokoyama, Tomohiro. 2019. Dissociating the person case constraint from its "repair". *Canadian Journal of Linguistics* 64:730–752.
Zavala, Roberto. 1992. *El Kanjobal de San Miguel Acatán*. México: UNAM.
Zavala, Roberto. 1994. Inverse alignment in Huastec. *Function* 15–16:27–81.
Zavala, Roberto. 2007. Inversion and obviation in Mesoamerica. In *Endangered Languages*, eds. Peter Austin and Andrew Simpson, volume Linguistische Berichte Sonderheft 14, 267–306. Hamburg: Helmut Buske Verlag.
Zavala Maldonado, Roberto. 2017. Alignment patterns. In *The Mayan Languages*, eds. Judith Aissen, Nora C. England, and Roberto Zavala Maldonado, 226–258. New York: Routledge.