

The interpretation and grammatical representation of animacy

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Abstract

We are used to thinking about person, number, and gender as features to which the grammar is sensitive. But the place of animacy is less familiar, despite its robust syntactic activity in many languages. I investigate the pronominal system of Southeastern Sierra Zapotec, identifying an interpretive parallel between animacy and person. Third person plural pronouns, which encode a four-way animacy distinction in the language, exhibit ASSOCIATIVITY, a cluster of interpretive properties that have been argued also to characterize first and second person plural pronouns. Building on Kratzer's (2009) and Harbour's (2016) theories of person, I propose a plurality-based semantics for animacy that captures their shared properties. The compositional mechanism underlying this semantics ties person and animacy features to a single syntactic position inside the noun phrase. This enables an understanding of these features' shared relevance to syntactic operations, including those underlying pronoun cliticization. In these Zapotec varieties, it is constrained both by person (in the well-known Person Case Constraint) and by animacy.

Keywords: animacy, person, ϕ -features, plurality, pronouns, feature geometry, nominal structure

All languages likely make some distinctions in animacy, even if this is only in their lexicon. In some languages, however, animacy also plays an active role in the syntax. It controls case assignment or verb agreement, as in differential object marking, or it shapes how arguments are linked to a grammatical position, as in direct-inverse alignment systems. These syntactic processes

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are frequently sensitive to person, alongside animacy, suggesting that both categories are encoded in the same way in human language. This article considers how animacy is represented in the grammar, in relation to person, by investigating the pronominal system of several Southeastern Sierra Zapotec varieties (*Dille'xhunh* or *Dille'xhonh*).¹

Third person pronouns distinguish elder humans, other humans, animals, and inanimates in the language, an animacy distinction which is grammatically active. Pronoun cliticization is constrained by an intuitive hierarchy of these animacy categories (Foley & Toosarvandani 2022). While an object pronoun can cliticize when it is “lower” in animacy than the subject, e.g., an animal object and human subject (1a), it cannot do so when it is “higher” in animacy than the subject, e.g., a human object and animal subject (1b).

- (1) a. 3.HU > 3.AN
 Bchew=**be'**=**ba'**.
 kick.COMP=**3.HU=3.AN**
 ‘S/he kicked it (an animal).’
- b. 3.AN > 3.HU
 Bdinn=**ba'** **lebe'**.
 bite.COMP=**3.AN 3.HU**
 ‘It (an animal) bit her/him.’ (Yalálag: Avelino Becerra 2004:34)

Pronoun cliticization in these Zapotec varieties, like differential object marking or direct-inverse alignment, is also constrained by person. First and second person pronouns cannot cliticize in object position (2b), though they can in subject position (2a).

¹The Zapotec languages (Oto-Manguean: Oaxaca, Mexico) exhibit dense variation: distinct dialects are spoken in towns only a few miles apart, and sharp language boundaries are hard to draw. This article includes data from the closely related Sierra Norte varieties of Santiago Laxopa, San Sebastián Guiloixi, and Santa María Yalina, for which I report my own fieldwork data, as well as the slightly more divergent varieties of Hidalgo Yalálag (López & Newberg 2005, Avelino Becerra 2004), Yatzachi el Bajo (Butler 1980, 1989), and San Bartolomé Zoogocho (Long 1993, Long & Cruz 2000, Sonnenschein 2004). In Santiago Laxopa, the language is known as *Dille'xhunh*, while in these other towns it is called *Dille'xhonh*. Following the *Catálogo de las lenguas indígenas nacionales* (Instituto Nacional de Lenguas Indígenas 2008), I refer to these varieties together as Southeastern Sierra Zapotec. In some dialect classifications, they are included in the “Cajono” subgroup of Northern Zapotec (Campbell 2017).

The original data reported in this article comes from meetings with four adult speakers living in the large diaspora community in California. All four learned Zapotec as their first language and moved to the United States as adults. I have been working with three of the speakers continuously since 2016 and the fourth starting in 2022. Our (bi)weekly meetings took place with Spanish as the intermediate language and remotely by Zoom in 2020–2021. All data from other sources has been orthographically normalized and morphologically reanalyzed.

The orthography used is the *alfabeto práctico de zapoteco de la Sierra Juárez*, distributed by the Centro de Investigaciones y Estudios Superiores en Antropología Social and used widely by Zapotec speakers in the Sierra Norte, as well as in California. All symbols have values identical to the International Phonetic Alphabet except: *ch* = [tʃ], *chh* = [dʒ], *j* = [ɸ ~ χ], *lh* = [l̥] (lenis lateral), *ll* = [ʎ], *nh* = [m ~ n ~ ŋ] (lenis nasal), *sh* = [ʃ], *x* = [ʂ] (fortis retroflex fricative), *xh* = [z] (lenis retroflex fricative), and ' = [ʔ]. For original fieldwork data, tone is transcribed phonetically with superscripted numerals, representing three levels of tone ranging from 1 (highest) to 3 (lowest).

The interlinear abbreviations used are: AN = animal, AND = andative, APL = associative plural, CAUS = causative, CL = classifier, COMP = completive, CONT = continuative, DEF = definite, DEM = demonstrative, EL = elder human, EMPH = emphatic, EXCL = exclusive, F = feminine, FREQ = frequentative, HU = (non-elder) human, IN = inanimate, INCL = inclusive, INF = infinitive, INT = intensifier, M = masculine, N = neuter, NEG = negative, OBV = obviative, PAST = past, PL = plural, POT = potential, PROX = proximate, PTC = particle, Q = question particle, REP = repetitive, SG = singular, STAT = stative, VEN = venitive.

- (2) a. 1 > 3.AN
 Bet=gak=**a'**=**ba'**
 kill.COMP=PL=**1SG**=**3.AN**
 'I killed [them (some animals)].' (Yalálag: Avelino Becerra 2004:25)
- b. 3.AN > 1
 Bnaw=**ba'** **nada'**
 follow.COMP=**3.AN 1SG**
 'It (an animal) followed me.' (Yalálag: after Avelino Becerra 2004:32)

In formal syntactic theories, the impossibility of cliticization in configurations like (2b) has been traced to the person features that the object pronoun and its clausemate argument have (Anagnostopoulou 2003, 2005, Béjar & Rezac 2003, and others). If the grammar makes reference to animacy in the same way, as it appears to do in Zapotec, then animacy must be represented featurally as well.

For person, the development of featural representations has been guided by the crosslinguistic typology of pronoun inventories and related paradigms, which large-scale surveys have demonstrated is tightly constrained (Cysouw 2009). The resulting theories have varied the number and type of person features, as well as their structural and interpretive relationships to one other and to number and gender features (Harley & Ritter 2002, Harbour 2016, Cowper & Hall 2019, Hammerly 2023). For animacy, however, similar questions have only begun to be explored, perhaps because many languages' pronouns only encode a binary distinction (animate vs. inanimate or human vs. nonhuman). Languages with such fine-grained animacy differentiations within the third person are not so common or well described.

I take a different approach to investigating animacy for this reason. If the same features that determine the morphological form of a pronoun also contribute to its compositional meaning (Heim & Kratzer 1998, Sauerland 2006, Sichel & Wiltschko 2021, and others), then interpretation can provide another source of evidence for featural representations.

My primary empirical claim will be that third person pronouns in Southeastern Sierra Zapotec are characterized by a cluster of semantic properties that hold of first and second person pronouns as well. In particular, I will show that third person plural pronouns: (i) exhibit reference to heterogeneous groups, (ii) use only the most marked animacy category to do so, and (iii) require any group they refer to to be contextually coherent. A third person plural human pronoun, for example, can refer to a group of individuals not all of whom are humans, just in case they are "associates" in the context. All three of these properties have been claimed to characterize first and second person plural pronouns (Jespersen 1924:192, Benveniste 1966:232–233, Zwicky 1977, Moravcsik 2003, Wechsler 2010, Ackema & Neeleman 2018). Following this tradition, I call this cluster of properties ASSOCIATIVITY, though I make no commitments about its connection to "associative plurals" (as Moravcsik and others do).

To account for this parallel, I will advance a specific hypothesis about the featural representation of animacy and its relationship to person, which has syntactic consequences. I propose that animacy features can combine via the same semantic mode of composition as person features do. This extends recent work exploring the possibility that ϕ -FEATURES (person, number, and gender) combine semantically by more than one compositional mechanism. Building on proposals by Kratzer (2009) and Harbour (2016), I adopt a mode of composition for person and animacy features which combines atomic individuals into plural individuals. Animacy gives rise to associativity, as person does, because they both compose by this mechanism.

This semantics enables an understanding of person and animacy’s shared relevance to syntactic processes involving case, verb agreement, and argument linking. One consequence of the plurality-based semantics is that the order in which features combine can substantively affect their interpretation. This means that animacy features can only give rise to associativity when they are located inside the same constituent as person features. I propose, specifically, that person and animacy features are located on the same functional head inside the noun phrase, in keeping with theories in which ϕ -features are decomposed and ordered hierarchically (Picallo 1991, Ritter 1991, and others). If animacy and person features occupy the same structural position, then both should be visible, in the same way, to syntactic operations.

How this hypothesis plays out for a particular phenomena depends on the syntactic mechanisms it involves. I will consider just one test case, the PERSON CASE CONSTRAINT (PCC; Perlmutter 1971, Bonet 1991) in (2), and its animacy-based counterpart in (1). I demonstrate that recent theories of the PCC (Coon & Keine 2021, Deal, to appear, Sichel & Toosarvandani, to appear) can derive its sensitivity to just person and animacy, by leveraging these features’ position on the highest functional head in the noun phrase. The generality of this result, which appeals to hierarchical differences in the position of ϕ -features, recommends it as a potential model for understanding other syntactic processes’ sensitivity to both person and animacy.

1 The place of animacy in the ϕ -domain

The pronoun inventory for Santiago Laxopa Zapotec is shown in Table 1. Distinct third person pronouns for elder humans (EL), other humans (HU), animals (AN), and inanimates (IN) are also found in the other Southeastern Sierra varieties, though their forms may vary slightly. Number (singular vs. plural) is realized formally, in this variety, only in the first and second persons (see Section 2.2 for further discussion).

	STRONG	CLITIC		STRONG	CLITIC
1SG	<i>neda'</i>	<i>=a'</i>	3.EL(DER)	<i>le'</i>	<i>=e'</i> (subject) \sim <i>=ne'</i> (object)
1PL.EXCL	<i>dziu'</i>	<i>=dzu</i>	3.HU(MAN)	<i>leba'</i>	<i>=ba'</i>
1PL.INCL	<i>netu'</i>	<i>=tu'</i>	3.AN(IMAL)	<i>leb</i>	<i>=(e)b</i>
2SG	<i>lhe'</i>	<i>=u'</i>	3.IN(ANIMATE)	<i>lenh</i>	<i>=(e)nh</i>
2PL	<i>le'e</i>	<i>=lhe</i>			

Table 1: Strong and clitic pronouns in Santiago Laxopa Zapotec (Toosarvandani 2017:129)

The animacy categories are strictly semantic, and they are not realized formally elsewhere (for example, on nouns or adjectives).

In many languages, animacy distinctions like these constrain syntactic operations according to an implicational hierarchy, which also includes person (Smith-Stark 1974, Silverstein 1976).

- (3) **Animacy Hierarchy:**
 speaker > hearer > kin/rational > human > animate > inanimate (Corbett 2000:56)

According to the Animacy Hierarchy, if a syntactic process in a given language is sensitive to some category on the hierarchy, it will also be sensitive to all higher categories, whether these involve

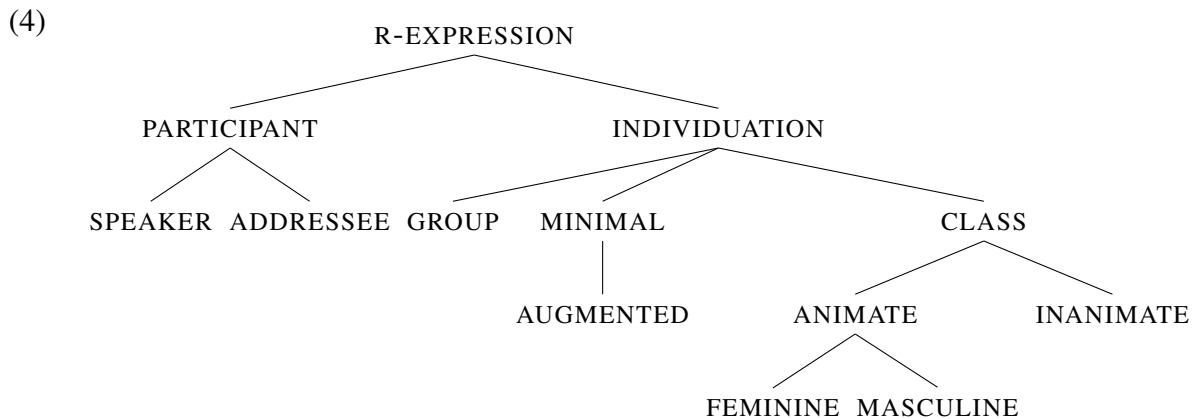
person or animacy. While this hierarchy encodes a typological generalization, it says nothing about why just these categories — involving conversational role, rationality, and sentience — are relevant for certain syntactic processes, while others are not, such as gender and number. Differential object marking and direct-inverse alignment are sensitive to person and animacy, but not social gender categories like masculine and feminine (Bossong 1991, Klaiman 1992, Aissen 2003).

For this reason, many formal syntactic theories aim to derive such implicational hierarchies from more basic grammatical primitives. The Animacy Hierarchy refers to properties of nominals, and so the relevant primitives would be their ϕ -features. Since Chomsky (1965:79–106), these have been used to mark nominals for the syntactic dependencies they enter into in a variety of syntactic frameworks, including Head Driven Phrase Structure Grammar (Pollard & Sag 1984), Lexical Functional Grammar (Bresnan 2001), and Minimalism (Chomsky 1995).

These features derive the implicational relations in the Animacy Hierarchy by encoding natural classes within person and animacy. These classes, which are supported by independent morphological and syntactic evidence, can be represented in a feature geometry (Harley & Ritter 2002). But while a geometry may be useful for encoding this structure within person and animacy, it cannot explain why some syntactic processes are sensitive just to these ϕ -features, and not others. To do this, these featural representations must contain a different type of structure, evidence for which I will argue comes from the semantics for person.

1.1 Features and feature geometries

Harley & Ritter (2002) propose a universal set of ϕ -features, organized into a hierarchically structured FEATURE GEOMETRY, a type of feature structure also deployed in phonological theory (Clements 1985, Sagey 1986).



(Harley & Ritter 2002:486)

This feature geometry represents the maximal ϕ -feature specification possible in human language. In a particular language, not all features may be ACTIVE. Depending on the contrasts the language learner finds, they might posit only a subset of them.

The dependency relations within a geometry define which feature specifications behave as a natural class for syntactic and morphological operations, in addition to which features are contrastive. The feature geometry above, for example, requires that, if both PARTICIPANT and SPEAKER are active in a language, a pronoun that has SPEAKER will also have PARTICIPANT (since a feature

entails the presence of any feature that dominates it). In other words, it treats first and second person as belonging to a class, distinct from the third person.

An inventory of three person categories has the feature specifications in (5), which follows Béjar’s (2003:38–44) implementation of Harley & Ritter’s geometry.

$$(5) \quad \begin{array}{ccc} & 1 & 2 & 3 \\ & \left[\begin{array}{c} \text{PARTICIPANT} \\ | \\ \text{SPEAKER} \end{array} \right] & \left[\text{PARTICIPANT} \right] & \left[\quad \right] \end{array}$$

These capture the old intuition, going back to Benveniste (1966:232–233), that first and second person — the “local” persons — are conceptually unified, since their referents can only be determined in relation to the discourse context. This is formalized in the lexical entries for the two person features in (6a–b), which treat them as one-place predicates.²

- (6) a. $\llbracket \text{SPEAKER} \rrbracket^c = \lambda x . x$ is the speaker of c
 b. $\llbracket \text{PARTICIPANT} \rrbracket^c = \lambda x . x$ is a conversational participant in c

The PARTICIPANT feature denotes the set of all conversational participants, of which SPEAKER denotes a proper subset. A second person pronoun will ultimately only refer to the addressee, because it competes with the semantically stronger first person pronoun (Heim 1991, Sauerland 2006).

The unity of local persons is not solely interpretive: they also share a feature, PARTICIPANT, which enables syntactic operations to make reference to them as a class. In Southeastern Sierra Zapotec, pronoun cliticization singles out the first and second persons. A local strong pronoun in subject position (when it bears a narrow focus) is generally clitic doubled, as in (7a–c), while third person strong pronouns, like the one in (8), generally are not (Sichel & Toosarvandani 2020).

- (7) a. $\text{Bi}^1\text{tu}^1 \text{yi}^1\text{ga}'\text{an}^3=\text{dzu}^1 \quad \text{dziu}'^1$.
 NEG stay.POT=**1PL.INCL 1PL.INCL**
 ‘WE will not stay.’ (Laxopa: RD, SLZ1106, 14:15)
- b. $\text{Bi}^1\text{tu}^1 \text{yi}^1\text{ga}'\text{an}^3=\text{tu}'^1 \quad \text{ne}^1\text{tu}'^1$.
 NEG stay.POT=**1PL.EXCL 1PL.EXCL**
 ‘WE will not stay.’ (Laxopa: RD, SLZ1106, 16:45)
- c. $\text{Bi}^1\text{tu}^1 \text{yi}^1\text{ga}'\text{an}^3=\text{lhe}^1 \text{le}'\text{e}^{12}$.
 NEG stay.POT=**2PL 2PL**
 ‘YOU ALL will not stay.’ (Laxopa: RD, SLZ1106, 5:30)

²These features combine semantically with each other like attributive adjectives, by a compositional rule amounting to set intersection (Heim & Kratzer 1998, Schlenker 2003, Heim 2008). For simplicity, the lexical entries above ignore whether ϕ -features are presuppositional or not (Cooper 1983:174–195).

I am adopting a compositional model-theoretic framework of semantic interpretation, which has at least the rules of Function Application and Predicate Modification (set intersection) for interpreting complex constituents (Heim & Kratzer 1998). The truth conditions of a sentence, and the contribution that its subparts make, are represented by an informal metalanguage which uses elements of predicate logic with the lambda calculus. I use x , y , and z as variables over individuals.

- (8) Bi¹tu¹ yi¹-s³-yiga’an³ leba’¹².
 NEG POT-PL-stay 3.HU
 ‘THEY will not stay.’

(Laxopa: RD, SLZ1106, 13:30)

If local person pronouns are distinguished featurally from third person pronouns, they can be targeted by the syntactic operation underlying pronoun cliticization, which is often taken to be the same mechanism responsible for featural co-variation in agreement (Borer 1984, Suñer 1988, Sportiche 1993, Anagnostopoulou 2003:249–320). In a Minimalist framework, this is the Agree operation (Chomsky 2001:3–6).

This operation’s ability to pick out only local persons shows up in other syntactic phenomena as well. The PERSON CASE CONSTRAINT (PCC), which I will describe in detail in Section 4, prohibits first and second person — but not third person — object pronouns from cliticizing in many languages, including in Zapotec. Similarly, in AGREEMENT DISPLACEMENT, found in Basque, Erzya (Mordvinian), Karuk, Kichean languages, Georgian, and Nishnaabemwin (Algonquian), an agreement marker is controlled not by a particular grammatical role (subject or object), but by whichever argument is higher on a person hierarchy, with a preference for the object. In some of these languages, a first or second person object invariably controls agreement, regardless of the subject’s person (Béjar 2003:151–172, Béjar & Rezac 2009, Preminger 2014:18–22).

The natural classes encoded in the featural specifications in (5) derive the implicational relations within person described by the Animacy Hierarchy. If a syntactic operation is sensitive to the SPEAKER feature, it will pick out only the first person; if it is instead sensitive to PARTICIPANT, it will pick out not just the second person, but the first person, too.

The four animacy categories in Southeastern Sierra Zapotec can, by analogy, have the feature specifications in (9) (Foley & Toosarvandani 2022). Three vertically-organized features serve to encode the overlapping classes within animacy.

- (9)
- | | | | |
|--|---|--------------------|--------|
| 3.EL | 3.HU | 3.AN | 3.IN |
| $\left[\begin{array}{c} \text{ANIMATE} \\ \\ \text{HUMAN} \\ \\ \text{ELDER} \end{array} \right]$ | $\left[\begin{array}{c} \text{ANIMATE} \\ \\ \text{HUMAN} \end{array} \right]$ | $[\text{ANIMATE}]$ | $[\]$ |

To derive the full Animacy Hierarchy, animacy features can then be made “part of” person, by inserting them as ancestors of PARTICIPANT in a feature geometry (cf. Béjar 2003:51, Oxford 2019).

- (10)
- ```

 ANIMATE
 |
 HUMAN
 |
 PARTICIPANT
 / \
SPEAKER ADDRESSEE

```

However, this geometric structure cannot on its own explain why certain syntactic processes make reference to person and animacy features, but not other  $\phi$ -features. Since the social gender features MASCULINE and FEMININE semantically characterize humans (see the discussion in Section 3.5), animacy features might dominate them as well, as in Harley & Ritter’s original feature geometry. If so, then animacy features would stand in the same structural relation to both person and gender features.

What is needed is some additional structure, beyond what a feature geometry provides, which connects person and animacy while distinguishing them both from gender and number. Evidence for this structure will come from a closer look at the semantics of person, in particular how it is defined over pluralities.

## 1.2 A plurality-based semantics for person

Local person pronouns exhibit some peculiar properties involving plural reference. As Jespersen (1924:192) observed, *we* can refer to a group which includes the speaker and individuals who are not conversational participants. Similarly, a second person plural pronoun, in languages that have one, can pick out a group including the addressee and other individuals, none of whom are the speaker. That is, while the first and second person in the singular only describe conversational participants, they can — in the plural — describe groups which include other individuals.

First and second person pronouns, in other words, allow reference to HETEROGENOUS groups, because their feature specifications are not DISTRIBUTIVE.<sup>3</sup> They can describe pluralities, some members of which fail to meet the description of being first or second person. In this respect local person pronouns diverge from other expressions: plural common nouns can only describe homogenous groups (e.g., *trees* describes trees and nothing else).

The non-distributivity of person has motivated some recent revisions to the simple semantics of person above. Harbour (2016) and Cowper & Hall (2019) each propose a new feature system for person, based on a plurality-based semantics, which aims to capture the attested crosslinguistic variation in person inventories. In both systems, the SPEAKER and PARTICIPANT features still have a distributive semantics. They achieve heterogenous reference by positing new MODES OF COMPOSITION, for combining these features semantically, or new semantic operators which carry out FEATURE MODIFICATION. These semantic mechanisms are encoded formally by the values for person features, which they assume are bivalent.

In Harbour’s (2016) system, there are two modes of composition for person: one which creates plural individuals (corresponding to +), similar to a proposal by Kratzer (2009), and one which subtracts elements from pluralities (corresponding to –). Variation in the ORDER OF COMPOSITION for these features derives how many person categories a language has. When SPEAKER takes scope over PARTICIPANT, depicted structurally in (11a), the result is a three-person inventory. When these features combine in the reverse order, as in (11b), a four-person inventory with an inclusive–exclusive distinction, like the one found in Zapotec languages, results.<sup>4</sup>

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<sup>3</sup>A feature (specification) F is DISTRIBUTIVE iff, for any  $x$  in the denotation of F, every  $y$  that is a part of  $x$  is also in F: i.e.,  $\forall x(x \in \llbracket F \rrbracket \rightarrow \forall y(y \leq x \rightarrow y \in \llbracket F \rrbracket))$ .

<sup>4</sup>These authors also consider languages with a binary person distinction. But two-person pronoun systems are quite rare (Harbour 2016:54–59), and so I do not focus on them here. They arise in these feature systems by removing one of the two person features.



- (11) a. 
$$\begin{array}{ccc} 1 & 2 & 3 \\ \left[ \begin{array}{c} +\text{SPEAKER} \\ | \\ +\text{PARTICIPANT} \end{array} \right] & \left[ \begin{array}{c} -\text{SPEAKER} \\ | \\ +\text{PARTICIPANT} \end{array} \right] & \left[ \begin{array}{c} -\text{SPEAKER} \\ | \\ -\text{PARTICIPANT} \end{array} \right] \end{array}$$
- b. 
$$\begin{array}{cccc} 1.\text{INCL} & 1.\text{EXCL} & 2 & 3 \\ \left[ \begin{array}{c} +\text{PARTICIPANT} \\ | \\ +\text{SPEAKER} \end{array} \right] & \left[ \begin{array}{c} -\text{PARTICIPANT} \\ | \\ +\text{SPEAKER} \end{array} \right] & \left[ \begin{array}{c} +\text{PARTICIPANT} \\ | \\ -\text{SPEAKER} \end{array} \right] & \left[ \begin{array}{c} -\text{PARTICIPANT} \\ | \\ -\text{SPEAKER} \end{array} \right] \end{array}$$

Cowper & Hall's (2019) system, as formalized and extended by Hammerly (2020, 2023), differs in several respects, though it shares some elements with Harbour's system. For the positive value, they also posit a mode of composition which creates pluralities. But the negative value, they propose, modifies a feature by returning its complement set.

- (12) a. 
$$\left[ \begin{array}{c} +\text{PARTICIPANT} \\ +\text{SPEAKER} \end{array} \right] \quad \left[ \begin{array}{c} +\text{PARTICIPANT} \\ -\text{SPEAKER} \end{array} \right] \quad \left[ -\text{PARTICIPANT} \right]$$
- b. 
$$\begin{array}{cccc} 1.\text{INCL} & 1.\text{EXCL} & 2 & 3 \\ \left[ \begin{array}{c} +\text{SPEAKER} \\ +\text{PARTICIPANT}^* \end{array} \right] & \left[ \begin{array}{c} +\text{SPEAKER} \\ -\text{PARTICIPANT}^* \end{array} \right] & \left[ \begin{array}{c} -\text{SPEAKER} \\ +\text{PARTICIPANT}^* \end{array} \right] & \left[ \begin{array}{c} -\text{SPEAKER} \\ -\text{PARTICIPANT}^* \end{array} \right] \end{array}$$

In the three-person inventory in (12a), the third person lacks SPEAKER altogether, since Cowper & Hall adopt a theory of contrastive interpretation in which features are only active when they are contrastive (Dresher 2009). This hypothesis also has consequences for the interpretation of the features themselves. In a four-person language, PARTICIPANT has a more restricted denotation, which includes only the addressee (as indicated by the asterisk), since it takes contrastive scope under SPEAKER.

These new modes of composition have consequences for the order in which person features combine with other  $\phi$ -features. In both Harbour's and Cowper & Hall's systems, person features must all compose together before combining with number features. This order of composition is required by the compositional mechanism which creates pluralities, as I will demonstrate in detail in Section 3. If person features did not compose together first, they would simply undo the effects of number. This distinct mode of composition — and this distinct order of composition — for person distinguishes it from number and gender, suggesting a new perspective on how it is linked to animacy in the grammar.

### 1.3 Looking forward

In particular, I propose the following general hypothesis about the composition of animacy, and its semantic relationship to person:

- (13) **Animacy Composition Hypothesis (general version):**  
Animacy features compose with person features (with the same mode and order of composition).

The remainder of this article spells out the content of the ANIMACY COMPOSITION HYPOTHESIS. I will start by motivating it empirically in Section 2, where third person pronouns in Zapotec are shown to exhibit marked reference to contextually-determined heterogeneous groups, just as local person pronouns do. I will then develop a formal grammar for  $\phi$ -features in Section 3, building on the theories above, which captures how animacy composes with person, and how both these features compose differently from gender and number.

This feature system incorporates a plurality-creating mode of composition, though it diverges from Harbour's (2016), Cowper & Hall's (2019), and Hammerly's (2020, 2023) systems in defining a semantics for person and animacy over featural representations which encode the natural class structure within them. This is motivated by the goal of understanding, not just how they are connected semantically, but why syntactic operations make reference to them in the same way.

The systems they propose posit a universal set of two person features, whose members can combine freely. Any specification of features and feature values is in principle allowed (only constrained, perhaps, by general considerations of contrastiveness). This generates feature specifications for the attested person inventories, with the correct interpretations. But as a result, the local persons no longer comprise a universal natural class, a consequence which Harbour (2016:125–128) acknowledges. In four-person languages, the first and second persons have no formal property in common. The local person specifications in (11b) and (12b) share neither (i) any features distinct from the third person (since all person categories possess the same two features), nor (ii) any feature values (or the modes of composition they encode) distinct from the third person.

As we have already seen, though, local persons pattern together formally even in four-person languages. In Southeastern Sierra Zapotec, all strong local person pronouns in argument position are doubled by a clitic, as in (7), while strong third person pronouns are not. In addition, the PCC, which I will be returning to in Section 4, requires reference to the class of first and second person pronouns, since it prohibits these pronouns from cliticizing in object position, regardless of the subject's person value. So, even in a language with a clusivity distinction, at least the syntactic operation leading to pronominal cliticization must be able to pick out all local person pronouns together.

One way to understand how grammatical operations can pick out syntactic objects which have no featural overlap is by redefining the operations themselves, so that they do not make reference to features in the first place. Hammerly (2020:169–244, 2021) proposes to do this, for instance, by making Agree sensitive to a new set of syntactic primitives, each the analogue of some element in the domain of discourse. There would be an arbitrary number of these atomic symbols, with labels corresponding to more basic ontological categories.

However, if we maintain the hypothesis central to syntactic theorizing since Chomsky (1965:79–106), that syntactic operations make reference to features, the only way to capture the natural class behavior of the local persons is by modifying the feature specifications in (11–12). In his system with only two person features, Harbour (2016:125–128) proposes to do this through underspecification. At least in some languages, the third person would lack SPEAKER — or perhaps both person features — so that all other person categories would form a class in virtue of having them. If this is possible, then the question becomes whether the second person can also be underspecified in the same way. Thus, adding underspecification in this way requires specifying which features can and cannot occur together, as I will discuss further in Section 3.4.

The feature system developed in Section 3 aims to represent the natural class structure within person and animacy explicitly, while pursuing my main goal, which is the semantics of animacy

and its syntactic consequences. Under the Animacy Composition Hypothesis, if animacy composes with person, their shared order of composition must be reflected in a shared structure. Both must occupy a single syntactic position inside the noun phrase, enabling them to combine together. This shared syntactic position is responsible, as I will then argue in Section 4, not just for why animacy is “like” person semantically, but also for why it is grammatically active like person.

## 2 Associativity in person and animacy

The empirical motivation for the Animacy Composition Hypothesis comes from the interpretation of third person plural pronouns in Southeastern Sierra Zapotec. They exhibit the following three properties, which they share with local person plural pronouns:

(14) **Associativity:**

a. **Heterogenous groups:**

A pronoun of a given (person-animacy) category can refer to pluralities containing individuals belonging to a different category.

b. **Marked reference:**

Such mixed groups are referred to using the most featurally marked pronoun: e.g., a group of humans and animals is referred to using the human pronoun.

c. **Context dependence:**

All members of a group must count as “associates” in the context.

The first property was introduced in Section 1.2. Local person plural pronouns can refer to pluralities that include individuals who are not the speaker or addressee. These groups are heterogenous, since these other individuals are not conversational participants.

This is a conceptually necessary property of person if the speaker and addressee in any given conversation are unique (Boas 1911:39, Zwicky 1977:731 fn. 1, Cysouw 2009:73–74). While there are situations where multiple individuals speak simultaneously — Greek choruses and soccer chants are the typical examples — natural language does not seem to encode this possibility grammatically. As Zwicky and Cysouw argue, there is no known language that morphologically distinguishes a “chorus *we*” from first person plural pronouns designating the speaker and others. A parallel argument has been made for the addressee (see Simon 2005, Bobaljik 2008:211–215). If human language does not countenance more than one speaker or addressee at a time, the feature specifications for first and second person can never be distributive.

The second property is also a well-known property of local person pronouns. Zwicky (1977) observes that there is no language with three persons in which a plurality comprising the speaker and addressee is referred to using a second person pronoun. Similarly, no language has been attested in which pluralities of the addressee and some others are referred to using a third person pronoun. In other words, when referring to a heterogenous group, the most featurally marked pronoun must be used (see Cysouw 2009:73–78 and Harbour 2016:40–44 for a more extensive discussion).

The third property, as it applies to person, is less obvious than the first two. Ackema & Neeleman (2018:84–88) observe a very subtle effect involving local person pronouns. According to their judgement in (15), it is strange for *we* to refer to the speaker and another individual, unless they

have already been identified as “associates” in the context.<sup>5</sup>

- (15) Context: Across the street, a famous singer passes by. One person says to their companion:  
#Do you see that **we**'re wearing the same coat? (Ackema & Neeleman 2018:86)

The judgement is quite delicate, which might be attributed to the context sensitivity of what counts as an associate. If the associate relation is “entirely context-dependent,” as Ackema & Neeleman propose (p. 84), then it might be easy to accommodate someone as an associate in one context, simply because they are a possible associate in another context.

At the same time, the associate relation seems to have more content than this. Moravcsik (2003:486) observes that *we* is rarely used to refer to a group of the speaker and an animal or thing. Indeed, it is quite strange in (16a) for the speaker to refer to the group comprising himself and the lions using *we*, just as it is difficult to understand *you* in Josie's question as referring to this group.<sup>6</sup>

- (16) Context: Paul is by himself at his town's small zoo, visiting the lion's cage. After seeing a picture of Paul with the lion on Instagram, his friend Josie decides to come meet him. She has never been to the zoo before and does not know where any animals are located.
- a. Josie calls Paul, saying: “I saw you in a picture with the lion. Where are you?”  
#**We** are (both) behind the gift shop.
  - b. Josie asks a zoo ranger: “I saw my friend in a picture with the lion. Where are they?”  
**They** are (both) behind the gift shop.

This effect cannot be attributed to general properties of plural reference: a third person plural pronoun in English can be used to refer to the same group. Intuitively, a local person pronoun would imply a close social relationship, which humans can typically enter into with each other, but not with an animal. The use of *we* in (16a) can be accommodated, however, if the speaker understands the lion as Paul's close companion for some reason, even if this is a highly unlikely state of affairs in normal society.

For other mixed human-animal groups, it is easier to establish an associate relation, at least in some contexts. For instance, if the animal in question is a beloved pet dog, then a speaker's using *we* to refer to both of them is not nearly as strange:

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<sup>5</sup>Along similar lines, Moravcsik (2003:486) points to “certain ‘presumptuous’ uses of *we*” which lump people “together with others that they see as ‘different.’”

<sup>6</sup>A reviewer observes that (16b) might still be slightly odd because Paul is only temporarily located behind the gift shop, while the lion lives there. If Paul happens to encounter a peacock that wanders the zoo freely, it would still be unacceptable for Paul to say: #*We are (both) behind the gift shop* to refer to the group comprising him and the peacock, while the zoo ranger could easily say: *They are (both) behind the gift shop*.

More generally, there are several cofounds which must be avoided in judging the examples in (16–18). Alternate interpretations must be ignored in the (b) examples, including when *they* has non-gendered singular reference or plural reference to just animals or inanimates. The predicate must also hold of both humans and non-humans, without imposing a collective interpretation which might be semantically implausible. To avoid these cofounds, I have selected stative predicates modified by a distributive operator (*both*).

- (17) Context: Sam is at the dog park with his beloved Doberman pinscher Franz. His friend Leslie is supposed to meet him somewhere inside.
- a. Leslie calls Sam, saying: “Are you here with Franz? Where are you?”  
**We** are (both) behind the oak tree.
  - b. Leslie sees an acquaintance and asks them: “Sam is here with Franz. Where are they?”  
**They** are (both) behind the oak tree.

More categorically, a first person plural pronoun cannot be used to refer to the speaker and an inanimate object, such as a parachute in (18a).

- (18) Context: Maria is an avid skydiver. One day after a jump, she is blown off course. She calls the skydiving company to come pick her up.
- a. The receptionist who answers the phone says: “We will come pick you up. We will also pick up your parachute at the same time. Where are you?”  
**#We** are (both) in the field at the edge of town.
  - b. The receptionist calls the helicopter pilot who will pick Maria up. The pilot says: “I will go pick her up. I will also pick up her parachute at the same time. Where are they?”  
**They** are (both) in the field at the edge of town.

Again, the associate relation is not a general property of plural reference. In (18b), *they* can much more easily be used to refer to the group comprising a person and a parachute.

Moravcsik (2003) argues that the associate relation is the same relation encoded by “associative plurals,” found in Japanese and many other languages. These appear on a name or common noun, describing a heterogenous group of individuals. For associative plurals in Japanese, Nakanishi & Tomioka (2004) propose that a focal referent “prominent within” the group must “represent” its associates in some way (see also Kaneko 2013).

- (19) Taro-**tati**-wa moo kaetta.  
Taro-**APL**-TOP already went.home  
‘The group of people represented by Taro went home already.’  
(Nakanishi & Tomioka 2004:124)

It may be, as Moravcsik proposes, that plural local person pronouns are associative plurals, differing solely in whether a pronoun or a noun is involved (cf. Vassilieva 2005:49–65, Kiparsky & Tonhauser 2011:2074–2077). But serious obstacles have been posed to such an assimilation (Corbett 2000:104, Ackema & Neeleman 2018:91–98, Daniel 2020).

I take no position here on whether associative plurals impose the same semantic relation as local person plural pronouns. What seems clear is that local person plural pronouns refer to groups whose members stand in some context-dependent relation to one another. Since this “associate” relation does not hold of plural reference in general, it is likely encoded semantically, though the precise content of the relation remains somewhat hazy. There seems to be more than one way to characterize its content, when humans are involved. The initial intuition about the contrast between the contexts in (16) and (17) suggests that associates must stand in some social relationship, which only some

animals can satisfy in only some contexts. One possibility would link the associate relation to shared intentionality, the human ability to engage in collaborative activities by inferring the intentions of others and establishing shared goals. Shared intentionality has been argued to be species specific (see Tomasello et al. 2005), though it is clear that humans do coordinate some actions with animals.<sup>7</sup>

The three properties in (14a–c) also characterize local person plural pronouns in Zapotec. The first two are self-evident from the pronoun inventory in Table 1. The final property is illustrated by the examples in (20–21), which parallel their English counterparts above.

- (20) Context: Pedro has gone by himself to his town’s zoo and is visiting the lion’s cage. His friend José sees a picture of Pedro on Instagram and decides to come meet him. He has never been to the zoo before and does not know where any of the animals’ cages are located.

José calls Pedro, saying: “I saw you in a picture with the lion. Where are you?”

# Nhi<sup>3</sup> ze<sup>3</sup>=tu<sup>3</sup>                      ku<sup>3</sup>lle<sup>3</sup> ba<sup>1</sup>nyw=nh<sup>3</sup>.  
 here stand.STAT=1PL.EXCL behind bathroom=DEF

Intended: ‘We are here behind the bathroom.’

(Yalina/Guiloxi: FA/RM, GZYZ160, 10:19)

- (21) Context: Maria is a skydiver. One day after a jump, she is blown off course. She calls the skydiving company to come pick her up.

The receptionist says: “We will come pick you up. We will also pick up your parachute at the same time. Where are you, and where is your parachute?”

# Nhi<sup>3</sup> ze<sup>3</sup>=tu<sup>3</sup>                      le<sup>3</sup> yi<sup>3</sup>xe<sup>3</sup>.  
 here stand.STAT=1PL.EXCL in field

Intended: ‘We are here in the field.’ (Yalina/Guiloxi: FA/RM, GZYZ160, 23:20)

In what follows, I argue that all three properties also characterize third person plural pronouns in Southeastern Sierra Zapotec, which encode a four-way animacy contrast. I will start by providing a semantic description of this animacy system, and then I will address each of the three properties of associativity in turn.

## 2.1 Elders, other humans, animals, and things

The most complex animacy category is the elder category. Descriptively, it is used to refer to elderly humans (22a), people in positions of authority (22b), and saints, gods, and other divine beings (22c).<sup>8</sup>

<sup>7</sup>One important consideration is that animals must readily count as associates for one another. As we will see in (29b) below, it is perfectly easy to refer to an all animal group with a plural pronoun in Zapotec. It seems plausible that groups of animals and the behaviors they participate in would be conceived of differently when no human was involved (see also Daniel 2020).

<sup>8</sup>To draw the boundaries of these animacy categories, I draw on both spontaneous speech and elicitation. The latter is not a perfect method, as speakers’ judgements about how forms should be used may not reflect their actual usage. But elicitation does at least give a pretty good sense of the semantic parameters that are relevant.

- (22) a. Ka' gok che bene' golph tio chi=a=nh' goshyi. Nha' ka'  
so happen.COMP of CL.EL old uncle of=1SG=DEF last.week and so  
g-oz-ak ch=e' yetni'a...  
COMP-REP-happen of=**3.EL**  
'That's what happened to my old uncle last week. And that's how it happened  
again to him another time...' (Zoogocho: Long 1993:39, 12–13)
- b. Nha'<sup>3</sup> pre<sup>1</sup>sde<sup>1</sup>nht=e'nh<sup>3</sup> ba<sup>1</sup> tsye'<sup>3</sup>=e<sup>1</sup>...  
and president=DEF already CONT.dance=**3.EL**  
'And the president will dance...' (Laxopa: IVJ, SLZ2020-t1, 24)
- c. ...chezakə'əbalhallə' Xanh=chho Jesucrist. Lla dmigw lla nech lla  
CONT.be.pleased lord=1PL.INCL Jesus.Christ day Sunday day first day  
kobə benhle'ey=e' yogə'ə-lol bel banhez...  
new CONT.bless=**3.EL** all-INT fish benefit  
'...our Lord Jesus Christ was pleased. The first Sunday, the new day, he blessed  
all the good foods...' (Yatzachi: Butler 1989:234, 1–2)

Native speakers report that an elder pronoun should be used to refer to anyone over a certain age (roughly, 60–70 years old). Others can be “promoted” into this class based on their seniority within a relevant social hierarchy (e.g., a family's kinship structure or the traditional *cargo* system for civil and religious governance).

Whether someone counts as an elder based on their age does not depend on the speaker's age or position in a social hierarchy. So, a young woman, who is a mother, can be referred to without an elder pronoun, as shown in (23c).

- (23) Context: A young woman gives birth and gives her daughter to her mother to be raised. When the children is four, she asks her grandmother:
- a. E<sup>1</sup> dzek<sup>1</sup>d=e'<sup>1</sup>/#=ba'<sup>2</sup> tsi=a'<sup>1</sup>?  
Q love.CONT=**3.EL/3.HU** of=1SG  
'Does she love me?' (Yalina/Guiloxi: FA/RM, GZYZ115, 16:22)
- Her grandmother responds:
- b. Dzek<sup>1</sup>d=e'<sup>1</sup> tsi=u'<sup>13</sup>.  
love.CONT=**3.EL** of=2SG  
'She loves you.' (Yalina/Guiloxi: FA/RM, GZYZ115, 17:46)
- c. Dzek<sup>1</sup>d=ba'<sup>2</sup> tsi=u'<sup>13</sup>.  
love.CONT=**3.HU** of=2SG (Yalina/Guiloxi: FA/RM, GZYZ115, 18:00)

And, an elderly woman should be referred to using an elder pronoun, even if it is by her own mother, who is also elderly, as in (24b).

- (24) Context: My grandmother and great-grandmother are elderly: my grandmother is 80 and my great-grandmother is 100. They live together. I ask my great-grandmother:
- a. Ga=nh<sup>31</sup> ta<sup>1</sup>w=a'<sup>3</sup>=nh? Ga<sup>31</sup> zde'=e<sup>1</sup>/#zda<sup>12</sup>=ba'<sup>2</sup>?  
where=DEF grandmother=1SG=DEF where go.STAT=**3.EL**/go.STAT=**3.HU**  
'Where is my grandmother? Where did she go?'  
(Yalina/Guiloxi: FA/RM, GZYZ115, 33:27)

She responds:

- b. Zde'=e<sup>1</sup>/#Zda<sup>12</sup>=ba'<sup>2</sup> lau'<sup>3</sup> ya'a<sup>3</sup>.  
 go=3.EL/go=3.HU to market  
 'She went to the the market.' (Yalina/Guiloxi: FA/RM, GZYZ115, 37:45)  
 [FA: "Because of their age, they are elderly." RM: "When they are older than 80 or 70, when they are siblings... they always use *Usted*."]

The discourse in (23a–b) illustrates “promotion” into the elder category. In her question, the child should refer to her mother using the elder pronoun, despite her mother being below the age cutoff. This promotion need not depend on the speaker’s age or social status: the grandmother in her answer can use the elder pronoun to refer to her own daughter, simply because she is a mother.

Some humans will generally only be referred to using a (non-elder) human pronoun, because they are not old enough to qualify as a true elder and cannot generally be promoted. Babies are only referred to with a human pronoun, as in (25a), unless they are divine and thus promoted to elder status, as in (25b).

- (25) a. Bene' ga zoa' **bidao'** ch=e', kate' gake=**be'** do t-bio'...  
 CL.EL where STAT.be **child** of=3.EL when POT.be=3.HU about one-month  
 'A person who has a baby, when it is going to be about one month...'  
 (Zoogocho: Long 1993:100, 1)
- b. Kana' gwne **Bdao' Dioz=enh'** che'=e burr...  
 at.that.time COMP.speak **baby god=DEF** CONT.tell=3.EL donkey  
 'At that time the God Child told the donkey...'  
 (Yatzachi: Butler 1989:269, 64)

Moving on to the animal pronoun, it is used, as expected, to refer to non-human animate living beings. This includes all animals, including ones that are relatively low in cognitive ability, such as insects.

- (26) ... kate' b-ez-lha' **bishe'zo** da'yoble za'ak=te=**ba'** Tbewa-lhe.  
 when COMP-REP-arrive **locust** again come.PL=INT=3.AN Tabehua-from  
 '... when the locusts returned coming from over by Tabehua.'  
 (Zoogocho: Long 1993:5, 27)

That being said, the animal pronoun need not refer to an animate entity that is currently alive: it is used to describe dead animals as well (27a). This is also true of human referring pronouns, which can refer to corpses (27b).

- (27) a. Nha' bet=bə' bel gall yichj=ənh'... nha' gwlhej=bə'  
 so COMP.kill=3.HU fish seven head=DEF and COMP.remove=3.HU  
 lholla'=əb=ənh'.  
 tongue=3.AN=DEF  
 'So he killed the seven headed snake... and he took out its tongues.'  
 (Yatzachi: Butler 1989:391, 53)



- b. Lla dmi<sup>g</sup>w go<sup>sh</sup>yi got to **nho'olhe golhe**... [n]ha'  
 day Sunday last.week COMP.die **one woman old** and  
 bgash=**e'** lla lun.  
 COMP.be.buried=**3.EL** day Monday  
 'Last Sunday an old woman died... and she was buried on Monday.'  
 (Zoogocho: Long 1993:215, 1–2)

Finally, the inanimate pronoun is used to refer to all non-animate living entities (trees and flowers) and things, as well as supernatural beings who are not revered, such as demons and *duende* (a traditional goblin).

- (28) **Da' xiwe'** da' lhal<sup>le'</sup>=**nh** yix<sup>e'</sup>.  
 CL.IN **demon** CL.IN STAT.roam=**3.IN** country  
 'It was a demon that roams the countryside.' (Zoogocho: Long 1993:41, 28)

This means that “inanimate” is really an elsewhere category: it characterizes entities that do not fit into any of the other animacy categories. This includes true inanimates (things), but also entities that are capable of agency, as long as they are not conceived of as living.

## 2.2 Reference to heterogenous groups

Plural reference is possible in at least some Southeastern Sierra varieties using the same third person pronouns that refer to singular individuals. Thus, as shown for the Laxopa variety in Table 1, local person pronouns expone number, while third person pronouns are superficially number neutral. Number marking shows up instead on the verb in different morphological guises. For most verbs in most aspects, third person plural subjects are marked with a verbal prefix *s(e)-*, as in (29a). This prefix can also trigger suppletion of the stem, such as *-o* ‘eat’ in (29b).

- (29) a. Be<sup>3</sup>-**se**-<sup>3</sup>chuchj<sup>3</sup>=chhgwa<sup>1</sup>=nh<sup>3</sup>, yez<sup>3</sup>=e'nh<sup>3</sup>.  
 COMP-**PL**-be.crushed=a.lot=**3.IN** corn.ear=DEF  
 'A lot were crushed, of the corn ears.' (Yalina: FA, GZYZ098-s, 12)
- b. Nha'<sup>3</sup> t-**s-o'**=b<sup>3</sup> bi<sup>3</sup>do'<sup>3</sup> ka'<sup>1</sup>.  
 then CONT-**PL-eat.PL**=**3.AN** child those  
 'Then they (animals) were eating those children.' (Laxopa: FSR, SLZ1003-t1, 5)

For a small number of motion verbs, a third person plural subject is marked solely through stem suppletion, e.g., *-ej* ‘go (sg.)’ in (30a). Finally, for all verbs, the stative aspect takes a special plural prefix *zja-*, as in (30b).

- (30) a. Tsu<sup>1</sup>pe<sup>1</sup> bil<sup>1</sup>=ba'<sup>2</sup> ts-j-**a'ak'**=ba'<sup>2</sup> La'<sup>1</sup>.  
 two sister=**3.HU** CONT-AND-**go.PL**=**3.HU** Oaxaca  
 'The two sisters are going to Oaxaca.' (Guiloxi: RM, GZYZ003-s, 29)
- b. Na'a<sup>3</sup> **zja**<sup>3</sup>-nhbanh<sup>3</sup>=e'<sup>1</sup>.  
 now **PL**-be.alive.STAT=**3.EL**  
 'They are still alive.' (Yalina: FA, GZYZ040-s, 38)

All four animacy categories are compatible with subject plural marking, as can be seen by looking across the examples in (29–30). In the Laxopa variety, plurality is not marked for objects at all, whether on the pronoun or the verb.

Despite its diverse realizations, I analyze plural morphology on the verb as agreement with the subject in number. This entails that pronouns are underlyingly specified for number — singular or plural — even if it is not expounded on pronouns themselves. This analysis finds support in other Southeastern Sierra varieties — including Yatzachi (Butler 1980:24) and Zoogocho (Long & Cruz 2000:414) — which do realize plural number on *strong* third person pronouns, like the left-dislocated subject in (31).

- (31) **Legake**=nh' chhe-se-lhe'e=chhgw=e' da' walh.  
**3PL.EL**=DEF CONT-PL-see=a.lot=3.EL CL.IN hard  
 'They really go through tremendous hardship.' (Zoogocho: Long 1993:134)

These strong plural pronouns all contain a formative *gak*, which has been analyzed as an enclitic that intervenes between a clitic pronoun and the semantically contentless “pronominal base”, which hosts it: i.e., *le=gak=e'* ‘they (elders)’ (Operstein 2003:171–172). Whether and how these strong pronouns are decomposed, these varieties demonstrate that number is realized not only the verb, but also on pronominal arguments.

### Heterogenous groups

While third person pronouns can refer to homogenous groups, heterogenous reference is also possible. In (32), the elder pronoun refers to a group consisting of a mother and her (small) child. Similarly, in (33), a plural elder pronoun refers to a mixed group of adults, children, and animals (the ones for whom the speaker is praying).

- (32) Context: A woman's new husband decides her child is a bother and tells her to go throw the child away.  
 a. Nachh gwz=e'e z-jə-cho'on=e'e=bə' de'e yoblhə.  
 then leave.COMP=3.EL STAT-AND-throw.away=3.EL=3.HU thing again  
 'Then she left to go throw him away again.'  
 b. Katə' be-sə'ə-linh=e' to ciuda...  
 when COMP-PL-arrive=3.EL one city  
 'When they arrived at a city... ' (Yatzachi: Butler 1989:387)
- (33) Lhenh chhnab=a' be' bnhelljw yogə'ə=lol xiko'=o xi'in=o' benə'  
 and CONT.ask=1SG COMP.give COMP.give every=INT **dog=2SG child=2SG person**  
 chhi' yelllhyo nhi de'e ye'ej de'e gao=ga'ak=e' nhich' ka'  
 CONT.sit world this thing POT.drink thing POT.eat=PL=3EL so.that thus  
 ye-sə'ə-zi'=e banez zejlikanə.  
 POT-PL-get=3.EL benefit eternally  
 'I also ask you to give all your creatures here on earth sustenance so they will receive benefit eternally.' (Yatzachi: Butler 1989:228)

While it is relatively easy to refer to heterogenous groups of elders and humans, such reference is more restricted for groups including animals or inanimates. This is a product of the third property of associativity, which I will discuss below.

### Marked reference

Not just any pronoun can be used to refer to a heterogenous group. For mixed groups of elders and others, it is the elder pronoun that must be used. So, in (34), for instance, a human pronoun is not possible.

- (34) Context: The donkey escapes from its corral. A boy and his grandfather go to chase it. I ask, “What are they doing?”  
 Ts-ja<sup>1</sup>-se<sup>1</sup>-naw<sup>3</sup>=e<sup>1</sup>/#=ba<sup>2</sup> bur<sup>1</sup>=e<sup>1</sup>nh<sup>3</sup>.  
 CONT-AND-PL-follow=3.EL/=3.HU donkey=DEF  
 ‘They are chasing the donkey.’ (Laxopa: FSR, SLZ1053, 1:00)

In other words, whenever there is heterogenous reference, it is the most featurally marked pronoun that is used (the one with the “highest” animacy). This is true for mixed groups whose members belong to the other animacy categories, too, as we will see below.

## 2.3 Context dependence

So far, we have seen how third person pronouns in Zapotec permit heterogenous reference with the most featurally marked pronoun possible. As I show next, the members of any group referred to in this way must also be conceived of as associates. Much as with local person plural pronouns, while humans are good associates for other humans, animals are not, in general, good associates for humans, and inanimate objects do not count as associates at all. Importantly, it is the inherent properties of these individuals that matter, not which animacy category they fall into.

### Mixed groups with animals

For many mixed human-animal groups, plural reference is difficult, whether this involves an elder human (35) or non-elder human (36). When speakers are asked, a comitative or coordination structure is usually offered instead, as in the (b) examples below.<sup>9</sup>

- (35) Context: My grandmother lives alone with her chickens. One day, my mother goes to visit her, but her house is empty. My mother goes to find them, and later I ask, “Where did you find them?” She says:  
 a. # Ts-j-a’ak<sup>3</sup>=e<sup>1</sup>/=eb<sup>3</sup> lau<sup>1</sup> ka<sup>1</sup>re<sup>1</sup>ter<sup>1</sup>.  
 CONT-AND-go.PL=3.EL/3.AN in road  
 ‘They are walking in the road.’ (Yalina/Guiloxi: FA/RM, GZYZ108, 30:00)

<sup>9</sup>All examples in this section were checked with four speakers. Unless otherwise indicated, all four agreed on the judgement. The references provided are exemplary.

- b. Zda<sup>1</sup>=lhenh<sup>2</sup>=e'<sup>1</sup> xjed<sup>1</sup>=e'=nh<sup>13</sup> lau'<sup>1</sup> ka<sup>1</sup>re<sup>1</sup>ter<sup>1</sup>.  
 STAT.walk=with=3.EL chicken=3.EL in road  
 'She was walking with her chickens in the road.' (Guiloxi: RM, GZYZ108, 31:15)
- (36) Context: A boy is standing with his pet bull outside a house.
- a. #Dze<sup>3</sup>-se<sup>3</sup>-ze<sup>3</sup>=ba'<sup>2</sup>/=b<sup>3</sup> dzua<sup>13</sup> yo'o<sup>13</sup>.  
 CONT-PL-stand=3.HU/3.AN near house  
 'They are standing by the house.' (Yalina/Guiloxi: FA/RM, GZYZ099, 16:00)
- b. Dze<sup>3</sup>=lhenh<sup>2</sup>=ba'<sup>2</sup> xgo'n<sup>13</sup>=ba'<sup>2</sup> dzua<sup>13</sup> yo'o<sup>13</sup>.  
 CONT.stand=with=3.HU bull=3.HU near house  
 'He is standing with his bull by the house.' (Yalina/Guiloxi: FA/RM, GZYZ099, 18:00)

In spontaneously produced texts, however, plural pronouns are found referring to mixed human-animal groups, both for elders (37) (cf. (33) above) and non-elders (38).

- (37) a. Nha' to benə' lenh to xikw=e'e zj-a'ak=e' gwxhen  
 then one person with one dog=3.EL STAT.PL-go.PL=3.EL INF.catch  
 bllinh' yixə'.  
 deer  
 'A man and his dog had gone to hunt deer.'
- b. Nha' be-sə'ə-linh=e' to ya'adao'...  
 then COMP-PL-arrive=3.EL one forest  
 'And they arrived in a forest...'
- c. Nhach xhikw=e'e=nh gop=əb le'...  
 then dog=3.EL=DEF COMP.guard=3.AN 3.EL...  
 'Then his dog guarded him...' (Yatzachi: Butler 1989:406, 2–5)
- (38) Context: A boy is trying get rid of a dearly beloved dog, who is eating his sheep.
- a. ...nha' bito bnhelljw=bə'ə=b benh' gwnab leb.  
 and NEG COMP.give=3.HU=3.AN person COMP=ask 3.AN  
 '... so he didn't give it to the man who asked for it.'
- b. **Gwza'ak=lh=bə'** əgwyej=be' lhill to gwet  
**COMP.leave.PL=surprisingly=3.HU** COMP.go=3.HU house one INF.kill  
 go'on...  
 bull  
 'Instead [t]he[y] left and [he] went to the home of a butcher of beef...' (Yatzachi: Butler 1989:204, 20)

Importantly, in these examples, the dog is not simply conceived of as a human. In each case, the dog is still referred to — in the singular — using an animal pronoun, as in (37c) and (38a). It is striking that the groups involve a human and a dog, the animal most likely to be considered a companion on a par with another human, recalling the contrast between the contexts in (16) and (17) above.

In more spontaneous speech, the same speakers who judged the examples in (35–36) infelicitous did use plural pronouns to refer to mixed human-animal groups. In an elicited story about a shepherd

boy and his dog, three speakers used plural pronouns consistently to describe the group of the boy and dog. (Note that, in (39a), the dog is referred to independently using an animal pronoun.)

(39) Context: There was once a boy who was a shepherd. Every morning with his dog he would gather his sheep. One day, the boy woke up earlier than usual.

- a. Be-z<sup>3</sup>-banh<sup>3</sup>=ba<sup>'2</sup>                      xhikw<sup>13</sup>=ba<sup>'2</sup>, be=nh<sup>3</sup>      dzej<sup>3</sup>=lenh<sup>1</sup>=ba<sup>'2</sup>  
 COMP-CAUS-be.alive=3.HU dog=3.HU      3.AN=DEF go.CONT=with=3.HU  
 le<sup>1</sup>ba<sup>3</sup>...  
 3.AN  
 'He woke up his dog, the one he was taking with him...'  
 (Guiloxi: RM, GZYZ118-s, 3)
- b. Be<sup>3</sup>-se<sup>3</sup>-lha'a<sup>12</sup>=ba<sup>'2</sup>                      xhi<sup>1</sup>le'=nh<sup>3</sup> ts-j-a'ak<sup>1</sup>=lenh<sup>1</sup>=ba<sup>'2</sup>=b<sup>3</sup>  
 COMP-PL-separate=3.HU sheep=DEF POT-AND-go.PL=with=3.HU=3.AN  
 chhua<sup>3</sup> yegw<sup>3</sup>.  
 until river  
 'They separated the sheep they were going to take to the river.'  
 (Yalina: FA, GZYZ118-s, 5)
- c. Nha<sup>'3</sup> j-a'ak<sup>3</sup>=ba<sup>'</sup>                              dzua<sup>3</sup> yegw='nh<sup>3</sup>.  
 then COMP.AND-go.PL=3.HU until river=DEF  
 'Then they went to the river.'  
 (Guiloxi: RM, GZYZ118-s, 6)
- d. Bi<sup>1</sup>dao<sup>'1</sup>=nh<sup>3</sup> lenh<sup>1</sup> xhikw<sup>13</sup>=ba<sup>'2</sup>=nh byo<sup>1</sup>=lhenh<sup>1</sup>=ba<sup>'2</sup>=b<sup>3</sup>                      to<sup>3</sup> lho<sup>3</sup>  
 child=DEF with dog=3.HU=DEF COMP.enter=with=3.HU=3.AN one in  
 lha<sup>3</sup>she<sup>'3</sup> ga=nh<sup>1</sup>      be<sup>3</sup>-se<sup>3</sup>-nit<sup>3</sup>=ba<sup>'2</sup>      xhi<sup>1</sup>le'=nh<sup>3</sup>.  
 valley where=DEF COMP-PL-lose=3.HU sheep=DEF  
 'The boy with his dog entered a valley where they lost the sheep.'  
 (Guiloxi/Yalina: RM/FA, GZYZ118, 28:15)
- e. Bi<sup>3</sup>tus<sup>1</sup>      be<sup>1</sup>-se<sup>1</sup>-le<sup>'</sup>ed<sup>13</sup>=ba<sup>'2</sup>=ba<sup>3</sup>.  
 no.longer COMP-PL-see=3.HU=3.AN  
 'They could no longer see them.'  
 (Guiloxi: RM, GZYZ118-s, 7)

A fourth speaker used a plural pronoun in a more limited fashion in only some parts of this story. But this same speaker, when asked to narrate a children's picture book, consistently used a plural pronoun to refer to a boy and his pet dog.

(40) Context: A boy and his pet dog go fishing and fall into the river.

- a. Tswia<sup>3</sup>=b<sup>3</sup>                      blull<sup>3</sup>=e'nh<sup>3</sup> be<sup>1</sup>ku<sup>'3</sup> do<sup>'1</sup>=nh<sup>3</sup> ba<sup>1</sup>  
 watch.CONT=3.AN frog=DEF dog little=DEF already  
 dz-e<sup>3</sup>-dzuj<sup>3</sup>=eb<sup>3</sup>                      yegw<sup>3</sup>=nh<sup>3</sup>.  
 CONT-FREQ-enter=3.AN river=DEF  
 'The frog is watching the little dog who is getting out of the river.'
- b. Tsup<sup>1</sup> la'a<sup>1</sup> t-s-a'a<sup>3</sup>klha<sup>3</sup>lle<sup>3</sup>=ba<sup>'2</sup>      yi<sup>1</sup>-se<sup>3</sup>-zenh<sup>3</sup>=ba<sup>'2</sup>      blull<sup>3</sup>=e'nh<sup>3</sup>.  
 two side CONT-PL-want.PL=3.HU POT-PL-catch=3.HU frog=DEF  
 'They want to catch the frog from both sides.' (Laxopa: FSR, SLZ1062-s, 8-9)

This variability across speakers and contexts contrasts with their unanimous agreement about the infelicity of (35–36), where the contexts are more impoverished and the mixed groups include animals that are stereotypically less intimate with humans.

This pattern of usage is parallel to what we observed earlier for local person pronouns, suggesting that the third person plural pronouns can only refer to a heterogeneous group if its members are associates in the context. This relation does not hold in every situation, even for a group of a human and a dog.

- (41) Context: An elderly man is walking with his dog.
- a. # Dze<sup>3</sup>-se<sup>3</sup>-z=e'e<sup>1</sup>.  
 CONT-PL-walk=3.EL  
 Intended: 'They are walking.' (Yalina/Guiloxi: FA/RM, GZYZ035, 17:09)
- b. # Dze<sup>3</sup>-se-za<sup>3</sup>=b<sup>3</sup>.  
 CONT-PL-walk=3.AN  
 Intended: 'They are walking.' (Yalina/Guiloxi: FA/RM, GZYZ035, 22:52)

In (41), which has a more impoverished context than the narratives above, speakers unanimously judged any plural pronoun as infelicitous.

The content of the associate relation for these third person pronouns is, moreover, broadly the same as what we described for local person pronouns. The speaker of the text in (40) remarked that, in using plural pronouns to refer to the boy and his dog, she was referring to it as if it “becomes part of your family” (Laxopa: FSR, SLZ1062, 53:30). Similarly, another speaker, who readily used plural pronouns throughout the story about the shepherd boy in (39), commented that he would only use (41a) if he wanted to “make fun [*vacilar*]” of the man by “making him family with the dog” (Laxopa: RD, SLZ1081, 15:05).<sup>10</sup> No such comment was offered about reference to the mixed group of a shepherd boy and his dog in (39), where they were engaged in coordinated activities. In general, it also seems that speakers are more likely to use a plural pronoun when the referents were engaged in an activity that necessarily involves a shared goal (e.g., separating the sheep or catching the frog).

### Mixed groups with inanimates

Speakers are also unanimous in rejecting reference to a group comprising a human and thing, as in (42) and (43).

<sup>10</sup>This speaker offered the same comment for a second person plural pronoun used in the same context as (41) to refer to a mixed group.

- (i) E<sup>1</sup> ba<sup>1</sup> tsa'a<sup>3</sup>=l<sup>h</sup>e<sup>1</sup>?  
 Q already CONT.walk=2PL  
 'Are you walking?' (Laxopa: RD, SLZ1081, 15:00)

If (i) is felicitous at all, the speaker remarked that he would be joking with the man by treating his dog as a member of his family. This supports a unified analysis of the associate relation across local and third person pronouns.

- (42) Context: My grandfather died, and on the same day, his favorite rosebush also died. I am sad, and someone asks you “Why are you sad?” I say:

# B-s-a’at<sup>3</sup>=e’<sup>1</sup>/=enh<sup>3</sup>.

COMP-PL-die.PL=3.EL=3.IN

‘They died.’

(Yalina/Guiloxi: FA/RM, GZYZ090, 12:45)

- (43) Context: I am playing hide-and-seek with my daughter. She wants her doll to play too. I leave the room, and when I come back I find them both behind the sofa. Someone asks me “Where were they hidden?”

# Zja<sup>1</sup>-nhka<sup>3</sup>che’<sup>3</sup>=ba’<sup>2</sup>/=nh<sup>3</sup> ko<sup>1</sup>lle’<sup>3</sup> so<sup>1</sup>fa<sup>3</sup> nha’<sup>3</sup>.

PL-hide.STAT=3.HU/=3.IN behind sofa there

‘They were hidden behind the sofa.’

(Yalina/Guiloxi: FA/RM, GZYZ090, 32:45)

But there is still some room for mixed groups involving entities belonging to the inanimate category, which includes, not just plants and non-living things, but also supernatural entities such as demons and goblins (*duende*). These turn out to be possible associates, though in a somewhat limited fashion.

In an elicited story, one speaker freely used plural human pronouns to refer to a mixed group of a goblin and a young human; another speaker accepted these uses, while sometimes also offering alternative formulations. (The goblin is still always referred to using a third person inanimate pronoun, as in (44a).)

- (44) Context: There is a goblin (*duende*) who likes to play tricks with the townspeople.

a. To<sup>3</sup> lle’<sup>13</sup> b-e<sup>3</sup>-llagd<sup>3</sup>=enh<sup>3</sup> to<sup>3</sup> bi’i<sup>1</sup> we<sup>1</sup>gu’<sup>3</sup> ka<sup>1</sup>te’<sup>3</sup>

one night COMP-FREQ-meet=3.IN one CL.HU youth when

ts-j-e<sup>1</sup>-da<sup>3</sup>=ba’<sup>2</sup> lhill<sup>3</sup>=ba’<sup>2</sup>...

CONT-AND-FREQ-move=3.HU home=3.HU

‘One night, it met a boy who was going home...’ (Guiloxi: RM, GZYZ105-s, 5)

b. Nha’<sup>3</sup> zja<sup>3</sup>-da<sup>3</sup> ja<sup>3</sup>-ya’ak<sup>3</sup>=ba’<sup>2</sup> do<sup>3</sup> txenh<sup>31</sup> ganh<sup>1</sup> shchol<sup>3</sup>...

then STAT.PL-move AND-go.PL=3.HU all together where be.dark.CONT

‘They went off into the darkness...’

(Yalina: FA, GZYZ105-s, 8)

c. Nha’<sup>3</sup> nhu’u<sup>1</sup>lhe<sup>1</sup> che<sup>3</sup>=ba’<sup>2</sup>=nh bi<sup>3</sup>tu<sup>3</sup> benhd<sup>13</sup>=ba’<sup>2</sup> lhenh<sup>1</sup>

then woman of=3.HU=DEF NEG hear.COMP=3.HU because

zja<sup>3</sup>-nkwa<sup>3</sup>she’<sup>3</sup>=ba’<sup>2</sup>.

PL-hide.STAT=3.HU

‘His wife couldn’t hear them because they were hidden.’

(Yalina/Guiloxi: FA/RM, GZYZ105, 1:03:10)

Two other speakers consistently did not use plural pronouns throughout this story, preferring either to only describe the human or use a comitative construction. This variability might be attributed to differences in how readily speakers are willing to conceive of the goblin as an associate in a specific context, given that they are by nature antagonistic to people.

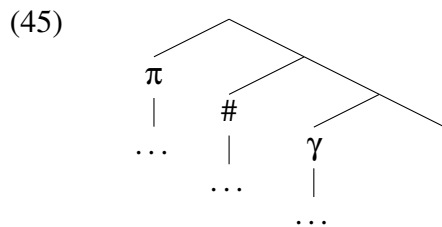
In sum, third person plural pronouns in these Zapotec varieties exhibit all three properties found with local person plural pronouns: (i) they can refer to heterogeneous groups; (ii) such mixed

groups are referred to using the most marked pronoun possible; and (iii) whether this heterogeneous reference is possible depends on context and the characteristics of the individuals involved, recalling the “associate” relation found with local person plural pronouns.

### 3 Animacy in the grammar of $\phi$

I propose that this analogy is a product of the semantic composition mechanism for person. Following Kratzer (2009) and Harbour (2016), I take person features to combine by a compositional operation that creates plural individuals, which gives rise to associativity for local person plural pronouns. Third person plural pronouns in Southeastern Sierra Zapotec share these properties because animacy features compose semantically by the same mode of composition and in the same order.

Some of this order can come from the hierarchical structure of the noun phrase itself. Nouns have an articulated functional structure, which hosts  $\phi$ -features in different positions: person features ( $\pi$ ) are located on a functional head higher in the noun phrase, while number (#) and gender ( $\gamma$ ) features are found in distinct positions lower down (Picallo 1991, Ritter 1991, 1995, Longobardi 1994, and others).



Within each domain, there must be some additional structure, as I discussed in Section 1.3. I assume that this has a familiar feature geometric shape, so that person, number and gender are each organized into trees. This phrase structural representation could, in principle, be replaced by an equivalent formal representation, defined over either privative or bivalent features (Noyer 1992:41–48), as long as it captures the natural class behavior of local persons, as well as animacy.

My main claim about the semantic composition of person and animacy, when embedded in the hypothesis above about the hierarchical organization of the noun phrase, can be restated as follows:

- (46) **Animacy Composition Hypothesis (specific version):**  
 Animacy features compose with person features on the same syntactic head via the same mode of composition.

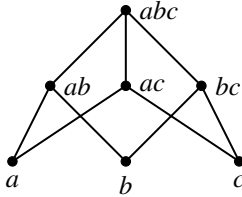
In the proposed system, animacy features are able to combine with person features because their meaning is compatible with the compositional operation that makes pluralities. Other  $\phi$ -features such as social gender features are not, and so they do not give rise to associativity.



### 3.1 Laying the foundation

In standard theories of plurality, the domain of discourse includes not just atomic individuals, but also collections of these individuals (Link 1983).<sup>11</sup> A domain that contains three singular individuals and all the freely generated pluralities of these individuals can be visualized, as in (47), in a Hasse diagram. The singular individuals at the bottom ( $a, b, c$ ) are connected to the pluralities formed from them with lines.

(47)



These singular and plural individuals form a LATTICE, ordered by the PART-OF relation ( $\leq$ ).<sup>12</sup> The singular individuals are atomic, since they are only parts of themselves (e.g., there is no element  $x$  such that  $x \leq a$ ). Plural individuals are formed by combining members of the lattice: for any two elements  $x$  and  $y$ ,  $x \sqcup y$  is their JOIN, the smallest element which both  $x$  and  $y$  are part of. In the diagram above, such pluralities are written simply as  $xy$ .

If the speaker and addressee in a conversation are unique, then any group containing them will have to be constructed by joining them with one or more other individuals. Kratzer (2009) and Harbour (2016) propose a compositional operator which does this, adopted by Cowper & Hall (2019) and Hammerly (2020, 2023). I present a version of Harbour’s semantics here, since it straightforwardly derives the first two properties of associativity, though I modify his feature system so it is compatible with privative person and animacy features, organized in a feature geometry.

Features are interpreted as one-place predicates denoting a subset of the domain of discourse, which includes both singular and plural individuals. I assume three such lattice-denoting elements.

- (48)
- a.  $\llbracket \text{SPEAKER} \rrbracket^c = \lambda x . x$  is the speaker in  $c$
  - b.  $\llbracket \text{PARTICIPANT} \rrbracket^c = \lambda x . x$  includes only the speaker or the addressee in  $c$
  - c.  $\llbracket \pi \rrbracket = \lambda x . x$  is/are (a) potential discourse subject(s) or object(s)

The SPEAKER feature always denotes a unit set — a trivial lattice — as illustrated in (49a). But PARTICIPANT denotes a larger lattice, as illustrated in (49b): its denotation includes the unique speaker and the unique addressee, as well as their join. These extensions are schematic, with  $i$  and  $u$  standing in for whichever individuals are the speaker and the addressee in a given conversation.

- (49)
- a.  $\{i\}$
  - b.  $\{i, u, iu\}$

<sup>11</sup>The literature on plurality poses many questions about the nature of the elements in this lattice, among them whether they can be understood simply as sets and whether a distinction between “sums” and “groups” is needed. I set these issues aside here.

<sup>12</sup>Since there is no unique bottom element, this is technically a complete atomic join semilattice. I will continue to refer to such structures as “lattices” for convenience.

$$\begin{aligned}
c. \quad & \{i, io, io', \dots, u, uo, uo', \dots, iu, iuo, iuo', \dots, o, oo', oo'', \dots, o' o'', \dots, oo' o'', \dots\} \\
& = \{i_o, u_o, iu_o, o_o, o'_o, \dots\}
\end{aligned}$$

The  $\pi$  feature denotes an even larger lattice, as illustrated in (49c), though its size depends on the number of atomic individuals in the domain. It comprises all singular individuals, including the speaker, the addressee, and any other individuals (i.e.,  $o, o', o'', \dots$ ), as well as all the pluralities that can be formed from them. Such complex lattices can be represented, using Harbour’s notation, by rewriting the sequence of an individual  $x$  and all groups containing that individual (i.e.,  $x, xo, xo', xo'', \dots, xoo', xoo'', \dots$ ) simply as  $x_o$ .

These schematic extensions are provided only for convenience, with the actual meanings of these features given by the lexical entries in (48). The notational system for the speaker, the addressee, and others, too, is only for illustrating what individuals are picked out by each feature, and has no formal status. It has nothing to do with why the speaker and addressee in any conversation are unique, which I take to come from the semantics of the SPEAKER and ADDRESSEE features. With the meanings in (48a–b), these pick out the unique speaker and addressee in the context. While this is simply stipulated in these lexical entries, it may also be possible to derive their uniqueness from a richer semantics. Wechsler (2010), for instance, proposes to derive it from a *de se* semantics for person, which conventionally encodes self-ascription by the speaker and addressee.

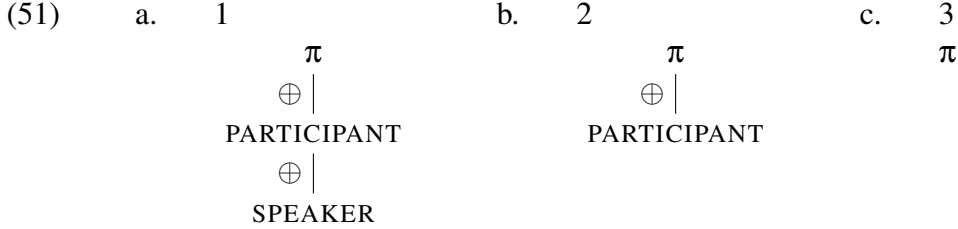
The lexical entry for  $\pi$  in (48c) adopts Sichel & Toosarvandani’s (to appear) proposal, building on Sichel & Wiltschko (2021), that this feature denotes all possible discourse participants — all potential subjects or objects of a discourse — whether singular or plural. This feature, and its particular semantics, is motivated by the need to differentiate personal pronouns from other pronominal elements, such as demonstrative pronouns (d-pronouns), as well as from lexical DPs. Its lexical entry makes no reference to the actual conversational situation, and so its denotation does not vary with the context. In the schematic extension in (49c),  $i$  and  $u$  thus correspond to whichever individuals happen to be picked out by the other person features as the speaker and addressee in a given conversation.

Sometimes, the uniqueness of the speaker and addressee is derived from a restriction on the “ontology” of person (Harbour 2016:67–71, Hammerly 2020:74–75). One way of understanding such an ontological commitment involves restricting the domain for semantic interpretation (the model relative to which linguistic expressions are interpreted). This is not the tack I take here, simply because such a restriction is not needed with the lexical entries above. The SPEAKER feature always picks out exactly one individual (much like *President* or *sun*), though who this is varies with the context. Similarly, PARTICIPANT picks out the unique speaker, the unique addressee, or the plurality comprising them, though again who these individuals are varies with the context. Thus, since these meanings themselves encode uniqueness, there is no need to impose uniqueness in the model as well.

These person features are combined semantically by operators which combine two lattice-denoting features to produce another lattice. To derive a three-way person system with no clusivity distinction, one such mode of composition, which creates pluralities, is sufficient. Harbour’s  $\oplus$  operator in (50), which generalizes Kratzer’s (2009:220) sum operator by applying it pointwise, joins every element in one lattice with every element of another lattice.

$$(50) \quad \left[ \begin{array}{c} G \\ \oplus \\ F \end{array} \right]^c = \lambda x . \exists y \exists z [x = y \sqcup z, y \in \llbracket F \rrbracket^c, \text{ and } z \in \llbracket G \rrbracket^c]$$

Since I am assuming that the features within person are organized geometrically, their vertical organization reflects the order of composition internal to this domain. I represent the mode of composition by which they combine by annotating the leaves of these trees. The person feature specifications in a three-person language would thus be:



Each feature combines with the feature immediately above it. This means that these person features will combine with one another before combining with any other features.

With the feature specifications in (51), while the first person would pick out just the speaker, the second person would pick out both conversational participants. Of course, second person pronouns can only be used to refer to the addressee. This follows from an additional principle, which we can call LEXICAL COMPLEMENTARITY, following Harbour (2016:80).

(52)      **Lexical Complementarity (LC):**

For feature specifications  $F$  and  $G$ , where  $\llbracket F \rrbracket \subset \llbracket G \rrbracket$ , use of  $G$  is restricted to  $\llbracket G \rrbracket - \llbracket F \rrbracket$ .

Lexical Complementarity forestalls a pronoun from being used to refer to individuals who are picked out by a semantically stronger pronoun. It derives plausibly from a general pragmatic principle like Grice's Maxim of Quantity or Heim's (1991) Maximize Presupposition (Sauerland 2006), though it cannot be defeasible.

The  $\oplus$  operator introduces the heterogeneity that characterizes associativity. To see why, consider the interpretations below for the three feature specifications in (51a–c).

(53)      a.       $\llbracket \oplus \text{SPEAKER}(\oplus \text{PARTICIPANT}(\pi)) \rrbracket^c = \oplus(\{i\})(\oplus(\{i, u, iu\})(\{i_o, u_o, iu_o, o_o, o'_o, \dots\}))$   
 $= \oplus(\{i\})(\{i_o, u_o, iu_o\})$                                       (as in (53b))  
 $= \{i \sqcup i, i \sqcup u, i \sqcup iu, \dots\}$   
 $= \{i_o, iu_o\}$

            b.       $\llbracket \oplus \text{PARTICIPANT}(\pi) \rrbracket^c = \oplus(\{i, u, iu\})(\{i_o, u_o, iu_o, o_o, o'_o, \dots\})$   
 $= \{i \sqcup i, i \sqcup u, i \sqcup iu, i \sqcup o, i \sqcup o', \dots,$   
 $u \sqcup i, u \sqcup u, u \sqcup iu, u \sqcup o, u \sqcup o', \dots,$   
 $iu \sqcup i, iu \sqcup u, iu \sqcup iu, iu \sqcup o, iu \sqcup o', \dots\}$   
 $= \{i_o, u_o, iu_o\} \xrightarrow{LC} \{u_o\}$

            c.       $\llbracket \pi \rrbracket^c = \{i_o, u_o, iu_o, o_o\} \xrightarrow{LC} \{o_o\}$

Starting from the bottom, the third person in (53c) involves no combinatorics at all, since by hypothesis it only encodes  $\pi$ . For the second person in (53b), the PARTICIPANT lattice is joined pointwise with the entire  $\pi$  lattice, removing all *atomic* individuals who are not the speaker or addressee (though these other individuals are still present in some plural individuals containing a conversational participant). The result is the set of individuals (singular or plural) containing the

speaker or addressee. If SPEAKER is added, as in the first person in (53a), this set is then further restricted to just those (singular or plural) individuals containing the speaker.

This derives the first two properties of associativity. The features specifications for both first and second person in (53a–b) are heterogenous, because of how the  $\oplus$  operator creates pluralities. Reference to these mixed groups is, moreover, only possible using the most featurally marked pronoun, due to the action of Lexical Complementarity. All groups containing the speaker are included solely in the final denotation for the first person in (53a). Similarly, any group including the addressee, but not the speaker, is found only in the final denotation for the second person in (53b). With the semantics in (48), the three person features stand in transitive entailment relations: SPEAKER entails PARTICIPANT, which in turns entails  $\pi$ . The denotation of first person in (53a) is a proper subset of the denotation of second person in (53b), which in turn is a proper subset of the denotation of third person in (53c). Lexical Complementarity thus restricts the reference of the second person to just the addressee and groups containing the addressee (but not the speaker), and in a similar fashion, it restricts the third person to just groups containing non-participants. The result is marked reference.

There is a substantive question about how the context dependence of associativity arises. One possibility is that it is encoded directly in the  $\oplus$  operator. This would then only create those pluralities whose members are associates in the context:<sup>13</sup>

$$(54) \quad \left[ \left[ \begin{array}{c} G \\ \oplus \\ F \end{array} \right] \right]^c = \lambda x . \exists y \exists z [x = y \sqcup z, y \in \llbracket F \rrbracket^c, z \in \llbracket G \rrbracket^c, \text{ and } y \text{ and } z \text{ are associates in } c]$$

This diverges from how the associate relation is treated in the literature on associative plurals, where it is taken to be part of the semantics of number. Kiparsky & Tonhauser (2011), for instance, advance a formal treatment of a context-dependent associative plural morpheme along these lines. But as Ackema & Neeleman (2018:91–98) point out, no language is known to have plural pronouns that realize such a morpheme overtly. This is true in Zapotec as well, where local plural pronouns are portmanteau morphemes.

Some housekeeping, now, before moving on. These features all denote one-place predicates, and the result of combining them by the rule in (50) is another one-place predicate. But pronouns refer to individuals. I assume that every referential pronoun contains an operator that returns the maximal individual satisfying its feature specification (Link 1983:307).

$$(55) \quad \llbracket [\sigma \pi P] \rrbracket^c = \text{the maximal individual } x \text{ such that } \llbracket \pi P \rrbracket^c(x) = 1$$

This essentially turns pronouns into definite descriptions. I make this choice purely as a matter of convenience, with nothing important riding on the decision. The semantics for person above is also compatible with other ways of making pronouns individual-denoting (with a free variable or syntactically represented index: e.g., Heim & Kratzer 1998:239–245).

<sup>13</sup>As an alternative, it might be possible to treat it as a semantic restriction imposed by the  $\pi$  feature. However, as we saw in Section 2, plural reference is not, in general, constrained in this way. This might simply be because *they* is an elsewhere pronoun, and thus devoid of any featural content (Bjorkman 2017, Konnelly & Cowper 2017). But if this third person plural pronoun does share the  $\pi$  feature with local person pronouns, then it cannot itself encode the associate relation.

### 3.2 Composing person with number

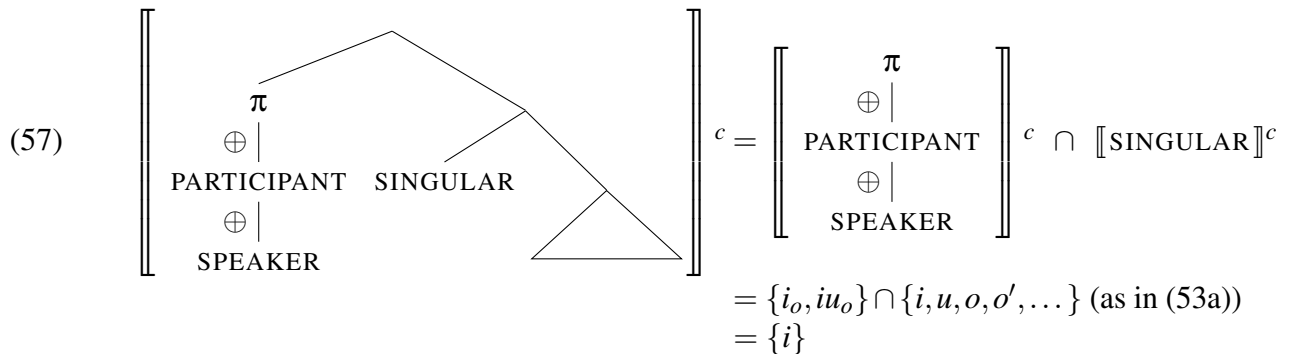
As Harbour (2016:154–156) observes, all person features must combine together first, before combining with number features, to deliver the correct interpretation for singular and plural pronouns. To see why, consider the semantics of the two simplest number features:

- (56) a.  $\llbracket \text{SINGULAR} \rrbracket = \lambda x . \forall y [y \leq x \rightarrow x = y]$   
 b.  $\llbracket \text{PLURAL} \rrbracket = \lambda x . \exists y [y \leq x \wedge x \neq y]$

The SINGULAR feature picks out all atomic individuals (all  $x$  for which there is no  $y$  such that  $y$  is a part of  $x$ , but is not  $x$  itself). Conversely, PLURAL picks out all non-atomic individuals (all  $x$  such that there is a  $y$  distinct from  $x$  which is a part of  $x$ ). These features can combine by set intersection restricting the reference of a pronoun to either an atomic or a non-atomic individual.

Building on a long tradition of work on nominal functional structure, I assume that number features occupy a distinct functional head below person (Picallo 1991, Ritter 1991, Bernstein 1993:204–217), which is itself either located in its own functional projection or is associated with D (Longobardi 1994, Ritter 1995:421, Panagiotidis 2002:19, Höhn 2016; see also Abney 1987:283). Gender, by contrast, is located at the lower end of the nominal domain, on a functional head or on the noun itself (Picallo 1991, Ritter 1993, Kramer 2015).

With this structure, all person features occupy the same functional head, composing semantically together first before combining with any other features.<sup>14</sup> Consider the semantic derivation for the first person singular:



The person features combine by the  $\oplus$  operator, so that the head bearing them denotes all groups containing the speaker, as in the derivation in (53a). This head can then combine with the head bearing SINGULAR by set intersection, removing all non-atomic individuals. The result is the set containing just the speaker.

I attribute this order of composition to the hierarchical positions of  $\varphi$ -features in the extended nominal project. But in fact, it is the only order in which person and number can compose semantically. They cannot be interleaved, since the former would then not have the necessary interpretive effect. Person features give rise to associativity by combining by the  $\oplus$  operator. If this operator applied after SINGULAR had composed with  $\pi$  or any other person feature, it would undo the work of number. While SINGULAR would remove all non-atomic individuals,  $\oplus$  would just add some non-atomic individuals back in, by creating new pluralities.

<sup>14</sup>This would be true, too, if the sequence of functional heads was inverted (Harbour 2016:153–156). Person features compose together first because they occupy their own functional head distinct from the one hosting number, not because of their hierarchical position in the extended nominal projection.

### 3.3 Composing animacy

Third person plural pronouns in Southeastern Sierra Zapotec exhibit associativity, then, because animacy features compose via the  $\oplus$  operator. And for the reason just described, they must combine with person features before either combines with number.

I take animacy features to have a distributive semantics, as person features do, denoting atomic individuals and homogenous groups.

- (58) a.  $\llbracket \text{ELDER} \rrbracket^c = \lambda x . x \text{ hold(s) a salient social role in } c$   
 b.  $\llbracket \text{HUMAN} \rrbracket = \lambda x . x \text{ is/are human}$   
 c.  $\llbracket \text{ANIMATE} \rrbracket = \lambda x . x \text{ is/are animate}$

These animacy features also stand in entailment relations to one another — ELDER entails HUMAN, which in turn entails ANIMATE — just as person features do. This is illustrated with the schematic extensions in (59), which extend the notation used above (*e* stands for non-conversational participant elders, *h* for non-elder humans, and *a* for animals).

- (59) a.  $\{i, u, e, e', \dots, iu, ie, ie', \dots, ue, ue', \dots, ee', \dots, iue, iue', \dots\}$   
 b.  $\{i, u, e, e', \dots, iu, ie, ie', \dots, ue, ue', \dots, ee', \dots, iue, iue', \dots, h, h', \dots, ih, ih', \dots, uh, uh', \dots, eh, eh', \dots, hh', \dots, iuh, iuh', \dots\}$   
 c.  $\{i, u, e, e', \dots, iu, ie, ie', \dots, ue, ue', \dots, ee', \dots, iue, iue', \dots, h, h', \dots, ih, ih', \dots, uh, uh', \dots, eh, eh', \dots, hh', \dots, iuh, iuh', \dots, a, a', \dots, ia, ia', \dots, ua, ua', \dots, ea, ea', \dots, ha, ha', \dots, aa', \dots, iua, iua', \dots\}$

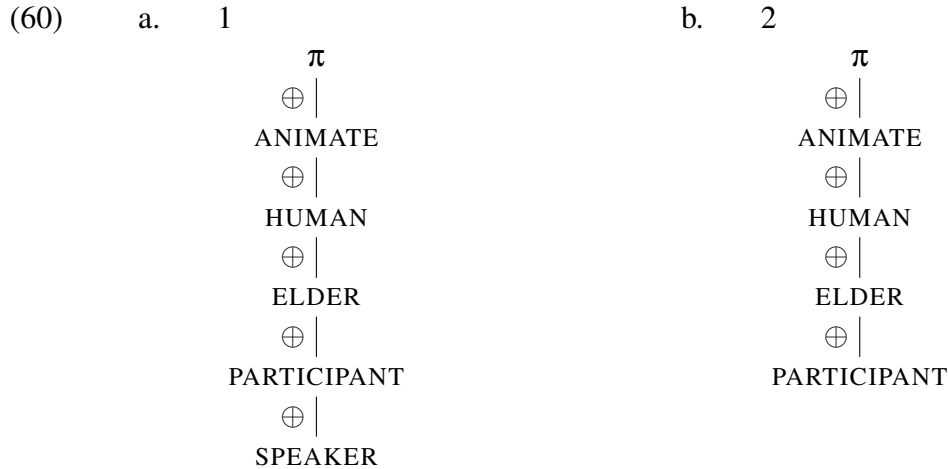
The ANIMATE feature denotes all animate individuals, including all humans, as in (59c). The HUMAN feature denotes a proper subset of this set: all human individuals, whether elder or not, as in (59b). Both necessarily include the speaker and addressee, under the assumption that conversational participants are always human.

Again, the notational scheme in (59) serves a purely illustrative purpose, and does not reflect any kind of ontological assumptions. The elements written as *a* simply represent those elements belonging to the denotation of ANIMATE, but not HUMAN; those written as *h* to the denotation of HUMAN, but not ELDER; and so on. The schematic extensions in (59) are intended to illustrate the overall shapes the actual extensions of these features would have.

With the semantics in (58a), the denotation of ELDER also includes the speaker and addressee. Following Foley & Toosarvandani (2022), I analyze this feature as describing all those individuals who hold a salient social role in the context, including that of being a conversational participant. As I showed in Section 2.1, however, the elder pronoun can only refer to non-conversational participants over a certain age, a status to which others can be promoted depending on their social position. This more restricted reference can be derived by Lexical Complementarity, through competition with the local person pronouns, if elder humans count as bearing a “salient social role” in the context. The elder pronoun will only refer to these individuals, then, because reference to the speaker or addressee is possible with a first or second person pronoun.<sup>15</sup>

<sup>15</sup>This assumes that the speaker and addressee are always human. There are obvious counterexamples, where animals and inanimates are speakers or addressees: fantastic stories, like *Winnie the Pooh* or *Beauty and the Beast*, come to mind. But these involve either personification or anthropomorphization.

This semantics allows for the possibility that local person pronouns bear ELDER and the other animacy features (cf. Béjar 2003:51, Oxford 2019). For Southeastern Sierra Zapotec, the feature specifications for first and second person (ignoring the inclusive–exclusive distinction for now) are the following:

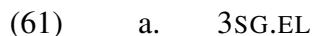


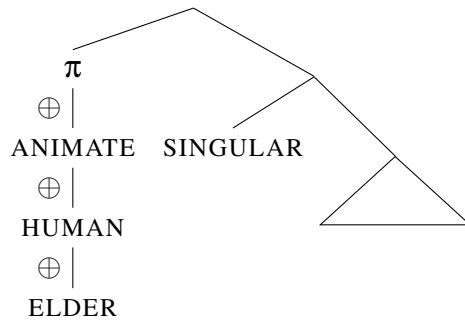
While these feature specifications are semantically equivalent to their analogues in (53a–b), the presence of animacy features in the first and second person has morphosyntactic consequences. Third person pronouns, which are specified for some or all animate features, will form a natural class with local person pronouns.

Not all languages will have the feature specifications in (60). Animacy features may not be active in a language, in which case local persons will have the representations in (51a–b). This variation is part of the broader variation found within pronoun inventories. Some languages have three or four person categories, while some only have two. These different inventories reflect the varying activation of person features (Harley & Ritter 2002, Harbour 2016).

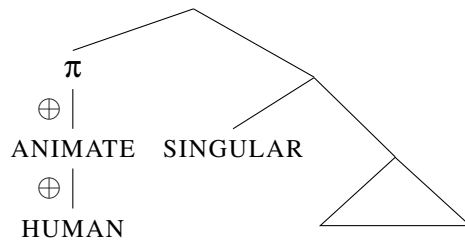
As the ELDER feature’s semantics is defined above, it can never be used to draw a distinction within first or second person. The ELDER feature denotes a superset of the denotations of SPEAKER and PARTICIPANT, and so cannot discriminate between conversational participants. Further, if the feature specifications in a language are subject to a mapping principle based on semantic entailment, as Béjar (2003:47–49) proposes, then ELDER will be present in all local persons, whenever it is active. It would not be useful, for this reason, for representing a formality distinction within the second person (like *tu* vs. *vous* in French).

Third person pronouns in Zapotec have the representations below, with animacy features combining with  $\pi$  via the  $\oplus$  operator.

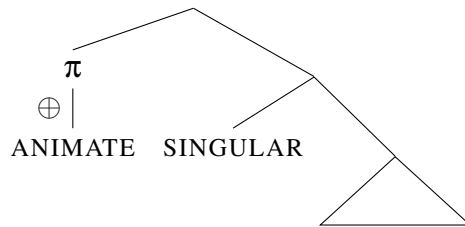




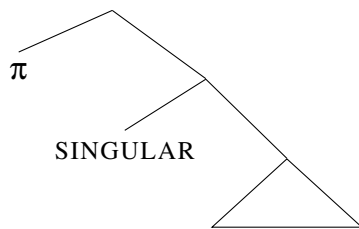
b. 3SG.HU



c. 3SG.AN



d. 3SG.IN



Just as with first and second person, this creates the heterogeneity characteristic of associativity. The denotation for the elder feature specification includes not just groups of elders, but any group that contains at least one elder, as shown in (62a). The same holds for the human and animal feature specification, as shown in (62b) and (62c). The inanimate feature specification in (61d) just denotes the full  $\pi$  lattice.



- (62) a.  $\llbracket \oplus \text{ELDER}(\oplus \text{HUMAN}(\oplus \text{ANIMATE}(\pi))) \rrbracket^c$   
 $= \{i, u, e, e', \dots,$   
 $ie, ie', \dots, ih, ih', \dots, ia, ia', \dots, io, io', \dots,$   
 $ue, ue', \dots, uh, uh', \dots, ua, ua', \dots, uo, uo', \dots,$   
 $iu, iue, iue', \dots, iuh, iuh', \dots, iua, iua', \dots, iuo, iuo', \dots,$   
 $ee', \dots, eh, eh', \dots, ea, ea', \dots, eo, eo', \dots\}$   
 $\xrightarrow{LC} \{e, e', \dots, ee', \dots, eh, eh', \dots, ea, ea', \dots, eo, eo', \dots\}$
- b.  $\llbracket \oplus \text{HUMAN}(\oplus \text{ANIMATE}(\pi)) \rrbracket^c$   
 $= \{i, u, e, e', \dots, h, h', \dots,$   
 $ie, ie', \dots, ih, ih', \dots, ia, ia', \dots, io, io', \dots,$   
 $ue, ue', \dots, uh, uh', \dots, ua, ua', \dots, uo, uo', \dots,$   
 $iu, iue, iue', \dots, iuh, iuh', \dots, iua, iua', \dots, iuo, iuo', \dots,$   
 $ee', \dots, eh, eh', \dots, ea, ea', \dots, eo, eo', \dots,$   
 $hh', \dots, ha, ha', \dots, ho, ho', \dots\}$   
 $\xrightarrow{LC} \{h, h', \dots, hh', \dots, ha, ha', \dots, ho, ho', \dots\}$
- c.  $\llbracket \oplus \text{ANIMATE}(\pi) \rrbracket^c$   
 $= \{i, u, e, e', \dots, h, h', \dots, a, a', \dots,$   
 $ie, ie', \dots, ih, ih', \dots, ia, ia', \dots, io, io', \dots,$   
 $ue, ue', \dots, uh, uh', \dots, ua, ua', \dots, uo, uo', \dots,$   
 $iu, iue, iue', \dots, iuh, iuh', \dots, iua, iua', \dots, iuo, iuo', \dots,$   
 $ee', \dots, eh, eh', \dots, ea, ea', \dots, eo, eo', \dots,$   
 $hh', \dots, ha, ha', \dots, ho, ho', \dots, \}$   
 $aa', \dots, ao, ao', \dots, \}$   
 $\xrightarrow{LC} \{a, a', \dots, aa', \dots, ao, ao', \dots\}$

The fewer features a pronoun has, the fewer restrictions it places on the input lattice and the larger its denotation is. But Lexical Complementarity ensures that each pronoun's reference is further restricted. A human pronoun, for instance, only refers to groups containing a non-elder human, possibly along with an animal or inanimate, through competition with the elder pronoun, as in (62b). All groups containing an elder human or a conversational participant are removed, since they are part of the denotation of the elder pronoun. The same logic applies to the other pronouns.

Together, the semantics of animacy in (58) and the compositional operator in (54) account for the associativity of third person pronouns in Southeastern Sierra varieties:

### 1. Heterogenous groups:

Heterogenous reference is enabled by the  $\oplus$  operator. Each feature specification in (62) picks out groups which contain elements that are not included in its denotation as atomic individuals. In (62a), for example, the elder category includes *eh*, *ea*, and *eo*, but not *h*, *a*, and *o*. These atomic individuals are removed by ELDER, leaving only groups containing at least one elder.

### 2. Marked reference:

Heterogenous groups can only be referred to using the most featurally marked pronoun because of Lexical Complementarity. While, for example, a mixed group of elder and non-elder humans is found in the denotations of all three pronouns in (62a–c), such groups are

eliminated as referential options for the human and animal pronouns, as the elder pronoun's denotation is a proper subset of theirs.

### 3. Context dependence:

The context-dependent associate relation is introduced by the  $\oplus$  operator that forms groups, as in (54) above. Thus, all plural individuals in the denotations in (62a–c) will be “associates” in the context.

These three properties are a product of how animacy features combine, specifically how they compose with the  $\pi$  feature via a dedicated mode of composition.

In fact, there is no other way for associativity to arise for third person pronouns, for the reasons discussed in Section 3.2. If animacy were to compose via the  $\oplus$  operator *after* person had combined with number, it would undo the effects of number. This is shown in the semantic derivation below, which corresponds to a structure in which animacy features do not form a constituent with  $\pi$ .

$$\begin{aligned}
 (63) \quad & \llbracket \oplus \text{ELDER}(\oplus \text{HUMAN}(\oplus \text{ANIMATE}(\pi \cap \text{SINGULAR})) \rrbracket^c \\
 & = \oplus \llbracket \text{ELDER} \rrbracket^c (\oplus \llbracket \text{HUMAN} \rrbracket^c (\oplus \llbracket \text{ANIMATE} \rrbracket^c (\{i, u, e, e', \dots, h, h', \dots, a, d', \dots, o, o', \dots\}))) \\
 & \hspace{15em} \text{(i)} \\
 & = \{i, u, e, e', \dots, ie, ie', \dots, ih, ih', \dots, ia, ia', \dots, io, io', \dots, ue, ue', \dots, uh, uh', \dots, \\
 & \quad ua, ua', \dots, uo, uo', \dots, ee', \dots, eh, eh', \dots, ea, ea', \dots, eo, eo', \dots, iu, iue, iue', \dots, \\
 & \quad iuh, iuh', \dots, iua, iua', \dots, iuo, iuo', \dots\} \\
 & \hspace{15em} \text{(ii)}
 \end{aligned}$$

Combining  $\pi$  with SINGULAR (by set intersection) removes all pluralities (i). But combining this then with animacy features by  $\oplus$  adds some pluralities back in (ii). As a result, the final denotation would include the atomic members of ELDER *and* all pluralities that can be created from them. Simply put, animacy features must combine with person, or else a pronoun with SINGULAR would not have singular reference.

## 3.4 The typologies of person and animacy

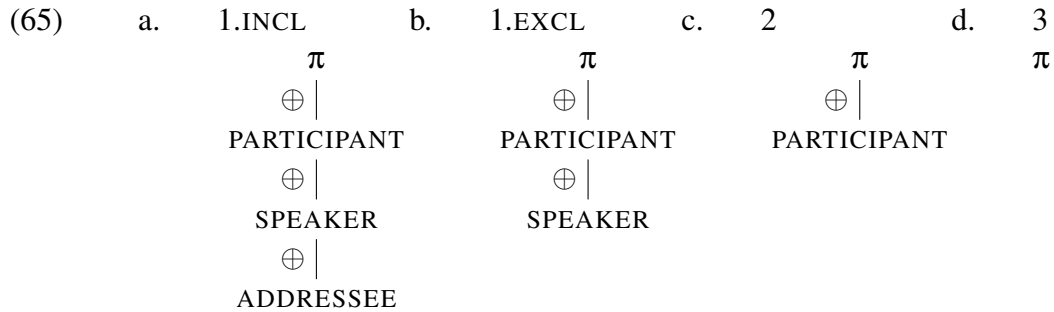
So far, I have focused on how associativity arises in person and animacy, setting aside the question of how four-person inventories are represented. With the person features in Section 3.1, combining by just one mode of composition ( $\oplus$ ), only three persons are possible. To derive both person inventories in a unified feature system, there must be either (i) another person feature, in addition to PARTICIPANT and SPEAKER or (ii) another operation by which features can be composed or modified. In previous discussions, these hypotheses have primarily been evaluated based on the predictions they make for the typology of person. But if person and animacy form part of the same compositional system, as I have argued, then their predictions for the typology of animacy are just as important. In what follows, I integrate these two hypotheses into the current feature system, working out their predictions for inventories of animacy categories.

The first approach adds a new person feature, ADDRESSEE (Harley & Ritter 2002, Béjar 2003, cf. Noyer 1992), whose denotation includes the unique addressee in the speech event.

$$(64) \quad \llbracket \text{ADDRESSEE} \rrbracket^c = \lambda x . x \text{ is the addressee in } c$$

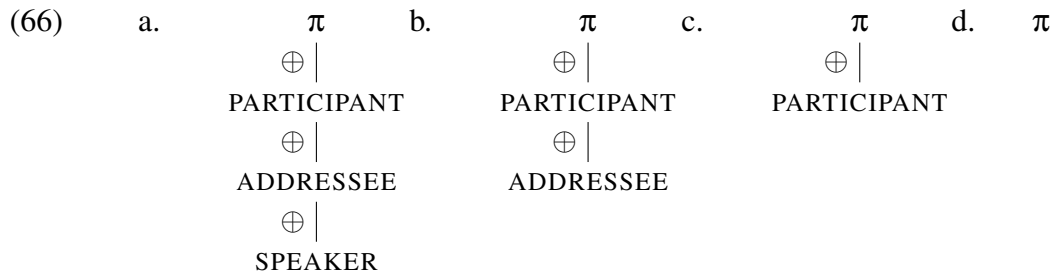
In Harley & Ritter's feature geometry in (4), SPEAKER and ADDRESSEE are treated as sisters. But this structure is not interpretable with the  $\oplus$  operator as it is defined above. The ADDRESSEE feature

can instead be a daughter of SPEAKER, which correctly derives the inclusive–exclusive distinction, as Harbour (2016:190–199) observes.



The most marked specification in (65a) would denote only groups containing both the speaker and addressee ( $\{iu_o\}$ ). By Lexical Complementarity, the specification in (65b) would then denote groups of the speaker and others ( $\{i_o\}$ ), and the specification in (65c) groups of the addressee and others ( $\{u_o\}$ ).

The feature geometry would have to exclude the feature specifications in (66), while still allowing those above. These recombine the same person features to produce pronouns whose interpretations do not align with their formal natural class.



As desired, the specifications in (66a) and (66b) would have the semantics of the first person inclusive ( $\{iu_o\}$ ) and second person ( $\{u_o\}$ ), respectively. The first person exclusive ( $\{i_o\}$ ) would correspond to the specification in (65c), through competition with (65b). But it would not comprise a class in featural terms with the first person inclusive (65a) to the exclusion of the second person. With these specification, in other words, there would be no unified category of first person.

Under this first approach, the feature geometry must ensure that ADDRESSEE is only ever a daughter of SPEAKER. This raises the question of whether this structural configuration must be stipulated in the feature geometry, or whether it can be derived from independent principles. Béjar (2003:47–49) proposes that feature geometries are constrained by semantic entailment, so that every feature entails all the features which dominate it. With the lexical entries above, though, SPEAKER and ADDRESSEE do not entail each other, and so cannot be related vertically according to Béjar’s hypothesis.

The issue, then, is that adding a person feature predicts an undesirably large typology of person, unless its combinatorial potential is curtailed. But does it make any predictions for the inventory of animacy categories? It does not, since expanding the inventory of person features has no bearing on what animacy features will be active in a language.

The second approach, by contrast, makes significant predictions for the typology of animacy. In this approach, just two features — PARTICIPANT and SPEAKER — generate both three- and four-person systems. The additional generative potential comes either from an additional mode of composition, which removes individuals from pluralities (Harbour 2016), or from feature modification via a set complementation operator (Cowper & Hall 2019, Hammerly 2020, 2023). With the structure for the noun phrase adopted here, both possibilities make similar predictions for the typology of animacy, so I focus on Harbour’s proposal here (though see Section 3.5 for a related discussion of Hammerly’s proposal).

Harbour adds a compositional operator ( $\ominus$ ), encoded by the negative value for person features, which subtracts every element in one feature’s denotation pointwise from every element in another feature’s denotation.

$$(67) \quad \left[ \begin{array}{c} \text{G} \\ \ominus \mid \\ \text{F} \end{array} \right]^c = \lambda y . \exists z [y = z \setminus \max(\llbracket \text{F} \rrbracket^c) \text{ and } z \in \llbracket \text{G} \rrbracket^c]$$

In this definition,  $x \setminus \max(f)$  is the group created by removing the maximal element of  $f$  (the smallest element of  $f$  which contains all other members of  $f$ ) from  $x$ .

By adding this compositional mechanism, the four person categories can have the feature specifications in (11b) above, which exhaust the possible combinations for two bivalent features. The first person inclusive and exclusive have the interpretations in (68a–b).

$$(68) \quad \begin{array}{ll} \text{a.} & \llbracket \oplus \text{SPEAKER}(\oplus \text{PARTICIPANT}(\pi)) \rrbracket^c = \oplus(\{i\})(\oplus(\{i, u, iu\})(\{i_o, u_o, iu_o, o_o, o'_o, \dots\})) \\ & = \oplus(\{i\})(\{i_o, u_o, iu_o\}) \quad (\text{as in (53b)}) \\ & = \{i_o, iu_o\} \xrightarrow{LC} \{iu_o\} \\ \text{b.} & \llbracket \oplus \text{SPEAKER}(\ominus \text{PARTICIPANT}(\pi)) \rrbracket^c = \oplus(\{i\})(\ominus(\{i, u, iu\})(\{i_o, u_o, iu_o, o_o, \dots\})) \\ & = \oplus(\{i\})(\{\emptyset, o_o, \dots\}) \\ & = \{i_o\} \end{array}$$

For the first person exclusive, the addressee is removed from the denotation of  $\pi$  via this operator, as shown in (68b). The first person inclusive involves leaving it in, as shown in (68a), with groups containing only the speaker eliminated by Lexical Complementarity.<sup>16</sup>

As I discussed in Section 1.3, the featural representations in (68a–b) do not encode local persons as a natural class, because they use just two bivalent features, whose values are freely combined. Harbour (2016:125–128) proposes to make at least the third person underspecified, in which case the features that can be underspecified must be specified somewhere: in a feature geometry, as in (51), or an equivalent formal representation (see Harbour 2016:190–199, 259–262 for additional discussion).

$$(69) \quad \begin{array}{cccc} \text{a.} & \text{1.INCL} & \text{b.} & \text{1.EXCL} & \text{c.} & \text{2} & \text{d.} & \text{3} \\ & \pi & & \pi & & \pi & & \pi \\ & \oplus \mid & & \ominus \mid & & \oplus \mid & & \\ & \text{PARTICIPANT} & & \text{PARTICIPANT} & & \text{PARTICIPANT} & & \\ & \oplus \mid & & \oplus \mid & & & & \\ & \text{SPEAKER} & & \text{SPEAKER} & & & & \end{array}$$

<sup>16</sup>Since the  $\ominus$  operator subtracts elements from the members of a lattice, it can create the unique bottom member ( $\emptyset$ ). This is a formal artifact, which can simply be removed.

So, adding a new mode of composition can generate just the attested inventory of person categories, as long as there is some underspecification. However, this compositional freedom predicts a much larger inventory of animacy categories than likely exists.

With two compositional operators, animacy features can combine semantically in many ways, beyond the four shown in (61). When all three animacy features are present, there are seven other combinations with  $\oplus$  and  $\ominus$  besides (61a).

- (70)
- a.  $\llbracket \oplus \text{ELDER}(\oplus \text{HUMAN}(\ominus \text{ANIMATE}(\pi))) \rrbracket^c = \{e, eh, eo, eho, \dots, e', e'h, e'o, e'ho, \dots\}$
  - b.  $\llbracket \oplus \text{ELDER}(\ominus \text{HUMAN}(\oplus \text{ANIMATE}(\pi))) \rrbracket^c = \{e, ea, eo, eao, \dots, e', e'a, e'o, e'ao, \dots\}$
  - c.  $\llbracket \ominus \text{ELDER}(\oplus \text{HUMAN}(\oplus \text{ANIMATE}(\pi))) \rrbracket^c = \{h, ha, ho, hao, \dots, h', h'a, h'o, h'ao, \dots, \emptyset\}$
  - d.  $\llbracket \oplus \text{ELDER}(\ominus \text{HUMAN}(\ominus \text{ANIMATE}(\pi))) \rrbracket^c = \{e, eo, \dots, e', e'o, \dots\}$
  - e.  $\llbracket \ominus \text{ELDER}(\ominus \text{HUMAN}(\oplus \text{ANIMATE}(\pi))) \rrbracket^c = \{a, ao, \dots, a', a'o, \dots, \emptyset\}$
  - f.  $\llbracket \ominus \text{ELDER}(\oplus \text{HUMAN}(\ominus \text{ANIMATE}(\pi))) \rrbracket^c = \{h, ho' \dots, h', h'o, \dots, \emptyset\}$
  - g.  $\llbracket \ominus \text{ELDER}(\ominus \text{HUMAN}(\ominus \text{ANIMATE}(\pi))) \rrbracket^c = \{o, o', oo', \dots, \emptyset\}$

While some of these may correspond to actual pronouns, e.g., (70c), (70e), and (70g), others are highly unlikely to. For instance, (70a) includes atomic elders and groups containing these elders and another human, or thing (*but no animals*), (70b) includes atomic elders and groups containing these elders and an animal or thing (*but no other humans*), and (70d) includes atomic elders and group containing these elders and a thing (*but no other humans or animals*). Nor can these be further restricted by Lexical Complementarity, through competition with the feature specifications in (61), to produce a more plausible pronoun. None of their denotations in (62a–c) are a subset of any in (70).<sup>17</sup>

If these categories are not attested, then animacy features cannot combine via the  $\ominus$  operator. This divergence would go against the specific formulation of the Animacy Composition Hypothesis in (46), though perhaps not its spirit. Person and animacy features would still be able to combine by *some* of the same modes of composition (i.e.,  $\oplus$ ). Then, the question would be why animacy differs from person in this way.

### 3.5 Limits on composition with person

Animacy and person are able to compose together because the semantics of the two domains are parallel. Person features stand in transitive entailment relations to each other:  $\llbracket \text{SPEAKER} \rrbracket^c \subset \llbracket \text{PARTICIPANT} \rrbracket^c \subset \llbracket \pi \rrbracket$  (Sichel & Wiltschko 2021), just as animacy features do:  $\llbracket \text{ELDER} \rrbracket^c \subset \llbracket \text{HUMAN} \rrbracket \subset \llbracket \text{ANIMATE} \rrbracket$ . Other  $\phi$ -features do not share this interpretive property, and so are unable to compose with person via the same mode of composition. This is true, in particular, for social gender, which is frequently marked in pronoun inventories.

When a gendered pronoun is used to refer to humans, and possibly also some higher animates, its gender features make an interpretive contribution. In English, this is the only way gender is

<sup>17</sup>A reviewer points out that, in other Northern Zapotec varieties, the third person pronoun which refers to elders can also refer to certain culturally significant objects. In the San Juan Atepec variety, it is used for the sun, moon, water, and maize (Nellis & de Nellis 1983:369). A featural specification like (70a) is probably not appropriate for representing this pronoun's referential possibilities, since there is no obvious way of excluding non-culturally significant inanimates. It is worth pointing out that, in this variety, the second person also seems to encode a formality distinction; it may be that this same contrast is realized in the third person as well.

manifested (*she* vs. *he*), but in languages with grammatical (or formal) gender, the same gender categories are extended to non-humans in potentially arbitrary ways. This can implicate just the language’s pronouns, or these categories can be extended to all nouns, as in noun classification systems. I will not be concerned here with grammatical gender, since it has little to do with the interpretation of gender features. Why a masculine pronoun, for instance, is used to refer to a table will not derive from semantically contentful gender features. Many theories of grammatical gender accordingly posit an additional class of gender features which are not interpreted, though these must stand in some systematic relationship to semantic gender features (Wechsler & Zlatić 2003, Kramer 2015, Wurmbrand 2017).

These interpretable gender features do not stand in any entailment relation to one another, if they are distributive and carve out mutually exclusive sets of individuals. With the lexical entries in (71), FEMININE and MASCULINE would denote disjoint sets of homogenous groups of females and males, respectively.

- (71) a.  $\llbracket \text{FEMININE} \rrbracket = \lambda x . x \text{ is/are (a) female person/people}$   
 b.  $\llbracket \text{MASCULINE} \rrbracket = \lambda x . x \text{ is/are (a) male person/people}$

As a result, if they combined with  $\pi$  via the  $\oplus$  operator, they would create pronouns with partially overlapping denotations. Both feminine and masculine plural pronouns would describe mixed groups of females and males, and Lexical Complementarity would not be able to restrict their reference any further.

This semantics for gender features is instead compatible with them composing intersectively and being located lower in the noun phrase than person (Picallo 1991, Bernstein 1993, Ritter 1993, Kramer 2015). But that does not mean that all gendered pronouns necessarily have homogenous reference. In French, for example, the masculine plural pronoun can refer to mixed groups of males and females, as in (72), as well as homogenous groups of males. The feminine plural pronoun refers only to homogenous female groups.

- (72) (Le fils et la fille,) **ils/\*elles** sont partis.  
 the.M boy and the.F girl **3PL.M/3PL.F** are left.PL.M  
 ‘(The boy and the girl,) they left.’

These pronouns do not, however, exhibit the second property of associativity, marked reference. If gender features have the distributive semantics in (71), then it is the feminine pronoun that is marked, since it only refers to homogenous groups. The heterogeneity of the “masculine” pronoun can arise through underspecification, with its reference restricted by Lexical Complementarity to the feminine pronoun’s complement. It would thus be the *less* featurally specified pronoun (the masculine) that refers to mixed gender groups.

Of course, this assumes that gender features are distributive. If they were not distributive, binary gender systems would end up exhibiting marked reference, as Sauerland (2006:65) points out. The MASCULINE feature would denote any group containing at least one male, and then it would be the masculine pronoun that would be more featurally specified and refer to heterogenous groups. The feminine pronoun would be unmarked, and by Lexical Complementarity would refer to groups of all females.

It is possible to show that some gender features are distributive by looking at languages with more than two genders, though this is not always easy (Wechsler 2010:339–340, cf. Déchaine

2019). To isolate the semantic contribution of gender features, we have to look solely at *referential pronouns* with human referents, as we did for French above. Bound and relative pronouns are more likely to permit mismatches between their form and the inherent properties of their referents (Corbett 1991:225–260, Kratzer 2009, Conrod 2022). In addition, while verb agreement with conjoined noun phrases is frequently used to diagnose the semantic contribution of gender features, agreement only provides indirect evidence for meaning, if resolving discordant gender inside conjunctions is mediated by some additional grammatical mechanism.

With this in mind, now, consider Icelandic, a language with three genders (masculine, feminine, and neuter), which are assigned semantically for animate nouns. These are realized overtly in third person plural pronouns: *Þær* ‘they (3PL.F)’ refers solely to homogenous female groups, and *Þeir* ‘they (3PL.M)’ solely to homogenous male groups. Any other group, including heterogenous groups of females and males, is referred to using the plural neuter pronoun, *Þau* ‘they (3PL.N)’ (Sigurðsson 2019:742).<sup>18</sup>

- (73) Sjáðu konu-na og mann-inn. {**Þau**, \***Þeir**} eru úti.  
 see.you woman-the.F.SG and man-the.M.SG **they.N.PL** **they.M.PL** be.PL outside  
 ‘Look at the woman and man. They are outside.’ (Þorvaldsdóttir 2017:10)

At least in Icelandic, then, MASCULINE and FEMININE must be distributive, as in the lexical entries above, and the three plural pronouns can have the following feature specifications (see Adamson & Anagnostopoulou 2022 for a similar proposal, with a more nuanced semantics):

- (74) a. 3PL.F  
 [ π [ PLURAL [ FEMININE [ ... ] ] ] ]  
 b. 3PL.M  
 [ π [ PLURAL [ MASCULINE [ ... ] ] ] ]  
 c. 3PL.N  
 [ π [ PLURAL [ ... ] ] ]

With the masculine and feminine plural pronouns in (74a–b) picking out homogenous groups, the neuter plural pronoun in (74c) will refer, by Lexical Complementarity, to any other group. Social gender in Icelandic is thus different from animacy in Southeastern Sierra Zapotec, since it does not exhibit marked reference.<sup>19</sup>

But while social gender features can never compose with person features, is it possible that animacy also has a life in the gender system of some languages? This would require weakening the

<sup>18</sup>Þorvaldsdóttir (2017) demonstrates experimentally that this pattern holds for pronominal reference to all animate groups. Icelandic does, however, have grammatical gender assignment for inanimate nouns. Corbett (1991:283) describes the same pattern for inanimates, though Þorvaldsdóttir’s results suggest the situation might be more complicated.

<sup>19</sup>A reviewer suggests that another non-binary gender system, in Czech, may not work like Icelandic’s. On the surface, it has four gender categories (masculine animate, masculine inanimate, feminine, and neuter), which are collapsed into three categories in the plural (masculine animate, masculine inanimate/feminine, and neuter). Kučerová (2018) describes that, in tensed clauses, conjoining a masculine animate noun with a noun of any other category leads to masculine animate agreement, while conjoining a masculine inanimate or feminine noun with a neuter noun leads to masculine inanimate/feminine agreement. While she does not provide any actual data on plural pronoun reference, this verb agreement pattern suggests it would exhibit marked reference, with masculine animate being most marked and neuter least marked. Given the analysis of social gender in Icelandic, this system should involve person and animacy in some way, not social gender. Indeed, Kučerová proposes to reduce these “gender” distinction entirely to person, within a feature system with four person values (see also Adamson & Anagnostopoulou 2022).

Animacy Composition Hypothesis, so that animacy features *could* combine with person features by the same mode of composition, but would not have to. They would, for instance, also be able to combine with gender features. In this case, they would compose by set intersection, and so would not give rise to associativity, as discussed above.

In his analysis of obviation in Ojibwe, Hammerly (2023) proposes that an ANIMATE feature is located on the same functional head as gender, low in the noun phrase. Only PROXIMATE and OBVIATIVE third-person arguments have this feature, since only animates participate in an obviation alternation. For mixed reference to a group of animates and inanimates, Ojibwe uses a *proximate* pronoun, the more marked pronoun bearing ANIMATE, and not an inanimate one.

- (75) ... weweni ji-gana-waabam-ang-waa      **ongow**      **awesiiny-ag**, miinawaa  
carefully in.order.to-care-look-INCL-3PL **DEM.PROX.PL animal-PL** and  
**ingiw**      **binesiw-ag**, miinawaa **giigoony-ag**, miinawaa **zaaga’igan**, **mitigoo-g**  
**DEM.PROX.PL bird-PL** and      **fish-PL** and      **lake**      **tree-PL**  
akina sa      **inigiw**.  
all      **EMPH DEM.PROX.PL**  
‘... so that we can carefully look after these animals, and these birds, and the fish, and the lake, the trees, all of these things.’ (Treuer 2001:110–111, *apud* Hammerly (2023:46))

However, in Hammerly’s system, the ANIMATE feature can combine by the  $\oplus$  operator, despite its structural position. This is possible because he assumes number features are located in a functional head *above* both person and gender: i.e., [ # [  $\pi$  [  $\gamma$  [ ... ] ] ] ], which can be seen as a different implementation of the general version of the Animacy Composition Hypothesis in (13). The animacy feature first combines with person features, through the same composition mechanism, before combining with number features. This means that Ojibwe would also be amenable to an analysis like the one I have advanced here, in which the ANIMATE feature occupies a high functional head with person.

The question posed above awaits a more comprehensive survey of pronoun systems encoding animacy (see Toosarvandani 2022 for a small survey of Bantu, Dravidian, and Northeast Caucasian languages). In the end, if only languages like Southeastern Sierra Zapotec and Ojibwe exist, this would support a strong version of the Animacy Composition Hypothesis, in which animacy *only* composes with person.

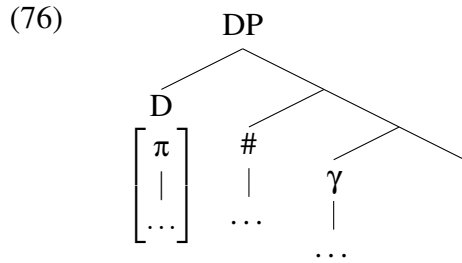
## 4 Person, animacy, and the PCC

So far, my goal has been to establish an interpretive parallel between person and animacy, developing a featural representation that can encode it. This involves, I argued, a compositional semantics in which person and animacy features occupy a single syntactic position. I aim next to show that this is plausibly responsible for their shared relevance to hierarchy-sensitive syntactic processes. If animacy and person features occupy the same position inside the noun phrase, then grammatical operations sensitive to one might also be sensitive to the other.

How this basic idea is implemented is crucial, since it must also derive why these operations are *not* sensitive to other  $\phi$ -features, including gender. I will focus here on the PERSON CASE CONSTRAINT (PCC), illustrated in (1–2) above, which makes reference to both person and animacy



in Southeastern Sierra Zapotec. The core hypothesis that will enable this is that only person and animacy features occupy the highest functional head in the noun phrase.



I take this functional head to be D (Longobardi 1994, Ritter 1995:421), though it might also be possible to reduce “D” itself to the most general person feature (Sichel & Toosarvandani, to appear).

This structural hypothesis is paired with a syntactic theory of the PCC, in which pronominal cliticization depends on the syntactic operation responsible for featural covariation, i.e., Agree (Chomsky 2001). I adopt a general version of Deal’s (to appear) and Sichel & Toosarvandani’s (to appear) recent accounts, in which a clausal functional head is able, in principle, to Agree with all the pronouns in its domain, leading to their cliticization. In a given derivation, whether it does in fact Agree with more than one pronoun is conditioned by the featural specifications of the pronouns it finds. In configurations where the PCC is violated, only one pronoun is Agreed with, and hence only one pronoun is able to cliticize.

To derive the PCC’s unique sensitivity to person and animacy, I take the featural requirements of this functional head to be *sequenced* (Coon & Keine 2021, cf. Anagnostopoulou 2003, Béjar 2003, Béjar & Rezac 2003, Preminger 2014).<sup>20</sup> That is, not only are functional heads specified for the features they must Agree with, they must search for these features in a particular order: first for person, and then for number or gender. Thus, if person and animacy share a syntactic position, they will be Agreed for at the same time, giving rise to the PCC effects involving these features. Other  $\varnothing$ -features can only be searched for later, rendering them irrelevant for the PCC.

#### 4.1 The PCC and its kin

In its original formulation, the PCC restricts pronominal cliticization based on person and grammatical role. In many languages, including in Romance where it was first observed, the PCC constrains the cliticization of direct and indirect object pronouns (Perlmutter 1971, Bonet 1991:176–221, cf. Haspelmath 2004). But in others, including Zapotec, cliticization of object pronouns is restricted based on what the subject is (see also Nevins 2011:948–949).

So, while subject and object pronouns can in general both cliticize, as shown in (77a) and (78a), a local person pronoun is prohibited from cliticizing in object position, including when the subject is a third person pronoun, as shown in (77b) and (78b).

<sup>20</sup>Coon & Keine (2021) propose this sequencing within a different theory of why only one pronoun can cliticize when the PCC is violated. Integrating Coon & Keine’s proposal with Deal’s and Sichel & Toosarvandani’s might be a first step toward unifying these accounts.

- (77) a. 1 > 3  
 Bet=gak=a'=ba'.  
 kill.COMP=PL=1SG=3.AN  
 'I killed [them].'  
 (Yalálag: Avelino Becerra 2004:25)
- b. 3 > 1  
 \* Bnaw=ba'=a'.  
 follow.COMP=3.AN=1SG  
 Intended: 'It followed me.'  
 (Yalálag: Avelino Becerra 2004:32)
- (78) a. 2 > 3  
 Bet=te=o'=ba'.  
 kill.COMP=ASS=2SG=3.AN  
 Intended: 'You killed [it].'
- b. 3 > 2  
 \* Bet=te=ba'=o'.  
 kill.COMP=ASS=3.AN=2SG  
 Intended: '[It] killed you.'  
 (Yalálag: Avelino Becerra 2004:30)

Foley & Toosarvandani (2022) show that the PCC also restricts object cliticization based on animacy in Southeastern Sierra Zapotec. In the Yalálag variety, an object pronoun can never cliticize when it exceeds a subject pronoun in animacy: this is shown in a pairwise fashion in (79–81).<sup>21</sup>

- (79) a. 3.EL > 3.HU  
 Wkwell=e'=be'.  
 kick.COMP=3.EL=3.HU  
 'He kicked him.'
- b. 3.HU > 3.EL  
 \* Wkwell=be'=e'.  
 kick.COMP=3.HU=3.EL  
 Intended: 'He kicked him.'
- (80) a. 3.HU > 3.AN  
 Bchew=be'=ba'.  
 kick.COMP=3.HU=3.AN  
 'S/he kicked it.'
- b. 3.AN > 3.HU  
 \* Bdinn=ba'=be'.  
 bite.COMP=3.AN=3.HU  
 'It bit her/him.'

(81)

<sup>21</sup>When a postverbal subject is a lexical DP, not a pronoun, object cliticization is prohibited altogether (see Sichel & Toosarvandani, to appear for further discussion).

- a. 3.AN > 3.IN  
 Bchochj=ba'=n.  
 hit.COMP=3.AN=3.IN  
 'It hit it.'
- b. 3.IN > 3.AN  
 \* Bchochj=en=ba'.  
 hit.COMP=3.IN=3.AN  
 'It hit it.'

(Yalálag: Avelino Becerra 2004:33–34)

This animacy-based PCC is subject to systematic variation across these Zapotec varieties. While in Yalálag, it is sensitive to the full animacy hierarchy, the other varieties exhibit a decreased sensitivity. In Laxopa, all humans are lumped together for the purposes of the PCC, so that any combination of human clitics is permitted, while in Zoogocho, any combination of animate clitics is allowed. In all varieties, however, any object pronoun that is unable to cliticize — whether because of its person or its animacy — is always realized as a strong pronoun in canonical argument position, as illustrated in (1b) and (2b) above.<sup>22</sup>

The PCC is not simply a phonological constraint, imposed by the lightness of the first and second person singular clitic pronouns (a single vowel in each case) or a floating high tone associated with the first person singular clitic (Bickmore & Broadwell 1998). All *plural* local person pronouns, which are heavier, are also unable to cliticize in object position.<sup>23</sup>

(82) 3 > 1/2

- a. \*Nhaw<sup>1</sup>=e'<sup>1</sup>=tu'<sup>3</sup>.  
 follow.STAT=3.EL=1PL.EXCL  
 Intended: 'S/he is following us.' (Yalina/Guiloxi: FA/RM, GZYZ161, 1:20)
- b. \*Nhaw<sup>1</sup>=e'<sup>1</sup>=dzu'<sup>3</sup>.  
 follow.STAT=3.EL=1PL.INCL  
 Intended: 'S/he is following us.' (Yalina/Guiloxi: FA/RM, GZYZ161, 1:15)
- c. \*Nhaw<sup>1</sup>=e'<sup>1</sup>=lhe'<sup>3</sup>.  
 follow.STAT=3.EL=2PL  
 Intended: 'S/he is following you all.' (Yalina/Guiloxi: FA/RM, GZYZ161, 1:40)

Nor can the PCC be reduced to a purely morphological constraint on linearly adjacent clitics. Pronominal cliticization in these Zapotec varieties involves syntactic movement, since it is sensitive

<sup>22</sup>I am abstracting away here from one difference between the person- and animacy-based PCC in these Zapotec varieties. The constraint sensitive to animacy is RELATIVE, so that object cliticization is ruled out only if the object's animacy *exceeds* the animacy of the subject. By contrast, the person-based constraint is an ABSOLUTE constraint. It prohibits any local person pronoun from cliticizing in object position, even when the subject is also a local person pronoun. This is not true in all languages: several Romance varieties and Kashmiri have a "Weak" PCC and Romanian has an "Ultrastrong" PCC, both of which are relative constraints (Nevins 2011:948–949). The grammatical mechanism underlying the PCC is generally taken to be uniform, though it must be able to derive both relative and absolute constraints. In the Agree-based theory discussed in Section 4.2, this variation is attributed to parametrization in the features that the probe is looking for, essentially reducing absolute constraints to relative ones.

<sup>23</sup>Similarly, the ungrammaticality of (79b) cannot be attributed to the lightness of the elder object clitic in Yalálag. In other varieties, it has a distinct realization with an initial consonant, e.g., =ne' in Laxopa, as shown in Table 1, and it is still subject to the PCC (see Foley et al. 2018).

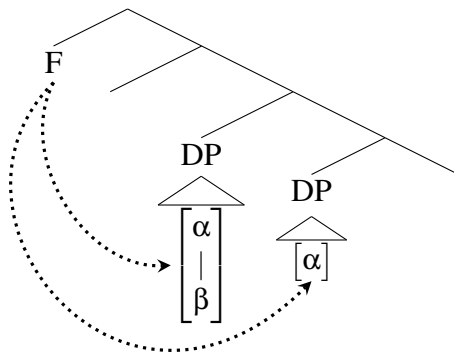
to islands (Sichel & Toosarvandani 2020). As a constraint on this syntactic movement, the PCC must also be syntactic in nature (in addition, see Toosarvandani 2017 for evidence from certain syntactic contexts in which otherwise illicit combinations of clitics become grammatical).

## 4.2 The grammatical mechanism underlying the PCC

Most theories of the PCC trace its source to the mechanism underlying pronominal cliticization (Anagnostopoulou 2003, 2005, Béjar & Rezac 2003, Nevins 2007, 2011, Coon & Keine 2021, Foley & Toosarvandani 2022, Deal, to appear, Sichel & Toosarvandani, to appear). This enables them to derive the phenomenon’s hierarchy sensitivity from the featural specifications of pronouns, in virtue of the formal natural classes they encode. While these theories differ in their details, they all take pronominal cliticization to depend on AGREE, a syntactic operation which matches a functional head (the PROBE) bearing a FEATURAL RELATIVIZATION — the features it is looking for — with constituents in its domain (GOALS) that have those features.

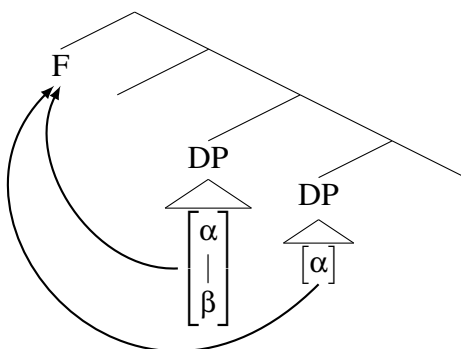
I adopt a theory of the PCC which generalizes over the recent accounts of Deal (to appear) and Sichel & Toosarvandani (to appear). It derives the pattern of cliticization in both hierarchy-obeying and hierarchy-violating configurations from how the Agree mechanism operates. In a hierarchy-obeying configuration, the probe (F) is able to Agree with both subject and object pronouns, because the higher pronoun (the subject) has a superset of the lower one’s (the object’s) features.<sup>24</sup>

(83)



These Agree relations are a precondition for syntactic movement, leading to either phrasal (Nevins 2011) or head (Preminger 2019) movement of the pronoun.

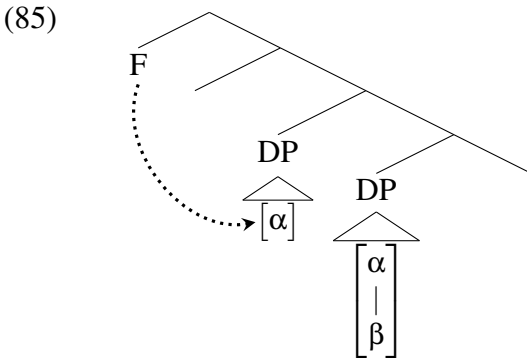
(84)



<sup>24</sup>I assume, following Sichel & Toosarvandani, that the probe is higher than all the pronouns it Agrees with. Deal must locate the probe between the two pronouns, but this difference is irrelevant for our purposes.

Thus, when the subject is located “higher” on a hierarchy than the object, both pronouns are able to cliticize through this sequence of operations.

In a hierarchy-violating configuration, the subject pronoun has a proper subset of the features of the object pronoun, as illustrated in (85). Without going into the details, the probe is then only able to Agree with one pronoun, because of how the Agree mechanism operates.



Since only one pronoun is able to Agree in such a configuration, only one pronoun is able to cliticize.

In this theory, the PCC derives ultimately from the featural specifications of pronouns, which determine whether a functional head can Agree with more than one pronoun. In a hierarchy-obeying configuration, both subject and object pronouns are able to cliticize because the condition in (86) is met.

- (86) A functional head  $F$  Agrees with two pronouns  $A$  and  $B$ , where  $A$  is higher than  $B$ , iff  $A$  has all the features of  $B$ .

This condition on Agree can be derived in different ways. Deal proposes that the probe’s relativization can be updated dynamically after it has Agreed once, which restricts the subsequent goals it can Agree with. For Sichel & Toosarvandani, the probe copies the features of the first goal it Agrees with; additional Agree relations with subsequent goals are possible, as long as they do not have more than these features. In either case, in hierarchy-violating configurations, the probe is not able to Agree with both pronouns, and so only one pronoun is able to cliticize.

The variation in the PCC within Southeastern Sierra Zapotec, described in Section 4.1, arises from the probe’s featural relativization (Foley & Toosarvandani 2022). This represents the functional head’s sensitivity to  $\phi$ -features: the fewer animacy features a probe is relativized to, the less sensitive it will be to the animacy hierarchy. In the Laxopa variety, for example, where the PCC does not distinguish between elder and non-elder humans, it is only relativized to HUMAN and ANIMATE, and so it does not even see the ELDER feature on pronouns. Similarly, in the Zoogocho variety, the probe is relativized just to ANIMATE.

On its own, this theory does not explain why the PCC is sensitive only to person and animacy. The condition on Agree in (86) only cares about featural markedness — whether one pronoun is more or less featurally specified than another — which does not distinguish person and animacy features from other  $\phi$ -features. Without saying anything more, we might expect gender and number, too, to be relevant for the PCC. By augmenting this theory in the right way, however, it is possible to draw the right cut between  $\phi$ -domains.

### 4.3 Accounting for the sensitivity of the PCC

I adopt the hypothesis that a functional head's relativization — the features it is looking for — is *sequenced*: a probe must first Agree in person, before it can Agree in number or gender (Coon & Keine 2021, cf. Anagnostopoulou 2003, Béjar & Rezac 2003). This hypothesis is found elsewhere in the literature on the PCC, though there it is combined with different assumptions about how Agree works.

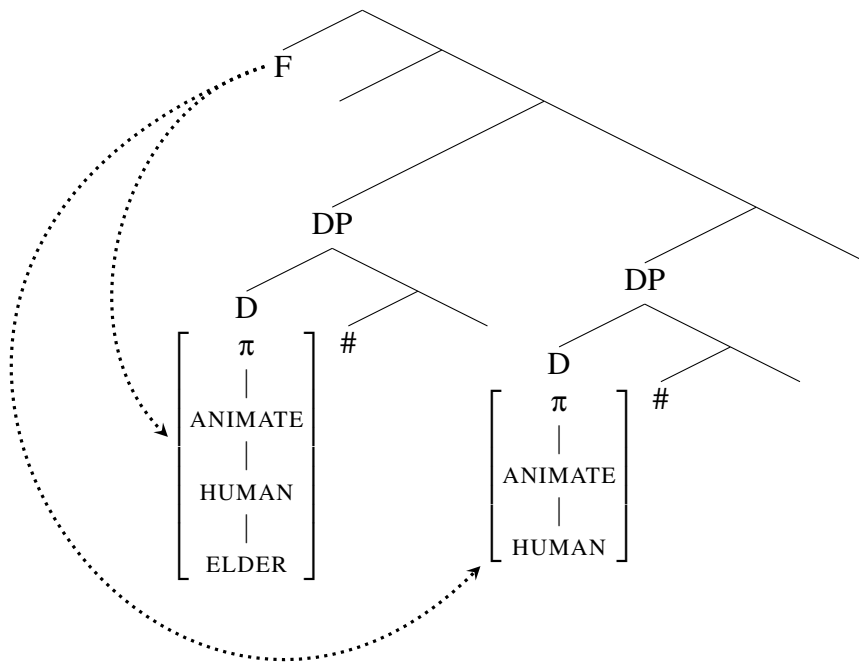
It is motivated by split patterns of agreement involving verbs with dative subjects. These verbs agree in number with the nominative object, as illustrated for Icelandic in (87), instead of with the dative subject (Taraldsen 1995, Sigurðsson 1996, cf. D'Alessandro 2004:89–131 on Italian and Rivero & Geber 2003 on Spanish and Romanian).

- (87) Honum mund-**u** alltaf líka **þeir**.  
 him.DAT would-**3PL** always like **they.NOM**  
 'He would always like them.' (Sigurðsson 2004:148)

Taraldsen and Sigurðsson propose to account for this agreement pattern by sequencing the probe's relativization. The probe Agrees first in person with the highest argument, which is the dative subject. After it does this, the dative argument moves into subject position, and the probe Agrees in number with the nominative object. Formally, this sequencing can be achieved in more than one way: by positing more than one functional head as the probe or by ordering a single probe's featural requirements.

Combined with Deal's and Sichel & Toosarvandani's theory, probe sequencing derives the PCC's privileged sensitivity to person and animacy. To see how, consider the derivation of a hierarchy-obeying configuration, like the one in (88), in which the subject is more animate than the object.

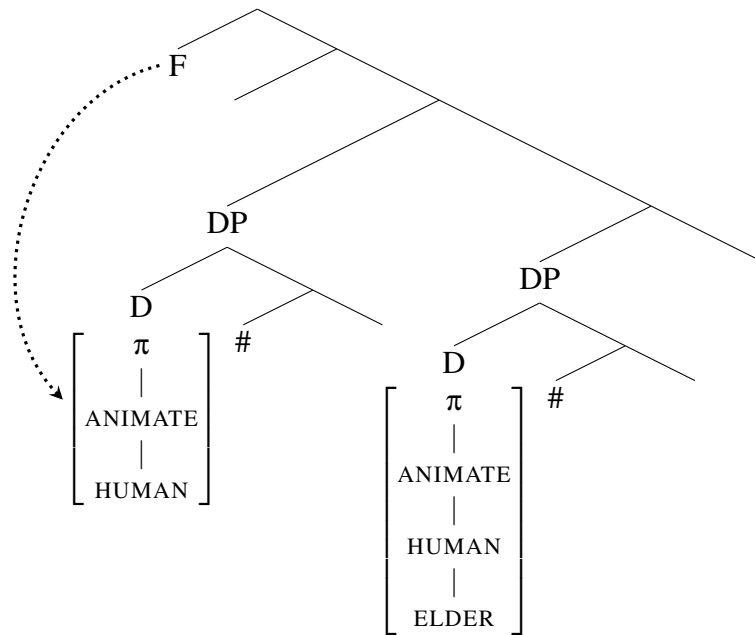
- (88) 3.EL > 3.HU = (79a)



If the probe is sequenced, it will look first for person and animacy features, which are located together in D on the goals. According to the condition in (86), the probe will Agree with both pronouns, both of which are then able to cliticize.

In the derivation of a hierarchy-violating configuration, such as (89), the probe is only able to Agree with one pronoun.

(89) 3.HU > 3.EL = (79b)



The probe looks first for person and animacy features. It Agrees with the subject pronoun in these features, enabling it to cliticize. According to the condition in (86), the probe is unable to Agree with the object pronoun in person or animacy features, and so it is unable to cliticize.<sup>25</sup>

How does probe sequencing, then, derive the PCC's sensitivity only to person and animacy? Under this theory of the PCC, the hierarchy effect arises from comparing the featural specifications of pronouns, a computation carried out by the Agree operation. If the probe is sequenced to search first for  $\pi$  — and the person and animacy features that collocate with it — this computation will only take these features into account.<sup>26</sup> This is because, when the probe Agrees first in person and animacy, it will always find at least one pronoun (the highest one), and so at least this pronoun is

<sup>25</sup>I assume that the object pronoun is also unable to cliticize by Agreeing in other  $\phi$ -features because of locality. If DP is a phase, then only its specifier and head are visible to external syntactic operations (Chomsky 2001). Thus, in the derivation in (89), the probe can try to look for number features, but it will be unsuccessful. The subject pronoun has already moved out of its domain, and the number features on the object pronoun are inaccessible to the probe. In derivations where there is Agreement with a goal in number or gender, I take this to be because the probe first Agrees with it in person, making the rest of the DP visible to syntactic operations (Preminger 2019, den Dikken 2019, cf. Rackowski & Richards 2005). This is not a possibility in (89), where the object pronoun never Agrees for person in the first place.

<sup>26</sup>In fact, there is no other sequencing possible. With person and animacy features both located in the highest nominal functional head, a probe must Agree first with these features. If DP is a phase as described in footnote 25, then only they will be visible to external syntactic operations. The other  $\phi$ -features, which are more deeply embedded within the noun phrase, will only become visible once the entire DP has been Agreed with one. Thus, probing for these features will have to follow probing for person.

guaranteed to cliticize. Once this pronoun moves out of the probe's domain, it will no longer be accessible for any subsequent Agree relations involving number or gender. With this pronoun's other features unavailable for the relevant calculation, there can be no hierarchy effect, parallel to the PCC, involving number or gender.

## 5 Conclusion and future prospects

I have sought to develop a coherent picture of the interpretation and grammatical representation of animacy. The pronoun system of Southeastern Sierra Zapotec, which encodes a four-way animacy distinction active in the language's syntax, was the starting point. Third person plural pronouns exhibit associativity, a cluster of properties which also characterizes local person plural pronouns. This empirical parallel, in turn, motivated a semantics for animacy based on the same compositional mechanism that combines person.

A syntactic consequence of this semantics is that person and animacy features share a structural position. They form a constituent to the exclusion of number features, because they must compose together first before composing with number. This interpretive argument for structure in the featural representation of pronouns is not fundamentally different from more familiar interpretive arguments for structure, like using a quantifier's scope to diagnose its structural position. Because of their shared syntactic position, moreover, we might expect both person and animacy to be available to the same syntactic processes. I showed how this general idea might work out for the syntactic operations underlying pronominal cliticization, which is constrained by the PCC. Whether this result can be extended to other hierarchy-sensitive syntactic phenomena, like differential object marking and direct-inverse alignment, remains to be seen.

A couple issues have come up which I have not been able to fully resolve, including the role of feature geometries. These were originally proposed to represent the feature specifications available in human language, though recent theories of person have questioned their utility, on both empirical and explanatory grounds (Harbour 2016, Cowper & Hall 2019, Hammerly 2020, 2023). They play a circumscribed role in the feature system I have proposed here, encoding the natural class structure within each  $\phi$ -domain. The phrase structural representations they use could be replaced by an equivalent formal representation, or possibly derived from some more general principles.

Even if feature geometries themselves might be eliminated, some of the information they contain is not so easily eliminated. Local persons, in both three- and four-person inventories, pattern together formally, as we saw in Section 1, requiring them to share some (possibly redundant) featural content. Similarly, to derive the PCC in Southeastern Sierra Zapotec varieties — and the variation in its hierarchy sensitivity — third person pronouns must bear overlapping animacy features. Cliticization of an object pronoun is, generally speaking, prohibited whenever its animacy exceeds that of the subject. So, in the Yalálag and Laxopa varieties, if the subject is an animal pronoun, only animal and inanimate object pronouns can cliticize, and a human pronoun in object position — whether elder or non-elder — cannot cliticize. In other words, human pronouns form a natural class, which must be encoded in a shared HUMAN feature.

This natural class structure is a formal property of pronouns, which is independent, in principle, from their interpretation. They are only connected if syntactic features, which encode the grammatical dependencies a syntactic object can enter into, are also semantically contentful. I have assumed that they are, for the methodological reasons I gave at the outset, and this has yielded some



significant analytical results. This assumption enabled us to infer, for instance, that because third person and local person pronouns exhibit an interpretative parallel, person and animacy features share a syntactic position. But this inference is only valid if the mapping from structure to meaning is transparent. While this mapping might be *necessarily* transparent in human language, it could also be that it just happened to be transparent in the case we have been looking at.

The first, methodologically stronger scenario might seem to imply that the syntax, as a grammatical system, serves merely to create representations to be interpreted by the semantics. But a transparent mapping from syntactic objects to meanings is not actually incompatible with these objects having formal properties that are semantically inert, and hence have no observable effects on their interpretation. Such purely formal structure would be visible solely to the operations of the syntax itself.

So, while I have drawn structural conclusions about person and animacy features from certain interpretive facts, on their own these require only that those features combine in a particular order. The feature geometric structure within each functional head, in particular, while useful for representing the natural class structure with person and animacy, served no semantic purpose. Thus, any arguments for feature geometries must make reference to their phrase structural representation itself, and it is still an open question, at this point, whether such evidence exists (though see Preminger 2014:39–49 and Foley & Toosarvandani 2022 for some arguments it does). If feature geometries do exist, they will have to be motivated by different empirical arguments than the ones I have provided here.

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