The interpretation and grammatical representation of animacy

Maziar Toosarvandani
University of California, Santa Cruz*

July 21, 2022

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 a cluster of interpretive properties; this associativity has 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 these shared properties with person. The compositional mechanism underlying this semantics ties person and animacy features to a single syntactic locus in the nominal structure. This enables an understanding of these features’ shared relevance to the syntactic operation underlying pronominal cliticization. In these Zapotec varieties, it is constrained both by person (as in the well-known person case constraint) and by animacy.

Keywords: animacy, person, ϕ-features, plurality, pronouns, 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 grammatical positions, as in direct-inverse alignment systems. These grammatical phenomena are frequently sensitive to person, alongside animacy, suggesting that both categories are encoded in human language in the same way. This article examines how animacy is represented.

*I am grateful to Raúl Díaz, Fe Silva Robles, and two other native speakers of Zapotec for teaching me about their language, as well as to Alberto Díaz, Raquel Díaz, Olivia Maldonado Maldonado, Rosario Reyes Vasquez, Sylvia Robles Jerónimo, Isidro Vasquez Jerónimo, and many other residents of Santiago Laxopa. This material is based on work supported by the National Science Foundation under Grant No. 2019804, as well as by a Faculty Research Grant awarded by the Committee on Research from the University of California, Santa Cruz.
Third person pronouns in the language distinguish elder humans, other humans, animals, and inanimates, with their ability to undergo syntactic cliticization depending on an intuitive hierarchy of these animacy categories. 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)

Foley & Toosarvandani (2022) draw a parallel between this restriction and the well-known PERSON CASE CONSTRAINT (PCC; Perlmutter 1971, Bonet 1991). Much like the animacy-based constraint in (1), the PCC restricts cliticization of an object pronoun, based on its position in a person hierarchy. In these Zapotec varieties, a first or second person pronoun cannot cliticize in object position (2a), though it can in subject position (2b).

---

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 Guiloxi, 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 = [ʃ], lh = [l] (lenis lateral), ll = [l], nh = [m n ŋ] (lenis nasal), sh = [ʃ], x = [s] (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, EL = elder human, EXCL = exclusive, F = feminine, FREQ = frequentative, HU = (non-elder) human, IN = inanimate, INCL = inclusive, INF = infinitive, INT = intensifier, M = masculine, N = neuter, NEG = negative, PL = plural, POT = potential, PTC = particle, Q = question particle, REP = repetitive, SG = singular, STAT = static, VEN = venitive.
In formal syntactic theories, the impossibility of pronominal cliticization in a configuration like (2b) is typically traced to the person features that the object 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, Harbour 2016). 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 (e.g., Bonet 1991, Noyer 1992, Harley & Ritter 2002, Béjar 2003). But for animacy, analogous questions have only begun to be explored (see Anagnostopoulou 2017, Oxford 2019, and Hammerly 2020 for some recent efforts). In part, this may be due to the relative rarity of languages like these Zapotec varieties. Many languages encode a simple animacy distinction in their pronouns (animate vs. inanimate or human vs. nonhuman). Languages with such a fine-grained differentiation within the third person based on animacy are, by comparison, not 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 show that third person plural pronouns: (i) exhibit reference to heterogenous groups, (ii) use only the most marked animacy category to do so, and (iii) require any group they refer to to be contextually coherent in a particular way. 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 advance a specific hypothesis about the featural representation of animacy and its relationship to person. 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. In particular, building on proposals by Kratzer (2009) and Harbour (2016), I adopt a mode of composition for person and animacy that combines atomic individuals into plural individuals. Animacy features, then, give rise to associativity just as person features do via this compositional mechanism.

One consequence of this semantics is that the order in which features combine can substantively affect their interpretation. And, 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, as in theories of nominal syntax in which $\phi$-features are decomposed and ordered hierarchically (Picallo 1991, Ritter 1991, and others). This shared structural position, in turn, suggests an explanation for why both animacy and person are relevant to the syntactic operations underlying hierarchy-sensitive phenomena like the PCC. If animacy and person features occupy the same structure position within pronouns, then both should be equally visible to these operations.

How this works out exactly depends on the particular syntactic phenomenon in question and its analysis. Focusing on the PCC, I demonstrate that recent theories (Coon & Keine 2021, Sichel & Toosarvandani 2021, Deal, to appear) can derive its sensitivity to just person and animacy, by leveraging the shared syntactic position of these features on the highest functional head in the extended nominal projection. The generality of this solution, which appeals to hierarchical differences in the position of $\phi$-features, recommends it as a potential model for understanding other syntactic processes’ shared sensitivity to person and animacy.

1  The place of animacy in the $\phi$-domain

The pronoun inventory for one Southeastern Sierra Zapotec variety is shown in Table 1. It has distinct third person pronouns for elder humans (EL), other humans (HU), animals (AN), and inanimates (IN). These four pronouns are found in all these varieties, though their forms may vary slightly.

<table>
<thead>
<tr>
<th></th>
<th>STRONG</th>
<th>CLITIC</th>
<th></th>
<th>STRONG</th>
<th>CLITIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1SG</td>
<td>neda’</td>
<td>=a’</td>
<td>3.EL(DER)</td>
<td>le’</td>
<td>=e’ (subject) $\sim$ =ne’ (object)</td>
</tr>
<tr>
<td>1PL.EXCL</td>
<td>dziu’</td>
<td>=duu</td>
<td>3.HU(MAN)</td>
<td>leba’</td>
<td>=ba’</td>
</tr>
<tr>
<td>1PL.INCL</td>
<td>netu’</td>
<td>=tu’</td>
<td>3.AN(IMAL)</td>
<td>leb</td>
<td>=(e)b</td>
</tr>
<tr>
<td>2SG</td>
<td>lhe’</td>
<td>=u’</td>
<td>3.IN(ANIMATE)</td>
<td>lenh</td>
<td>=(e)nh</td>
</tr>
<tr>
<td>2PL</td>
<td>le’e</td>
<td>=lhe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

These animacy categories are strictly semantic, and they are not realized formally anywhere else in the language (e.g., on nouns or adjectives).

All pronouns have both clitic and strong forms. But, as we saw in (1–2), whether an object pronoun is able to cliticize or not is constrained by both person and animacy. This dual sensitivity characterizes not just the PERSON CASE CONSTRAINT (PCC), which I will describe in more detail in Section 4, but also differential object marking and direct-inverse alignment. Both have been characterized in terms of an ANIMACY HIERARCHY, which locates animacy on a single, continuous scale with person (Smith-Stark 1974, Silverstein 1976).
While this implicational hierarchy describes the connection between person and animacy, it does not explain it. In particular, 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). And, as far as I know, there is no PCC that makes reference to gender, just as there is no “Number Case Constraint” (Nevins 2011:965–967).

For this reason, formal theories of syntax generally aim to derive such implicational hierarchies from more basic grammatical primitives. Since the Animacy Hierarchy refers to the properties of nominals, the relevant primitives would be their ϕ-feature specifications. These serve to encode formal natural classes, which morphological and syntactic operations are sensitive to (Bonet 1991, Noyer 1992, and subsequent work). However, as I discuss below, features alone cannot explain why the PCC and other hierarchy-sensitive phenomena only make reference to person and animacy. Some structure is needed to distinguish these features from others, such as gender and number.

I consider the possibility that ϕ-features are organized into a feature geometry, which encodes the concurrence dependencies amongst features (Harley & Ritter 2002). But while a geometry may add structure relevant for morphological or syntactic operations, it is unable to pull person and animacy features apart from other types of features. I argue, instead, that a closer look at the semantics of person — in particular, how it is defined over pluralities — points the way to a different type of structure in these featural representations, which can create the space to understand why it is just animacy that is tied to person in human language.

1.1 Featural representations for person and animacy

Syntactic features encode formal natural classes, as in the familiar feature specifications for person in (4). These distinguish three person categories using two privative features. Since first and second person share the PARTICIPANT feature, morphological and syntactic processes can make reference to them together (Noyer 1992:51–52, Harley & Ritter 2002, Béjar 2003, Béjar & Rezac 2009, Preminger 2014).

\[
\begin{array}{c|c|c}
1 & 2 & 3 \\
\hline
\text{PARTICIPANT} & \text{PARTICIPANT} & \\
\text{SPEAKER} & & \\
\end{array}
\]

This featural representation is related fairly transparently to the Animacy Hierarchy. A category that is more featurally marked is “higher” on the Animacy Hierarchy than less featurally marked ones (where being more marked, for privative features, comes down simply to having more features).

Not all languages have three persons — those with an inclusive-exclusive distinction have four — a fact which raises important questions about the adequacy of this representation. Focusing on the analogy between person and animacy for now, though, the four animacy categories in Southeastern Sierra Zapotec can be encoded using three privative features, in a parallel fashion (Foley & Toosarvandani 2022).
With these feature specifications, the four animacy categories stand in the desired markedness relations, which can accounts for their implicational relationships in the Animacy Hierarchy.

On their own, however, these featural representations do not account for why hierarchy-sensitive phenomena are only sensitive to person and animacy. Many binary gender systems are also analyzed in terms of underspecification, as person and animacy are above (Bonet 1995:614–615, Sauerland 2006, Wechsler 2010). One gender category is specified for some feature, usually FEMININE, while the other lacks this feature.

The resulting pattern of markedness ends up being no different from either person or animacy. Gender, and number, thus, must be distinguished from these categories in some other way, which goes beyond simple considerations of markedness.²

### 1.2 Feature geometries and their entailments

Harley & Ritter (2002) propose that ϕ-features are organized into a hierarchically structured feature geometry, encoding the possible feature combinations available in human language.

²Nevins (2011) proposes, for this reason, to make some ϕ-features (e.g., number) bivalent, while leaving others (e.g., person) as privative. Depending on how syntactic operations are defined, this can derive the difference between them. But it raises the question of why these operations are sensitive to this formal distinction in the first place.
from the phrase structural representation itself, since a feature can only occur if it does so with all features that dominate it.

For this feature geometry to be universal, McGinnis (2005:703–704) observes it must be accompanied by an explicit semantics, or else it would have no crosslinguistic predictive power. Béjar (2003:47–49) proposes a straightforward principle mapping the dominance relation to semantic entailment: a feature entails all features it is dominated by. This mapping holds for the person features in (7) with the semantics in (8a–c), where they are treated as one-place predicates. Both \textsc{speaker} and \textsc{addressee} denote subsets of \textsc{participant}.

\begin{enumerate}
\item \textit{\textsc{speaker}} \textit{c} = \lambda x . x \text{ is the speaker of } c \\
\item \textit{\textsc{addressee}} \textit{c} = \lambda x . x \text{ is the addressee of } c \\
\item \textit{\textsc{participant}} \textit{c} = \lambda x . x \text{ is a conversational participant in } c
\end{enumerate}

These features combine semantically with each other like attributive adjectives, by a compositional rule amounting to set intersection (Heim & Kratzer 1998, Schlenker 2003, Heim 2008). This means that, with the feature specifications in (4), while the first person would pick out just the speaker, the second person would pick out both conversational participants. But of course, second person pronouns can only be used to refer to the addressee. This follows from an additional principle, which I call \textit{lexical complementarity} following Harbour (2016:80).

\begin{enumerate}
\item \textbf{Lexical Complementarity (LC):}
\textbf{For feature specifications} \textit{F} \text{ and } \textit{G}, where \([\textit{F}] \subset [\textit{G}], \text{ use of } \textit{G} \text{ is restricted to } [\textit{G}] - [\textit{F}].\)
\end{enumerate}

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. Whatever its source, Lexical Complementarity ensures that a second person pronoun picks out only the addressee, not the speaker, despite \textsc{participant} denoting the set of all conversational participants.

It might seem possible to capture animacy’s relationship to person by inserting animacy features as ancestors of \textsc{participant} and its descendants (cf. Béjar 2003:51, Oxford 2019). If the speaker and the addressee are necessarily human, then the person features would entail \textsc{human} and \textsc{animate}.

\footnote{I adopt 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 subparts of a sentence make to them, 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.}

\footnote{For simplicity, these entries ignore whether \(\varphi\)-features are presuppositional or not (Cooper 1983:174–195).}

\footnote{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 \textit{Winnie the Pooh} or \textit{Beauty and the Beast}, come to mind. But these involve either personification or anthropomorphization.}
While this would make animacy “part of” person in some sense, it still would not distinguish person and animacy features from other ϕ-features. The gender features MASCUINE and FEMININE semantically characterize humans, and perhaps also some higher animates, and so ANIMATE should be able to dominate them as well, as in Harley & Ritter’s original geometry above. But then, animacy features would stand in the same structural relation to both person and gender features, and we would have no way of pulling person and animacy apart from gender.

1.3 Adding pluralities

A way of doing this becomes available, I argue, with a richer semantics for ϕ-features. While the lexical entries for person above were defined over atomic individuals, human language also enables reference to groups of individuals using pronouns. These lexical entries have to be revised accordingly, for a domain of discourse which includes not just atomic individuals, but also collections of these individuals (Link 1983).

This is not a trivial task, since person exhibits some unusual properties involving plurality, as Jespersen (1924:192) and Benveniste (1966:232–233) observe. The first person plural pronoun we can refer to a group which includes the speaker and individuals who are not conversational participants. Similarly, a second person plural pronoun always refers to a group including the addressee and some other individuals, none of whom are the speaker. That is, while in the singular the first and second person only describe conversational participants, in the plural they describe groups that include other individuals.

Put another way, the feature specifications for first and second person are not DISTRIBUTIVE. They can describe pluralities of individuals, the members of whom need not meet the description of being first or second person individually. In this respect, local person plural pronouns are different from all other plural expressions. The plural of a common noun like tree only describes groups that are comprised entirely of trees and nothing else. The first and second person, in other words, allow reference to HETEROGENOUS groups, unlike the plural of tree which can only denote HOMOGENOUS groups.

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

---

6 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., ∀x(x ∈ [[F]] → ∀y(y ≤ x → y ∈ [[F]])).
a “chorus we” from first person plural pronouns designating the speaker and others. A parallel argument has been made for the addressee, though some languages are claimed to have a “second person exclusive” which refers to the group of more than one addressee and no others. Simon (2005) systematically reviews each of these cases, showing that they can be analyzed in other terms (see also Bobaljik 2008:211–215). If natural language does not countenance more than one speaker or addressee at a time, then the feature specifications for first and second person can never be distributive.

The non-distributivity of person has motivated revisions to the simple semantics of person above (Kratzer 2009, Harbour 2016, Ackema & Neeleman 2018, Cowper & Hall 2019, Hammerly 2020). Instead of interpreting features as one-place predicates which combine purely intersectively, these approaches posit different ways in which features can be modified or composed with one another. Kratzer and Harbour, for instance, propose that person features combine semantically, not by set intersection, but by a compositional operation that creates plural individuals.

In Harbour’s theory, the SPEAKER and PARTICIPANT features themselves still have a distributive semantics, parallel to (8a–b). Heterogenous reference arises from how these features combine with one another by the mechanism that builds plural individuals. In a very simple domain like the one in (11), which includes only two non-participants (o and o’) besides the speaker (i) and addressee (u), the feature specification for first person ends up denoting any group containing the speaker (delimited by the dotted line).

(11)
pluralities. This distinct mode of composition — and this distinct order of composition — for person distinguishes it from gender, making space for animacy in the grammar.

1.4 Looking forward

The feature systems above can be characterized along four dimensions, based on their interpretive properties:

(12) a. SEMANTIC CONTENT
What are the (model-theoretic) interpretations of the features?
b. MODE OF COMPOSITION
How are the interpretations for features combined with each other (both within a domain and across domains)?
c. ORDER OF COMPOSITION
What order do features combine in?
d. FEATURE MODIFICATION
How (if at all) can the interpretation of a feature be modified?

This interpretive classification abstracts away from the formal properties of feature systems, providing a way to isolate the interpretive claims that competing theories make.

For instance, recent theories which aim to develop a unified feature system for deriving the crosslinguistic typology of person often make use of two bivalent features, ±SPEAKER and ±PARTICIPANT, rather than the privative features I introduced above (Harbour 2016, Cowper & Hall 2019, Hammerly 2020). On the one hand, this formal similarity obscures important differences among these theories in the interpretative roles of the positive (+) and negative (−) values. Cowper & Hall (2019) and Hammerly (2020) take the − value to contribute logical negation. It involves FEATURE MODIFICATION, in other words, since it takes a feature and returns its complement set (which can then combine with other features just by set intersection). By contrast, Harbour (2016) takes the + and − values for person features to encode MODES OF COMPOSITION: they encode semantic mechanisms for taking two features and combining them to produce an interpretation.

On the other hand, the formal difference between bivalent and privative features can also obscure interpretive similarities. Choosing between these feature types certainly has consequences for the morphological and syntactic operations making reference to them, but it does not always have significant consequences for meaning. While Harbour takes the − value to introduce a mode of composition, which removes elements from pluralities, this action closely mirrors the work done by Lexical Complementarity when a privative feature is absent through underspecification.

With that being said, I will mostly stick with privative features here, since my ultimate goal is to develop a featural representation for person and animacy which can interface with the syntactic operations underlying agreement and movement. So, it is important that this representation use the features these operations trade in, and this is usually privative features. It has even been argued that some of these, including Agree (Chomsky 2001), must operate over privative features (Preminger 2014:39–49). I return to this choice in Section 3, where I examine the typology of person in light of the typology of animacy.

There are analytical tradeoffs among the four dimensions above, one of which we have already seen. Under the traditional semantics described in Section 1.2, features are one-place predicates
and their mode of composition is equivalent to set intersection, for which order does not matter, i.e., \( A \cap (B \cap C) = (A \cap B) \cap C \). Moving to a richer domain that includes pluralities opens up the door to different compositional mechanisms, whose order of application could be relevant for interpretation. While features can still be thought of as one-place predicates (over singularities and pluralities), Kratzer and Harbour posit compositional mechanisms for person that create pluralities. This mechanism must combine all person features together first, before these can be combined with number features.

We can take advantage of this additional compositional flexibility to understand animacy. In particular, I propose the following hypothesis about the composition of animacy features:

(13) **Animacy Composition Hypothesis (initial 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 this hypothesis. I start in Section 2 by motivating it empirically. I show how animacy categories in Zapotec exhibit reference to contextually-determined heterogenous groups, a property which also characterizes person. Then, building on the theories above, I develop a formal grammar for \( \varphi \)-features in Section 3 which captures how animacy composes with person, and how both these domains compose differently from gender and number.

While I am primarily concerned with the interpretative properties of animacy, the Animacy Composition Hypothesis has syntactic consequences. If animacy composes with person, their shared order of composition must be reflected in a shared syntactic representation. Both must occupy a position in nominal structure that allows them to combine together. In Section 4, I explore how this shared syntactic locus is responsible, not just for how animacy is “like” person semantically in Zapotec, but also for how it can be syntactically active like person.

### 2 Associativity in Zapotec pronouns

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

(14)  

a. **Heterogenous groups:**
A pronoun of a given animacy category can refer to pluralities containing individuals belonging to a different animacy 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.

These three properties also characterize first and second plural pronouns. As I discussed in Section 1.3, 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.
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.7

(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.8

(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 bathroom.
   b. Josie asks a zoo ranger: “I saw my friend in a picture with the lion. Where are they?”
   They are (both) behind the bathroom.

This effect cannot be chalked up 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 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

---

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

8 A reviewer observes that (16b) might still be slightly odd because Paul is only temporarily located behind the bathroom, 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 bathroom to refer to the group comprising him and the peacock, while the zoo ranger could easily say: They are (both) behind the bathroom.

More generally, there are a number of 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. Also, the predicates must be able to hold of both humans and non-humans, without imposing a collective interpretation which might be semantically implausible: here, I have selected stative predicates modified by a distributive operator (both).
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:

(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.*

‘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 there are serious obstacles to such an assimilation. To start, as Corbett (2000:104) observes, local plural pronouns do not show their associative meaning in a morphologically transparent fashion (for a more extensive discussion, see Ackema & Neeleman 2018:91–98 and 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 the 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, for instance, Tomasello et al. 2005), though it is clear that humans do coordinate some actions with animals.9

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?”

   # Nhi3 zɛ3=tu3 ku3 lyɛ3 ba1 nɔw=nh3.
   here stand.stat=1PL.EXCL behind bathroom=DEF
   Intended: ‘We are here behind the bathroom.’

   (Yalina/Guiloxi: FA/RM, GZY160, 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?”

   # Nhi3 zɛ3=tu3 le3 yĩ3 xe3.
   here stand.stat=1PL.EXCL in field
   Intended: ‘We are here in the field.’ (Yalina/Guiloxi: FA/RM, GZY160, 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 start by providing a semantic description of this animacy system, and then with this background, I address each of the three properties of associativity in turn.

9One 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).
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).^{10}

(22) a. Ka’ gok che bene’ golh 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 che=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’^3 pre1 sde1 nht=e’n’h^3 ba1 tsey^3=e^1…
   and president=DEF already CONT.dance=3.EL
   ‘And the president will dance…’ (Laxopa: IVJ, SLZ2020-t1, 24)

c. . . . chezak@ balhall@ Xanh=chho Jesucrist. Lla dmigw lla nech lla
   CONT.be.pleased lord=1PL.INCL Jesus.Christ day Sunday day first day
   kobo benhle’ey=el’ yogoa’olo 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. E1 dzek1 d=e1#/=ba2 tsi=a1?
      love.CONT=3.EL/3.HU of=1SG
      ‘Does she love me?’ (Yalina/Guiloxi: FA/RM, GZY115, 16:22)

   Her grandmother responds:
   b. Dzek1 d=e1 tsi=u13.
      love.CONT=3.EL of=2SG
      ‘She loves you.’ (Yalina/Guiloxi: FA/RM, GZY115, 17:46)

   c. Dzek1 d=ba2 tsi=u13.
      love.CONT=3.HU of=2SG (Yalina/Guiloxi: FA/RM, GZY115, 18:00)

^{10}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.
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=$n^{31}$ ta’ w=$a^3$=nh?
where=$DEF$ grandmother=$1SG=DEF$ where go.$STAT=3.EL$/go.$STAT=3.HU$
‘Where is my grandmother? Where did she go?’

She responds:

b. Zde’=$e^1$/#Zda$^{12}$=$ba^2$ ya’a$^3$.
go=3.EL/go=3.HU to market
‘She went to the market.’

(Yalina/Guiloxi: FA/RM, GZYZ115, 33:27)

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, for instance, 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=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.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’
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).
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).

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$^3$-se$^-3$chuchj$^3$=chhgwa$^1$=nh$^3$, yez$^3$=e$^\prime$nh$^3$.
        COMP-PL-be.crushed=a.lot=3.1N corn.ear=DEF
        ‘A lot were crushed, of the corn ears.’ (Yalina: FA, GZYZ098-s, 12)

    b. La da’ xiwe’ da’ lhalle’=nh yixe’.
        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.

11These supernatural beings are also sometimes referred to with an animal pronoun:

(11)  Ja$^3$-se$^-3$-nhaw$^3$=e$^\prime$b$^{13}$ pero la’a$^1$ de’e$^3$ xi$^3$we$^3$ pu$^1$rar$^1$ za’ak$^1$=eb$^3$.
        COMP-PL-follow=3.EL=3.AN but look.like CL.IN demon fast STAT.come.PL=3.AN
        ‘They were following them, but they were demons and were coming fast.’ (Laxopa: IVJ, SLZ2004-t1, 30)

Impressionistically, this happens when a demon or duende is acting more like a human or animal. This seems like a limited kind of personification.
b. Nha³ t-s-o’o=b³ bi³ do’³ ka¹.
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. Tsu¹ pe¹ bil¹=ba² ts-j-a’ak¹=ba² La’¹.
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’a³ zja³-nhbanh³=e¹.
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 exponed 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’=e’=e’=e’=o’=yoblh₉.
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. Katớ be-so’ɔ’-llinh=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’ bhelljw yɔg=ɔ xi’in=ɔ’ 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-so’ɔ-zi’e=e
    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’-se’-naw=1=e’#/=ba’2
    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.12

(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. # Tsj-a’ak\(^{3}\)=e’\(^{1}\) lau\(^{1}\) ka\(^{1}\) re\(^{1}\) ter\(^{1}\).
CONT-AND-go.PL=3.EL/3.AN in road
‘They are walking in the road.’ (Yalina/Guiloxi: FA/RM, GYZ108, 30:00)
b. Zda\(^{1}\)=lhenh\(^{2}\)=e’\(^{1}\) xjed\(^{1}\)=e’=nh\(^{13}\) lau\(^{1}\) ka\(^{1}\) re\(^{1}\) ter\(^{1}\).
STAT.walk=with=3.EL chicken=3.EL in road
‘She was walking with her chickens in the road.’ (Guiloxi: RM, GYZ108, 31:15)

(36) Context: A boy is standing with his pet bull outside a house.

a. # Dze\(^{3}\)-se\(^{3}\)-ze\(^{3}\)=ba’\(^{2}\)=b\(^{3}\) dzua\(^{13}\) yo’o\(^{13}\).
CONT-PL-stand=3.HU/3.AN near house
‘They are standing by the house.’ (Yalina/Guiloxi: FA/RM, GYZ099, 16:00)
b. Dze\(^{3}\}=lhenh\(^{2}\}=ba’\(^{2}\) xgo’n\(^{13}\}=ba’\(^{2}\) dzua\(^{13}\) yo’o\(^{13}\).
CONT.stand=with=3.HU bull=3.HU near house
‘He is standing with his bull by the house.’ (Yalina/Guiloxi: FA/RM, GYZ099, 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 beno’ lenh to xikw=e’ zj-a’ak=e’ gwxhen
then one person with one dog=3.EL STAT.PL-go.PL=3.EL INF.catch
deer
‘A man and his dog had gone to hunt deer.’
b. Nha’ be-so’-ollinh=eh’ to ya’adao’...
then COMP-PL-arrive=3.EL one forest
‘And they arrived in a forest…’
c. Nhach xhikw=e’e=nh gop=ob 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=ba’=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.’

12 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. **Gwza’ak=lh=bo’ agwyej=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. For instance, 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-z³-banh³=ba’² xhikw₁³=ba’², be=nh³ dzej³=lenh¹=ba’²
      COMP-CAUS-be.alive=3.HU dog=3.HU 3.AN=DEF go.CONT=with=3.HU
      le¹=ba’³...
      3.AN
      ‘He woke up his dog, the one he was taking with him…’
      (Guiixo: RM, GZYZ118-s, 3)

   b. Be³-se³-lha’a¹²=ba’² xhi¹=nh³ ts-j-a’ak¹=lenh¹=ba’²
      COMP-PL-separate=3.HU sheep=DEF POT-AND-go.PL=with=3.HU
      chhua³ yegw³.
      until river
      ‘They separated the sheep they were going to take to the river.’
      (Yalina: FA, GZYZ118-s, 5)

   c. Nha³ j-a’ak³=ba’³
      then COMP.AND-go.PL=3.HU until river=DEF
      ‘Then they went to the river.’
      (Guiixo: RM, GZYZ118-s, 6)

   d. Bi¹-dao¹=nh¹ lenh¹ xhikw₁³=ba’²=nh byo¹=lhenh¹=ba’²=ba’³
      COMP.child=DEF dog=3.HU=DEF COMP.enter=with=3.HU=3.AN one in
      lha³ she³=g=nh¹ be³-se³-nit³=ba’² xhi¹=nh³.
      valley where=DEF COMP-PL-lose=3.HU sheep=DEF
      ‘The boy with his dog entered a valley where they lost the sheep.’
      (Guiixo/Yalina: RM/FA, GZYZ118, 28:15)

   e. Bi³-tus¹ be¹-se¹-le’eq¹³=ba’²=ba’³.
      no.longer COMP-PL-see=3.HU=3.AN
      ‘They could no longer see them.’
      (Guiixo: 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. Tswia³=b³ blull³=e’nh³ be’ku³ do¹=nh³ ba¹ watch.CONT=3.AN frog=DEF dog little=DEF already dz-e³-dzuj³=eb³ yegw³=’nh³. CONT-FREQ-enter=3.AN river=DEF

‘The frog is watching the little dog who is getting out of the river.’

b. Tsup¹ la’a¹ t-s-a’a¹ klha’³ lle³=ba² yi³-se³-zenh³=ba² blull³=e’nh³. 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 heterogenous 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. # Dze³-se³-z=e’e¹. CONT-PL-walk=3.EL

Intended: ‘They are walking.’ (Yalina/Guiloxi: FA/RM, GZYZ035, 17:09)

b. # Dze³-se-za³=b³. 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).13 No such comment was offered about reference to the mixed

[13] 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) E¹ ba¹ tsa’a³=lhe¹?
Q already CONT.walk=2PL

‘Are you walking?’ (Laxopa: RD, SLZ1081, 15:00)
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).

(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’at³=e¹¹/=enh³.
COMP-PL-die.PL=3.EL=3.1N
‘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?”

# Zja¹-nhka³-che³=ba²/=nh³ ko¹lle³ so¹fa³ nha³.
PL-hide.PL=3.HU/=3.1N 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. To³ lle¹³ b-e³-llagd³=enh³ to³ bi¹ one night COMP-FREQ-meet=3.IN one CL.HU youth when
   ts-j-e¹-da³=ba² hill³=ba²... 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. Nha³ zja³-da³ ja³-ya’ak³=ba³ do³ txenh³ ganh¹ shcho³... 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)

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.
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, give 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 heterogenous groups; (ii) such mixed groups are referred to using the most marked pronoun possible; and (iii) whether this heterogenous 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 ϕ

I propose that this analogy is a product of the semantic composition mechanism for person. If the speaker and addressee in a conversational situation are unique, then any group containing these individuals will have to be assembled from atomic individuals. 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 shares these properties, because animacy features compose semantically by the same mode of composition and in the same order.

Some of this order I take to come from the hierarchical structure of the noun phrase itself. Nouns have a rich functional structure, which hosts ϕ-features in different positions: person features (π) are located on a functional head higher in the noun phrase, while number (#) and gender (γ) features are found in distinct positions lower down (Picallo 1991, Ritter 1991, 1995, Longobardi 1994, and others).

(45)

\[
\begin{array}{c}
\pi \\
| \\
\# \\
| \\
\cdots \\
| \\
\gamma \\
| \\
\cdots \\
\cdots
\end{array}
\]

This structure supplants some of the need for a feature geometry like (7), as it relates person, number, and gender in virtue of their positions in the functional sequence.

Within each domain, there may be additional structure. I assume this has a familiar feature geometric shape, so that person, number and gender are each organized in trees, which encode the featural combinations that are possible. Some recent approaches have questioned the need for any feature geometric structure at all, allowing features to combine freely instead (Harbour 2016,
Cowper & Hall 2019, Hammerly 2020). I will start by assuming that — internally — each ϕ-domain has a more traditional organization, though I return to the consequences of this choice later.

My main claim, then, is about the semantic composition of person and animacy. But this is embedded in a specific hypothesis about the hierarchical organization of the noun phrase, leveraging the independent syntactic evidence for this structure. The Animacy Composition Hypothesis can accordingly be revised to take this into account:

(46) **Animacy Composition Hypothesis (revised):**
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. Gender features by contrast are not, and so 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). 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 \((\leq)\). 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 \(x, y\), \(x \sqcup y\) 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. Both Kratzer (2009) and Harbour (2016) propose semantics for ϕ-features that do just this (see also Ackema & Neeleman 2018 for a related proposal with different combinatorial assumptions). I present a version of Harbour’s semantics here, since it straightforwardly derives the first two properties of

---

14 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.

15 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.
associativity. I modify his feature system to be compatible with the assumption that person and animacy features are privative and organized in a feature geometry. I will return to discuss Harbour’s original system, which uses bivalent features, and its typological consequences in Section 3.4.

Features are interpreted as one-place predicates denoting a subset of the domain of discourse, which includes both singular and plural individuals. To capture a three-way person distinction, three such lattice-denoting elements are needed, with the meanings in (48).

\[(48)\]
\[\begin{align*}
\text{a.} & \quad \left[\text{SPEAKER}\right]^c = \lambda x . \text{is the speaker in } c \\
\text{b.} & \quad \left[\text{PARTICIPANT}\right]^c = \lambda x . \text{includes only the speaker or the addressee in } c \\
\text{c.} & \quad \left[\pi\right] = \lambda x . \text{i/s are potential discourse subject(s) or object(s)}
\end{align*}\]

Since there is only a single speaker in any given context, SPEAKER always denotes a unit set — a trivial lattice — as illustrated in (49a). However, PARTICIPANT denotes a larger lattice: its denotation includes the unique speaker and the unique addressee, as well as their join, as illustrated in (49b). These extensions are schematic, with \(i\) and \(u\) standing in for whichever individuals are the speaker and the addressee in a given conversation.

\[(49)\]
\[\begin{align*}
\text{a.} & \quad \{i\} \\
\text{b.} & \quad \{i, u, iu\} \\
\text{c.} & \quad \{i, io, io', \ldots, u, uo, uo', \ldots, iu, iuo, iuo', \ldots, o, oo', oo'', \ldots\} = \{i_o, u_o, i_o u_o, o_o, o'_o, \ldots\}
\end{align*}\]

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., \(o, o', o'', \ldots\)), 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., \(x, xo, xo', xo'', \ldots\)) 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. In particular, 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 (2021) 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.

$$\begin{array}{c}
\begin{array}{c}
G \\
\oplus \\
F
\end{array}
\end{array}
^c = \lambda x. \exists y \exists z [x = y \sqcup z, y \in [F]^c, \text{ and } z \in [G]^c]
$$

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:

```
(51) a. 1 π
    +——>+——> π
    |         |
PARTICIPANT
    +——-> SPEAKER

b. 2 π
    +——>+——> π
    |         |
PARTICIPANT
    +——-> SPEAKER

c. 3 π
    +——>+——> π
    |         |
PARTICIPANT
    +——-> SPEAKER
```

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.

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

```
(52) a. $[\oplus_{\text{SPEAKER}}(\oplus_{\text{PARTICIPANT}}(\pi))]^c = \oplus(\{i\}) (\oplus(\{i, u, iu\}) (\{i_o, u_o, iu_o, o_o, o_o', \ldots\}))$
    = \oplus(\{i\}) (\{i_o, u_o, iu_o\})
    = \{i \sqcup i, i \sqcup u, i \sqcup iu, \ldots\}
    = \{i_o, iu_o\}

b. $[\oplus_{\text{PARTICIPANT}}(\pi)]^c = \oplus(\{i, u, iu\}) (\{i_o, u_o, iu_o, o_o, o_o', \ldots\})$
    = \{i \sqcup i, i \sqcup u, i \sqcup iu, i \sqcup o, i \sqcup o', \ldots, u \sqcup i, u \sqcup u, u \sqcup iu, u \sqcup o, u \sqcup o', \ldots, iu \sqcup i, iu \sqcup u, iu \sqcup iu, iu \sqcup o, iu \sqcup o', \ldots\}
    = \{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 (52c) involves no combinatorics at all, since by hypothesis it only encodes \( \pi \). For the second person in (52b), 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 (52a), 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 (52a–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 (LC). All groups containing the speaker are included solely in the final denotation for the first person in (52a). Similarly, any group including the addressee, but not the speaker, is found only in the final denotation for the second person in (52b). 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 (52a) is a proper subset of the denotation of second person in (52b), which in turn is a proper subset of the denotation of third person in (52c). 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:  

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

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).

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

\(^{16}\)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 in 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.
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).

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:

\[(55) \hspace{1cm} a. \quad \text{SINGULAR} = \lambda x . \forall y [y \leq x \rightarrow x = y] \]
\[b. \quad \text{PLURAL} = \lambda x . \exists y [y \leq x \land x \neq y] \]

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.


With this structure, all person features occupy the same functional head, composing semantically together first before combining with any other features.\(^{17}\) Consider the semantic derivation for the first person singular:

\[(56) \quad \pi \sqcup \text{PARTICIPANT} \quad \text{SINGULAR} \quad \pi \sqcup \text{SPEAKER} \quad \subset \quad \pi \sqcup \text{PARTICIPANT} \quad \text{SPEAKER} \quad \sqcap \quad \text{SINGULAR}^c \quad \subset \quad \{i, o, o', \ldots\} (\text{as in (52a)}) \quad \subset \quad \{i\} \]

The person features combine by the \(\sqcup\) operator, so that the head bearing them denotes all groups containing the speaker, as in the derivation in (52a). 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.

\(^{17}\)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.
I attribute this order of composition to the hierarchical positions of \( \varphi \)-features in the extended nominal project. But it is, in fact, the only order in which person and number can compose semantically. Person features and number features cannot be interleaved, since then the former would 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.

### 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.

\[
\begin{align*}
(57) \quad a. \quad [\text{ELDER}]^c &= \lambda x . x \text{ hold(s) a salient social role in } c \\
b. \quad [\text{HUMAN}] &= \lambda x . x \text{ is/are human} \\
c. \quad [\text{ANIMATE}] &= \lambda x . x \text{ is/are animate}
\end{align*}
\]

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 (58), which extend the notation used above (\( e \) stands for non-conversational participant elders, \( h \) for non-elder humans, and \( a \) for animals).

\[
\begin{align*}
(58) \quad a. \quad \{i,u,e,e',...,iu,ie,ie',...,ue,ue',...,ie',...,iue,iue',...,\} \\
b. \quad \{i,u,e,e',...,iu,ie,ie',...,ue,ue',...,ee',...,iue,iue',..., \\
    h,h',...,ih,ih',...,uh,uh',...,eh,eh',...,hh',...,iuh,iuh',...,\} \\
c. \quad \{i,u,e,e',...,iu,ie,ie',...,ue,ue',...,ee',...,iue,iue',..., \\
    h,h',...,ih,ih',...,uh,uh',...,eh,eh',...,hh',...,iuh,iuh',..., \\
    a,a',...,ia,ia',...,ua,ua',...,ea,ea',...,ha,ha',...,aa',...,iua,iua',...,\}
\end{align*}
\]

The ANIMATE feature denotes all animate individuals, including all humans, as in (58c). The HUMAN feature denotes a proper subset of this set: all human individuals, whether elder or not, as in (58b). Both necessarily include the speaker and addressee, under the assumption that conversational participants are always human.

Again, the notational scheme in (58) 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 (58) are intended to illustrate the overall shapes the actual extensions of these features would have.

With the semantics in (57a), 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.

This semantics allows for the possibility that local person pronouns themselves bear ELDER, along with the other animacy features. Feature specifications like the following would be possible for both first and second person:

\[(59)\]

\[
\begin{array}{ll}
\text{a.} & 1 \\
\pi & \oplus \\
\text{ANIMATE} & \oplus \\
\text{HUMAN} & \oplus \\
\text{ELDER} & \oplus \\
\text{PARTICIPANT} & \oplus \\
\text{SPEAKER} & \\
\text{b.} & 2 \\
\pi & \oplus \\
\text{ANIMATE} & \oplus \\
\text{HUMAN} & \oplus \\
\text{ELDER} & \oplus \\
\text{PARTICIPANT} & \oplus \\
\end{array}
\]

These alternative representations are not semantically consequential and would have the same interpretations as the ones in (52a–b). But they do have morphosyntactic consequences. Third person pronouns that realize this four-way animacy distinction will form a natural class with local person pronouns, because of their shared animacy features.

The four third person pronouns in Zapotec have the representations below, with the animacy features composing with $\pi$ via the $\oplus$ operator.

\[(60)\]

\[
\begin{array}{c}
\text{a.} & 3\text{SG.EL} \\
\pi & \oplus \\
\text{ANIMATE} & \oplus \\
\text{SINGULAR} & \oplus \\
\text{HUMAN} & \oplus \\
\text{ELDER} & \\
\end{array}
\]
Just as with the first and second person, combining animacy features by $\oplus$ 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 (61a). The same holds for the human and animal feature specification, as shown in (61b) and (61c). The inanimate feature specification in (60d) just denotes the full $\pi$ lattice.

\[(61) \quad \left[ \oplus_{\text{ELDER}} \left( \oplus_{\text{HUMAN}} ( \oplus_{\text{ANIMATE}} (\pi)) \right) \right]^c = \{ i, u, e, e', \ldots, \\
ie, ie', \ldots, ih, ih', \ldots, ia, ia', \ldots, io, io', \ldots, \\
u, u', \ldots, uh, uh', \ldots, ua, ua', \ldots, uo, uo', \ldots, \\
u, iue, iue', \ldots, iuh, iuh', \ldots, iua, iua', \ldots, iuo, iuo', \ldots, \\
e, e', \ldots, eh, eh', \ldots, ea, ea', \ldots, eo, eo', \ldots \} \]
\[\xrightarrow{LC} \{ e, e', \ldots, ee', \ldots, eh, eh', \ldots, ea, ea', \ldots, eo, eo', \ldots \} \]
b. $[[\oplus \text{HUMAN}(\oplus \text{ANIMATE}(\pi))]^c$

$$= \{i,u,e,e',...,h,h',.... ,
  ie,ie',...,ih,ih',...,ia,ia',...,io,io',..., 
  ue,ue',...,uh,uh',...,ua,ua',...,uo,uo',..., 
  iu,iue,iue',...,iuh,iuh',...,iua,iua',...,iuo,iuo',..., 
  ee',...,eh,eh',...,ea,ea',...,eo,eo',..., 
  hh',...,ha,ha',...,ho,ho',...,\}$$

$$\xrightarrow{\text{LC}} \{h,h',...,hh',...,ha,ha',...,ho,ho',...,\}$$

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 (61b). 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 (57) and the compositional operator in (53) 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 (61) picks out groups which contain elements that are not included in its denotation as atomic individuals. In (61a), for instance, the elder category includes $eh$, $ea$, and $eo$, but not $h$, $a$, and $o$. These atomic individuals are removed by $\text{ELDER}$, 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 instance, a mixed group of elder and non-elder humans is found in the denotations of all three pronouns in (61a–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 (53) above. Thus, all plural individuals in the denotations in (61a–c) will be “associates” in the context.
These three properties are a product of how animacy features combine, specifically how they compose with the π 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 ⊕ 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 π.

\[(62) \quad \left[\oplus_{\text{ELDER}}(\oplus_{\text{HUMAN}}(\oplus_{\text{ANIMATE}}(\pi \cap \text{SINGULAR})))\right]^c = \oplus \left[\text{ELDER}^c(\oplus \left[\text{HUMAN}^c(\oplus \left[\text{ANIMATE}^c(\{i, u, e, e', \ldots, h, h', \ldots, a, a', \ldots, o, o', \ldots\})\})\right])\right]^c = \{i, u, e, e', \ldots, ie, ie', \ldots, ih, ih', \ldots, ia, ia', \ldots, io, io', \ldots, u, u', \ldots, uh, uh', \ldots, u, u', \ldots, ee, ee', \ldots, eh, eh', \ldots, ea, ea', \ldots, eo, eo', \ldots, i, i', \ldots, u, u', \ldots, o, o', \ldots\}\]

Combining π with SINGULAR (by set intersection) removes all pluralities (i). But combining this then with animacy features by ⊕ adds some pluralities back in (ii). In particular, 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, and this has required certain simplifying assumptions about the typology of person. Not all languages, however, have only three persons: some have two, while others have four. This typological variation is dually manifested in the variety of person inventories attested in the world’s languages. In languages with a four person pronoun inventory, which includes all Southeastern Sierra varieties (see Table 1), the first person inclusive (including the addressee) is distinguished from the first person exclusive (not including the addressee). For these languages, three person features, combined by just one compositional mechanism (⊕), are not enough. Below, I explore two ways of extending the current system to account for four persons, as well as what these predict for the typology of animacy.

The first approach minimally changes the present system by adding another person feature, ADDRESSEE (Harley & Ritter 2002, cf. Noyer 1992). This would denote the set containing the unique addressee in the speech event.

\[(63) \quad \left[\text{ADDRESSEE}\right]^c = \lambda x . x \text{ is the addressee in } c\]

In Harley & Ritter’s feature geometry in (7), SPEAKER and ADDRESSEE are treated as sisters. But this structure is not interpretable with the ⊕ operator, which as it is defined above, must compose two features in an immediate domination relation. As Harbour (2016:192) points out, the featural specifications in (64) are possible, and these would correctly derive the inclusive–exclusive distinction.
The most marked specification in (64a) would denote only groups containing both the speaker and addressee (\{iu_o\}). By Lexical Complementarity, the specification in (64b) would denote groups of the speaker and others (\{io\}), and the specification in (64c) groups of the addressee and others (\{uo\}).

This would place a significant explanatory burden, however, on a feature geometry. The following feature specifications, which involve different combinations of the same features, would have to be ruled out, as they would produce pronouns whose interpretations do not align with their formal natural class.

The specification in (65a) would have the semantics of the first person inclusive (\{iu_o\}), and the specification in (65b) the semantics of second person (\{uo\}), which is perhaps not a problem. But the first person exclusive (\{io\}) would correspond to the specification in (64c), through competition with (64b). Yet it does not comprise a natural class in featural terms with the first person inclusive (64a) to the exclusion of the second person. There would thus be no unified category of “first person” with these feature specifications. And even worse, it would be the first person inclusive and second person that would constitute a natural class.

The feature combinations in (65) could be excluded by a universal feature geometry. But this would not be deriveable from the entailment relations amongst features, in the way described in Section 1.2. The SPEAKER and ADDRESSEE features do not entail each other, and so could not be related vertically. The problem is the inherent symmetry of these two features, which forecloss any semantic explanation for why the feature specifications in (65) are not possible.

A second approach avoids adding an ADDRESSEE feature altogether, either by posting another compositional mechanism for combining person features (Harbour 2016) or permitting the possibility of feature modification (Cowper & Hall 2019, Hammerly 2020). This would allow just three features to generate both three and four person systems. Harbour, for instance, proposes an additional mode of composition (⊖), encoded by the negative value in a bivalent feature system, which subtracts pointwise every element in one feature’s denotation from every element in another feature’s denotation.
In this definition, $x \setminus \text{max}(f)$ is the group created by removing the maximal element of $f$ (the smallest element of $f$ which contains all other members of $f$) from $x$. With the addition of this compositional mechanism, the same feature specifications in (51) could give rise to a four person system, when $\ominus$ is used to combine $\text{PARTICIPANT}$ with $\pi$.

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 Complimentarity.

Both first person categories and the second person form a natural class, as desired, in virtue of their sharing the feature $\text{PARTICIPANT}$.

However, with both the $\oplus$ and $\ominus$ operators, there are some other ways person features could compose, including those in (69a–b). Since the $\ominus$ operator does much the same work as Lexical Complementarity, these end up being semantically equivalent to the underspecified representations in (67): (69a) is identical to the second person in (67c), and (69b) to the third person in (67d).\(^{19}\)

Because of this equivalency, Harbour proposes that a feature geometry restricting possible feature specifications to just those in (67) is not needed. The four person categories can arise instead by

\(^{19}\)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.
allowing the three person features to compose freely, by either ⊕ or ⊖: first person inclusive as in (68a), first person exclusive as in (68b), second person as in (69a), and third person as in (69b).

However, there are formal consequences to eliminating feature geometries in this way. As Harbour acknowledges (pp. 125–128), the exclusive (68b) no longer forms a natural class with the inclusive (68a) and the second person (69a) — either in terms of the features they have (since all four persons possess all three features), or in terms of modes of composition (and the bivalent feature values that encode them). Some underspecification thus seems necessary. At least the third person must be underspecified, as in (67d), so that the other person categories can form a natural class (an idea going back to Benveniste 1966). But if this is possible, the second person could also be underspecified, as in (67c). And then, it seems like we may be back where we started, needing a theory of underspecification to restrict the possible feature specifications to just these (see Harbour 2016:125–128, 190–199, 259–262 for additional discussion).

These two approaches have interesting consequences for the typology of animacy. The first, which adds an ADDRESSSEE feature, does not change the predicted crosslinguistic inventory of animacy categories. This is simply because all it does is expand the inventory of person features.

But the second approach, which posits an additional compositional mechanism, predicts a much larger typology of animacy. If animacy features were also able to combine by ⊖, there would be several logically possible featural combinations beyond the four in (60). Three of these are provided below.

\[
\begin{align*}
\text{a. } & [⊕\text{ELDER}(⊕\text{HUMAN}(⊕\text{ANIMATE(π))))]^c = \{e, eh, eo, eho, \ldots, e', e'h, e'o, e'ho, \ldots\} \\
\text{b. } & [⊕\text{ELDER}(⊖\text{HUMAN}(⊕\text{ANIMATE(π))))]^c = \{e, ea, eao, \ldots, e', e'a, e'ao, \ldots\} \\
\text{c. } & [⊖\text{ELDER}(⊕\text{HUMAN}(⊕\text{ANIMATE(π))))]^c = \{h, a, o, hh', \ldots, ha, \ldots, ho, \ldots, \varnothing\}
\end{align*}
\]

The specification in (70a) includes elders and groups of elders and other humans or things (but no animals); the one in (70b) includes elders and groups of elders and animals or things (but no other humans); and, the one in (70c) includes non-elders and any group containing a non-elder human and an animal or thing. All of these seem unlikely to correspond to actual pronouns, suggesting that animacy features are not able to combine via the ⊖ operator, though a definitive answer awaits a more complete survey of languages with rich animacy distinctions in the third person.

If animacy does not exhibit the full combinatoric potential enabled by having both modes of composition, there are a couple paths forward. First, we might add an ADDRESSSEE feature, while accepting the explanatory burden this places on a feature geometry. Second, we might permit some divergence in the combinatorial mechanisms used by person and animacy. While person features would be able to combine by ⊖, animacy features would not. This would go against the specific formulation of the Animacy Composition Hypothesis above, but not its spirit. A weaker version would allow for some divergence between person and animacy in their modes of composition:

\[
\text{Animacy Composition Hypothesis (weak version):}
\]

Animacy features compose with person features on the same syntactic head via some of the same modes of composition.

That is, while person would combine via both modes of combination, animacy would combine solely by ⊕. The question would be why animacy differed 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: \([\text{SPEAKER}]^c \subset [\text{ADDRESSEE}]^c \subset [\pi]\) (Sichel & Wiltschko 2021), just as animacy features do: \([\text{ELDER}]^c \subset [\text{HUMAN}] \subset [\text{ANIMATE}]\). Other \(\phi\)-features do not necessarily share this semantic property, and so they are unable to compose with person via the same mode of composition. This is true, in particular, for social gender, which is also realized in many languages’ 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 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 (Déchaine 2019). With the lexical entries in (72), FEMININE and MASCULINE would denote disjoint sets of homogenous groups of females and males, respectively.

\[(72) \quad \begin{align*}
\text{FEMININE} &= \lambda x \cdot x \text{ is/are (a) female person/people} \\
\text{MASCULINE} &= \lambda x \cdot x \text{ is/are (a) male person/people}
\end{align*}\]

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 (73), as well as homogenous groups of males. The feminine plural pronoun refers only to homogenous female groups.

\[(73) \quad (\text{Le fils et la fille,}) \text{ ils/*elles sont partis.} \quad \text{the.M boy and the.F girl 3PL.M/3PL.F are left.PL.M} \]

‘(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 (72), 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 Complementary 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, Conrad 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: Pær ‘they (3PL.F)’ refers solely to homogenous female groups, and Peir ‘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).

(74) Sjáðu konu-na og mann-inn. {Pau, *Peir} 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)

---

20 They also do not seem to exhibit the third property, context dependence. In French, elles appears to have no problem referring to groups of a human and an animal (i) or a human and a thing (ii).

(i) **Laurie Martel**, 19 ans, s’est prise d’affection pour Olympia, une vache issue d’une exploitation de Mesnil-Martinsar dans la Somme… Elles sont inséparables depuis toujours!

‘**Laurie Martel**, 19 years old, was taken with Olympia, a farm cow from Mesnil-Martinsar in the Somme… They had been inseparable since forever.’


(ii) Comment la jeune fille et la rose sont-elles rapprochées? Quels points communs ont-elles (cherchez dans les trois strophes)?

‘How are the young girl and the rose compared? What points in common do they have (look in the three verses)?’


This supports the claim that third person plural pronouns, in general, are not restricted to being “associates” in the context.

21 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.
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:

(75) 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 (75a–b) picking out homogenous groups, the neuter plural pronoun in (75c) will refer, by Lexical Complementarity, to any other group.

Social gender in Icelandic is thus different from animacy in Zapotec, since it does not exhibit marked reference. This, in turn, supports the distinct syntactic positions and distinct modes of composition for these animacy and gender features.  

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 locus. I aim next to show that this shared structural position is plausibly responsible for the syntactic activity of person and animacy.

It is easy to see, in general terms, how this might serve as the start of an explanation for their shared relevance for syntactic phenomena like differential object marking, direct-inverse alignment, and the Person Case Constraint (PCC). 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. But how this basic idea is implemented is crucial, since it must also derive why these operations are not sensitive to other φ-features, including gender.

I will focus here on the PCC, illustrated initially in (1–2) above, since it makes reference to both person and animacy in Southeastern Sierra Zapotec. The core hypothesis that will enables this is that person features — along with animacy features — occupy the highest functional head in the noun phrase.

22A reviewer suggests that not all non-binary gender systems may work like Icelandic, pointing to Czech, which on the surface has four gender categories (masculine animate, masculine inanimate, feminine, and neuter). These are collapsed into three categories in the plural (masculine animate, masculine inanimate/feminine, and neuter). As Kučerová (2018) describes, 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 data on plural pronoun reference, this pattern of verb agreement does parallel marked reference, with masculine animate being most marked and neuter the least marked. The analysis of social gender in Icelandic suggests that this system should involve person and animacy in some way. Indeed, Kučerová proposes to reduce these “gender” distinction entirely to person, within a feature system with four person values.
I take this functional head bearing person and animacy features to be D (Longobardi 1994, Ritter 1995:421), though it might also be possible to reduce “D” itself to the most general person feature (Béjar & Kahnemuyipour 2017, Sichel & Toosarvandani 2021).

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). In particular, I adopt a general version of Deal’s (to appear) and Sichel & Toosarvandani’s (2021) recent accounts, in which a 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 Agree with more than one pronoun, however, is conditioned by the featural specifications of the pronouns it finds. Configurations in which the PCC is violated are ones in which 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). That is, not only are functional heads specified for the features they Agree in, they also 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 ϕ-features can only be searched for later, after at least one pronoun has cliticized, thereby 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 (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).

---

23Coon & 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) argue 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).24

(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)

24 When a postverbal subject is a lexical DP, not a pronoun, object cliticization is prohibited altogether (see Sichel & Toosarvandani 2021 for further discussion).
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.

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). Plural local person pronouns, which are heavier, are also unable to cliticize in object position.

(82) 3 > 1/2

a. * Nhaw₁=eᵋ⁴=tuᵋ³.
follow.STAT=3.EL=1PL.EXCL
Intended: ‘S/he is following us.’ (Yalina/Guiloxi: FA/RM, GZY161, 1:20)

b. * Nhaw₁=eᵋ⁴=dzu³.
follow.STAT=3.EL=1PL.INCL
Intended: ‘S/he is following us.’ (Yalina/Guiloxi: FA/RM, GZY161, 1:15)

c. * Nhaw₁=eᵋ⁴=lhe³.
follow.STAT=3.EL=2PL
Intended: ‘S/he is following you all.’ (Yalina/Guiloxi: FA/RM, GZY161, 1:40)

25I 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 a functional head’s relativization (Nevins 2007, 2011, Coon & Keine 2021, Foley & Toosarvandani 2022, Deal, to appear). That is, the features that the head is looking for can be parameterized, both across languages and across ϕ-domains, essentially reducing absolute constraints to relative ones.

26Similarly, 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).
Nor can the PCC be reduced to a purely morphological constraint on linearly adjacent clitics. To start, pronominal cliticization in these Zapotec varieties involves syntactic movement, since it is sensitive to islands (Sichel & Toosarvandani 2020). A pronoun cannot cliticize asymmetrically out of a coordination (where the underscore marks the starting point of movement).

(83) * Ts-ja-wi=e’1[ ... 1 nha’ xna’a] taw=a’.
    CONT-AND-visit=3.EL and mother=1SG grandmother=1SG

    Intended: ‘S/he and my mother went to visit my grandmother.’

(Yalina/Guiloxi: Sichel & Toosarvandani 2020:111)

As a constraint on this syntactic movement, the PCC is also syntactic in nature. The evidence for this comes from contexts in which otherwise illicit combinations of clitics are grammatical. In ditransitive clauses, indirect and direct objects can cliticize without being constrained by their relative animacies (Toosarvandani 2017). A hierarchy-violating sequence of clitics is thus possible in a ditransitive clause (84b), unlike in a monotransitive clause (84a).

(84) a. * Udi’in=e bib3=ne’1.
    bite.COMP=3.AN=3.EL

    Intended: ‘It (an animate) bit her/him.’

    (Laxopa: FSR, SLZ1012, 19:25)

b. Blhui’i=da’1=b=ne’1.
    show.COMP=1SG=3.AN=3.EL

    ‘I showed her/him to it (an animal).’

    (Laxopa: RD, SLZ1029-s, 9)

Without going into why the PCC might be lifted in ditransitives (see Foley & Toosarvandani 2019), a syntactic mechanism must be responsible for why cliticization of both subject and object pronouns is impossible in the hierarchy-violating configurations above (see Albizu 1997 and Rezac 2008 for a similar argument in Basque).

4.2 The grammatical mechanism underlying the PCC

In many syntactic theories of the PCC, its source is traced to the mechanism underlying pronominal cliticization (Anagnostopoulou 2003, 2005, Béjar & Rezac 2003, Nevins 2007, 2011, Coon & Keine 2021, Sichel & Toosarvandani 2021, Foley & Toosarvandani 2022, Deal, 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 (2021). 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.27

27I 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 present purposes.
These Agree relations are a precondition for syntactic movement, leading to either phrasal (Nevins 2011) or head (Preminger 2019) movement of the pronoun.

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 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 (88) is met.

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

On its own, this theory does not explain why the PCC is sensitive only to person and animacy. The condition on Agree in (88) 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, as I discussed in Section 1.1. So, 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 with verbs that assign dative case to their subject. These verbs agree in number with the nominative object, as illustrated for Icelandic in (89), 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).

\[
\text{(89)} \quad \text{Honum mund-u alltaf líka ðeir.} \\
\text{him.DAT would-3PL always like they.NOM} \\
\text{‘He would always like them.’} \quad \text{(Sigurðsson 2004:148)}
\]

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 then the probe Agrees in number with the nominative object. This accounts not only for why the object controls number agreement, as in (89), but also for why the verb never agrees with the object in person, as in (90).

\[
\text{(90)} \quad \begin{align*}
\text{a. } & \quad \text{* Honum mund-um alltaf líka við.} \\
& \text{him.DAT would-1PL always like we.NOM} \\
& \text{Intended: ‘He would always like us.’}
\end{align*}
\]

\[
\text{b. } & \quad \text{* Honum mund-uð alltaf líka ðið.} \\
& \text{him.DAT would-2PL always like you.PL.NOM} \\
& \text{Intended: ‘He would always like you (pl.).’} \quad \text{(Sigurðsson 2004:148)}
\]
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 why, consider the derivation of a hierarchy-obeying configuration, like the one in (91), in which the subject is more animate than the object.

(91) 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 (88), 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 (92), the probe is only able to Agree with one pronoun.
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 (88), the probe is unable to Agree with the object pronoun in person or animacy features, and so it is unable to cliticize.\(^{28}\)

Now, how does probe sequencing 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 when it relates a functional head to the pronouns in its domain. If the probe is sequenced to search first for \(\pi\) — and the person and animacy features that colocate with it — this computation will end up only being able to take these features into account. 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 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. And with this pronoun’s features unavailable for the relevant calculation, there can be no hierarchy effect, parallel to the PCC, comparing its number or gender with any other pronoun’s number or gender.\(^{29}\)

\(^{28}\)I assume that the object pronoun is also unable to cliticize by Agreeing in other \(\varphi\)-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 (92), 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 (92), where the object pronoun never Agrees for person in the first place.

\(^{29}\)This attributes the PCC’s unique sensitivity to person and animacy to the nature of the probing mechanism: a functional head must first Agree for person and animacy, before it can Agree in number or gender. But it is worth pointing out that this sequencing is, in fact, necessary if features are structured within the noun phrase as I have proposed. If person and animacy features are both located in the highest nominal functional head — and if DP is a phase — a probe must Agree first in these features, as only they are visible to external syntactic operations. And if other \(\varphi\)-features, which are more deeply embedded within the noun phrase, only become visible to these operations once it has been
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 three properties which also characterize 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 locus. 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 would work for the syntactic operations underlying pronominal cliticization, which is constrained by the PCC. Whether this solution 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 in this discussion which I have not been able to fully resolve, including the role of feature geometries. These were originally proposed to restrict 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). I assigned them a fairly circumscribed role in the feature system I proposed here: they served merely to organize features within each φ-domain. Across domains, I took features to be organized hierarchically, with person and animacy features located highest in the extended nominal projection. The cooccurrence dependencies encoded by this feature geometrical structure played an important role in establishing, for person and animacy, the formal natural classes that pronouns fall into. At least for animacy features, it is not clear that this geometric structure can simply be eliminated, permitting them to combine freely. To derive the PCC, for instance, third person pronouns in Zapotec must have overlapping animacy features. Cliticization of an object pronoun is, generally speaking, prohibited whenever its animacy exceeds that of the subject. So, in Yalálag and Laxopa, 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. Human pronouns thus form a natural class, which must be encoded in a shared HUMAN feature.

This is a formal property of pronouns, which is independent, in principle, from their interpretative properties. In fact, these properties are only connected if the same features that encode formal natural classes 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, for instance, enabled us to infer that, because third person and local person pronouns exhibit an interpretative parallel, person and animacy features share a syntactic locus. But this inference is only valid if the mapping from features’ formal representation to their meaning is transparent. While this mapping might be necessarily transparent in human language, another possibility is that the mapping between syntax and semantics just happened to be transparent in the case that we were

Agreed with (see footnote 28), then these will have to follow person in the probe’s sequencing.
looking at. In other domains, there could be significant mismatches between the formal pieces manipulated by the syntax and their interpretations.

At present, I see no empirical way of choosing between these alternatives, though it is still worth drawing out some consequences of these possibilities for the questions about feature geometries we considered above. 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, in fact, incompatible with these objects having formal properties that are semantically inert, and hence have no observable effects on their interpretation. Such purely formal structure, which would be visible solely to the operations of the syntax itself, is a possibility because the semantic system underdetermines syntactic representations. For instance, I have drawn structural conclusions about person and animacy features from certain interpretive facts, but on their own these only require that those features combine in a particular order. Some of this order, I attributed to feature geometric structure within each functional head. And while this structure was essential for encoding formal natural class, it also served no semantic purpose which could not be carried out equally well by other kinds of structure. So, it is possible that feature geometries might exist, but they will have to be motivated by different empirical arguments than I have provided here.

References


den Dikken, Marcel. 2019. The attractions of agreement: Why person is different. *Frontiers in
Psychology 10:978.


Konnelly, Lex & Elizabeth Cowper. 2017. The future is they: The morphosyntax of an English epicene pronoun. Ms., University of Toronto.


Mexico City: Instituto Lingüístico de Verano.


Rivero, María Luisa & Dana Geber. 2003. Quirky subjects and person restrictions in Romance:


