Second person contains first

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Abstract This paper sketches a compositional theory of person features which captures a core part of the typology of local person inventories (Zwicky 1977, Harbour 2016). Reviewing an argument made by Harbour, I illustrate that that typology is suggestive of a deep asymmetry in how the authors and hearers of linguistic utterances are morpho-syntactically encoded. To capture the asymmetry, rather than stipulating what kinds of morpho-syntactic features are made available by Universal Grammar (which is Harbour's approach), I stipulate a particular conception of the semantics-pragmatics interface, one which determines what kinds of morpho-syntactic features are definable, and from which the typology of person contrasts ultimately follows. (Not unrelatedly, a greater range of predictions about semantic phenomena are made by the present proposal than are made by Harbour [2016], and overall the system I develop employs a much more general semantics.) The wellspring of the analysis is the supposition that Kaplanian utterance contexts, standardly taken to include both an author and hearer coordinate (which value the extension of first- and second-person indexicals respectively), do not, in fact, contain the latter. The corollary is that while first person can be cashed out morpho-syntactically by way of a single indexical person feature, second person cannot be, and must be constructed compositionally with extra morpho-syntactic machinery. In conjunction with independently-motivated pragmatic principles governing the use of definite descriptions, the typology falls out for free from that difference in morpho-syntactic complexity.

1 Introduction

The study of person has proceeded along two somewhat different avenues in recent decades. There are, on the one hand, approaches to person which are principally concerned with its morpho-syntactic typology (*e.g.* Zwicky 1977, Noyer 1992, Harley & Ritter 2002, Harbour 2016). Generally speaking, these approaches aim to find a set of person features which are, by hypothesis, made available by Universal Grammar, and which derive the range of variation in person inventories (*e.g.*, the fact that some but not all languages grammaticize clusivity contrasts) as well as notable syntactic properties of person, such as person hierarchy effects.

On the other hand, there are approaches more concerned with how person is to be characterized semantically, where topics like indexicality and bound variable readings (especially under focus) play a larger role. This kind of work may be expressly typological (Deal 2017, 2020), but on the whole there seems to have been less attention paid to the question of what person features UG makes available. Granted, it is not uncommon in these semantic approaches to decompose pronouns into their constituent features (including person features: Heim 2008, Kratzer 2009, Charnavel 2015), but that decom-

position typically is not motivated by data from more than a few languages, or is not informed by the data that the first group of approaches are.

Thus, to the extent that these are distinct research programs, I believe they have not been as mutually informative as they could be, and this paper makes a modest contribution toward bridging the gap: I will aim to provide a solution to a morphological problem using the semantic machinery built to handle the interpretation of indexicals (Kaplan 1989, Nunberg 1994, Elbourne 2005, 2008). The morphological problem is rather narrow; it amounts to a puzzle noted by Zwicky (1977) and discussed extensively in Harbour (2016), namely: why is it that in languages without a dedicated inclusive pronoun, inclusive *meanings* (which are, for our purposes, characterized by reference to pluralities that contain both the author and the hearer of the utterance) are always communicated with a first-person pronoun, and never with a second-person pronoun? Put another way, paraphrasing Harbour (2016: 1), why is it the case that in English-like languages (*i.e.*, in those with no clusivity distinction), the meaning that *we and you* has can be communicated with the pronoun *we*, but not with the pronoun *you*?

1.1   Outline

The goal of the next section is to elucidate Zwicky's puzzle more fully. After a few comments on the ontology of person and its interface with the grammar in Section 2.1, I present in Section 2.2 the relevant portion of the typology of person inventories. I introduce the methods and a key empirical finding of Harbour's (2016) study, and observe that he derives an important gap in his typology from an asymmetry in how authors and addressees are encoded by morpho-syntactic features.

In Section 3, I put forward a hypothesis regarding what kinds of information are recoverable from utterance contexts; that hypothesis restricts what kinds of person features are definable. That is, the formal content of utterance contexts determines a class of person features – where crucially, the author-hearer encoding asymmetry stipulated in Harbour's work resurfaces. (Thus I preserve the spirit of Harbour's analysis, but departing rather radically from it in terms of in implementation.) In tandem with independently-motivated pragmatic constraints on the use of definite descriptions, the set of person features determined by nature of utterance contexts in turn derives a solution to Zwicky's puzzle. Section 4 concludes.

2   The typology of local persons

For the purposes of this paper I will restrict attention to the *local* persons. (These are the persons for which, in order to formalize their meanings, one must make reference to the *authors* and *hearers* of linguistic utterances.) This decision is a natural one on the common but not uncontroversial view that third is best understood as a non-person (Benveniste 1966, Kayne 2000, *i.a.*). The relation between the local persons and third in the context of a system like the one developed here is discussed in Author (2023: Ch. 3).

This section introduces three semantic attributes of person and personal pronouns.[1] One of these (Section 2.1) has to do with what kinds of mental representations that person *per se* seems to deal in, and two (Section 2.2) have to do with the relationship between those representations and the meanings of those pronouns that person finds itself in.

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[1] Though I will use the term 'pronoun' throughout this paper, the analysis I will develop extends without qualification to pronominal affixes and clitics so long as the relevant forms are being used referentially (rather than as a reflex of agreement).

2.1 A first pass at the ontology

I assume that the range of meanings that linguistic expressions can have is restricted by the *ontology* of natural language, in Harbour's (2016) sense. His ontology, and that of all others who make this kind of thing explicit, contains two kinds of discourse participants: utterance authors and their hearers, over which I will let a and h range as variables. I will motivate a departure from the this ontology in §3, but for the time being, I will for expositional purposes assume it to be correct.

I will take the following characteristics about the elements of the ontology (*i.e.* a and h) to be the case: (i) that a and h are disjoint atomic individuals, and (ii) that a and h are unique at every context of utterance. (ii) is somewhat counterintuitive in light of (i) and common-sense ideas about discourse (can't utterances have multiple addressees, after all?), but will be motivated shortly in Section 2.1.1.

Subsequently in Section 2.2.1, I show that these elements of the ontology can only be accessed by grammars in a way that is indifferent to semantic number. In other words, with Kratzer (2009), Harbour (2016), and much other work, I assume the distinction between atoms and pluralities is opaque to person. In Section 2.2.2, I introduce another empirical generalization about the way local pronouns behave, one that will be relevant to the analyis in Section 3.

As something of a teaser, here's what the first two of these suppositions buy us. Taken together, author/hearer uniqueness (which is a claim about the ontology) and number-indifference (which is a claim about the relation between that ontology and the meanings of linguistic expressions) define maximally three local persons, which are traditionally termed *first exclusive* (1EX), *first inclusive* (1IN), and *second* (2ND). (The terms deserve caution. As we will see, and not only as a matter of analysis, inclusives are not a variety of first person any more than they are a variety of second person.) When person plays a role in determining the referent of an expression (a free pronoun, *e.g.*), the relation between the person categories and the elements of the ontology (a, h) can be character-ized as in (1), where the person categories are defined semantically by the mereological containment relation that holds between the discourse participants and the referent.

(1)

CATEGORY	REFERENT CONTAINS:
1EX	a, but not h
1IN	both a and h
2ND	h, but not a

This is as all desired, since three local persons (and in fact *these* local persons) constitutes the upper bound on person contrasts cross-linguistically (Cysouw 2003, Harbour 2016). As we will see, however, not all of these persons are actually contrasted in the grammars of many languages – a fact which should inform any theory of person features. First, however, I will provide some justification for the aforementioned assumptions about the ontology and how it interfaces with linguistic meanings.

2.1.1 Authors and addressees are unique

While many linguistic utterances obviously have a sole author, others intuitively seem to have multiple (*e.g.*, the verses sung by a choir). It appears, however, that no language has a person system which tracks this distinction (Noyer 1992: 148, Bobaljik 2008, Harbour 2016: 67-71). For instance: if I, speaking alone, intend to communicate that the members of my choir are off-key, the English sentence *We are off-key* does the job. Crucially, the

person specification of the pronoun need not change for my choir, singing in synchrony, to communicate the same proposition. Here the morphological number of the pronoun says something about the cardinality of its referent, but neither number nor person carries any information about how many authors the utterance has.

Moreover, while utterances can intuitively be directed at a single addressee or multiple, apparently no language makes a morpho-syntactic cut that tracks *this* contrast either. For instance, in a situation where a teacher is speaking to her class, we can observe that the person specification of the pronoun in the sentence *Your homework is due tomorrow* needn't change as a function of whether all students are present (independently of how many students are in the class). Plural morphological number on *your*, if present, tracks the cardinality of the referent, not the cardinality of hearers, and second person is licensed so long as *some* student is a part of that referent. So person *per se* simply does not care about the cardinality of the two kinds of discourse participant.

To make this point in a different way, consider the prediction that arises if we assume a different ontology, one with two atomic hearers h_1 and h_2. (The reader may conduct a similar exercise to see the predictions of permitting multiple authors in the ontology.) Namely: some language should have a person system that makes the following contrasts.

(2)

CATEGORY	REFERENT CONTAINS:
1EX	a, but not h_1 or h_2
1IN	a, h_1, and h_2
1IN$'$	a and h_1, but not h_2
1IN$''$	a and h_2, but not h_1
2ND	h_1 and h_2, but not a
2ND$'$	h_1, but not a or h_2
2ND$''$	h_2, but not h_1 or a

No language is reported to have such a person system,[2] nor a person system whose categories distinguish multiple authors. This suggests that if grammars can access the atoms of the ontology individually, then both authors and hearers should be unique if the goal is to derive no more than three local persons.

This is what motivates the supposition the author and hearer of an utterance are ontologically unique at the context of utterance. For the purposes of expositional simplicity, I will further assume that a and h are atoms (but see Wechsler [2010] and Author [2023: Ch. 2] for justification on this point). To make sense of utterances that have a plurality of intuitive authors or a plurality of intuitive addressees in light of the assumption that authors and hearers are atomic, the curious reader can for the moment adopt Harbour's view on this point (2016: 71), which holds that in the former case, each author fixes the value of a to herself, and that in the latter case, each hearer fixes the value of h to herself. So in group address, for instance, each hearer h egoistically interprets a pronoun like *y'all* (2ND.PL) as something like 'the plurality containing h'.

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[2] Granted, we might expect 1IN$'$ to not be contrasted with 1IN$''$, nor 2ND$'$ with 2ND$''$. (How could interlocutors reliably distinguish which addressee is h_1 and which is h_2?) Even if we allow for these distinctions to be done away with, the resulting person system still overpredicts in that is has two flavors of second person and two flavors of inclusive person.

2.2 The relation between the ontology and the grammar

2.2.1 Personful expressions are number-indifferent by default

Some languages have inventories of pronouns or agreement which, while contrasting for person, do not morphologically contrast for number. In such languages, the pronouns' ability to refer is not restricted as a function of the referent's cardinality. In Imonda, for instance, the pronoun *ka* may refer to any individual (atomic or plural) that contains the utterance author, so long as it does not contain the hearer. *Mutatis mutandis*, the pronoun *pəl* refers to individuals that contain both the author and the hearer, while the pronoun *ne* refers to individuals that contain the hearer but not the author.

(3)　*Imonda* (Border > Waris; Seiler 1985 via Harbour 2016)

1EX	ka
1IN	pəl
2ND	ne

One can characterize the pronouns of Imonda in a way that does not invoke semantic number at all; rather, one need only consider whether a and h are a mereological part of the referent. (The inclusive pronoun, of course, cannot refer to atoms, but this already follows from it referring to entities that contain both a and h, which are necessarily disjoint.[3])

　It appears that this fact about Imonda generalizes fully. That is, there is no pronominal inventory whose members display no morphological number contrasts but can refer only to atoms (or dyads, in the case of inclusives). On the view that authors and hearers are atomic and unique, what this suggests is that grammar can only access these individuals in a way that is *number-indifferent,* to use Daniel's (2013) term.

　The number-indifference of person will be a crucial ingredient in my proposal to follow. I will show that because person is number-indifferent, more than one local person has the ability to refer plural individuals which contain both a and h. It is precisely this property which allows local persons to compete pragmatically under certain circumstances, and will be put to use in deriving the core part of the typology of person that I focus on in this paper.

2.2.2 The atoms of pronominal referents are animate

a and h are the *indices* of first- and second-person pronouns, in Kaplan's (1989) sense: they are what anchor the referents of the relevant pronouns. More specifically, the relationship between the person index and the referent of the pronoun it anchors is (at least prototypically) one of reflexive mereological parthood.

(4)　Oh no, we're running late!

If (4) is spoken by Zoë, then Zoë is a, the author, and she is the atomic index of the pronoun her utterance contains. Presented out of the blue like this, we readers can't determine which plural individual *we* refers to – it may or may not contain her adressee(s), for instance – but it is most naturally understood to refer to an individual one of whose atoms is the author, Zoë.

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[3] Even when a person talks to only themself, it seems reasonable to think that there are two intensional individuals involved: one author and one hearer.

Beyond referring to an individual the author stands in the parthood relation to, the pronoun *we* in (4) contributes at least two further aspects of meaning. First, felicitous use of this pronoun requires that its referent is a plurality – the sentence is unacceptable if Zoë intends to refer to herself *qua* singleton with that pronoun, at least in American English. Morphological number is what contributes this aspect of *we*'s meaning. (As we've seen from languages like Jarawa and Imonda, though, number distinctions in pronouns are not universal.)

Second, felicitous use of this pronoun requires that each atom of the referent is animate – the sentence is also unacceptable if Zoë intends *we* to refer to the sum of her and her car, unless the car is being construed as animate. The animacy condition is notable because it appears to be a universal property of local pronouns across languages. To date, the question of why it should be the case has not been answered. I will not answer it in this paper either, but it will figure into a feature's denotation later on.

2.3   The typology of person inventories: Zwicky's puzzle

With that background covered, we turn to the typology of local person contrasts. As mentioned above, the maximum number of local persons that can be contrasted is three. When a language has three local persons, they are always those that were given in (1), and that were exemplified transparently by the pronouns of Imonda, which are repeated below in (5).

Other languages, however, contrast fewer persons. Jarawa, for instance, has a pronoun *mi* which is used for first-person exclusive and first-person inclusive meanings alike (6). (Like those of Imonda, the pronouns of Jarawa do not contrast for number or gender.)

(5)   *Imonda* (Waris; Seiler 1985)   (6)   *Jarawa* (Ongan; Kumar 2012)

1EX	ka
1IN	pəl
2ND	ne

1EX	mi
1IN	
2ND	ŋi

Jarawa *mi* is a sometimes called a *generalized* first-person pronoun; it is generalized in the sense that it covers the range of meanings that Imonda inclusive and exclusive first-person pronouns collectively do. We may understand the Jarawa paradigm in (6), then, as a less articulated version of the Imonda paradigm, where what are distinct categories in Imonda have fallen together. Put another way, the Jarawa pronominal paradigm is syncretic with respect to the Imonda one.

2.3.1   Partitions, not paradigms

Any non-trivial theory of person should have something to say about the range of syncretisms which can overlay the three-person scaffold motivated by languages like Imonda. But as shown by Harbour (2016: 8-17), paradigmatic syncretisms are not a good window into the typology of person contrasts, for two reasons.

First, every logically possible syncretic pattern over the three local persons is attested. So in addition to the 1EX/1IN syncretism found in the Jarawa pronominal inventory, Harbour points out that South Efate features 1EX/2ND syncretism in a subject agreement paradigm, Bilua presents 1IN/2ND syncretism in an object agreement paradigm, and Hocąk has a three-way syncretism of 1EX/1IN/2ND in its pronouns.

Second, Michael Cysouw's (2003, 2005) work, which investigates the relative frequencies of paradigmatic syncretisms, indicates that one cannot simply sort the marginal from

the common patterns, because there is no obvious cut-off point between the two. Rather, there is gradual cline in frequency among the kinds of paradigmatic syncretisms. If the goal is to build a theory of *n*-celled person paradigms, no route forward seems non-arbitrary, analytically speaking.

The situation changes drastically for the better once paradigms are taken to not be the sole or even primary source of data on the typology of person inventories. As Harbour and others (McGinnis 2005, Sauerland & Bobaljik 2013, *e.g.*) have recognized, there are much more tangible typological generalizations about the number of person contrasts at the level of a language than there are about the number of contrasts in some paradigm that that language happens to employ. While the cells of any one paradigm might be subject to accidental homophony, one can generalize over a set of paradigms to discover the way that person is *partitioned* in the language. A language's person partition can be thought of as an upper bound on the number of person contrasts internal to any individual paradigm.

The analyst uncovers a language's partition by superimposing person paradigms (Harbour 2016: 17-29); the following illustrates a way of implementing this idea. Start by collecting all the person paradigms a language has to offer (or a representative subset, as I do here for the purposes of exposition). Consider the following two Kiowa agreement paradigms (*ibid.*: 14); these are defined by argument status (cross-referencing subjects vs. objects) and by number.

(7) *Kiowa*
    Object agreement (PL)

1EX	gyát-
1IN	gyát-
2	bát-

(8) *Kiowa*
    Subject agreement (NSG)

1EX	e-
1IN	ba-
2ND	ba-

Neither of these paradigms contrasts all three local persons. Note that the *grammar* of Kiowa, however, simply must, as every person can be distinguished from every other in at least one of these paradigms.

We may use lowercase letters to represent which persons are morphologically contrasted in each of the above paradigms. We say that (7) has an 'aab' pattern to mean that 1EX and 1IN are associated with the same morphological form, but that 2ND is associated with a different one. (The order of the person categories – 1EX, 1IN, 2ND – is arbitrary but consistent throughout this paper.) By contrast, (8) has an 'abb' pattern. These patterns are recorded in the left half of the table in (9). Restricting our attention to that left half, note that no two rows are identical – the first row (aa) is not the same as the second (ab), and neither is the same as the third (bb). Since each row is unique, we may associate each one with a distinct *uppercase* letter, as I do in the right half of the table.

(9)

	Paradigms			Partition
	(7)	(8)		
1EX	a	a	→	A
1IN	a	b	→	B
2ND	b	b	→	C

The rightmost column in (9), then, represents a generalization over the paradigmatic person contrasts. To say that Kiowa exemplifies an 'ABC' partition expresses that every local person can be distinguished from every other local person in at least some paradigm. Thus we may conclude from just two paradigms, (7) and (8), that Kiowa has the same local persons that Imonda wears on its pronominal sleeve.

   But superimposing person paradigms doesn't suffice to yield a three-way contrast between local persons in all languages. English, for instance, has an AAB person partition, since 1EX and 1IN are collapsed in every paradigm in which both are effable. Both being effable is important, because it's wrong to conclude from the fact that the pronoun *I* can be exclusive but not inclusive that English has a clusivity contrast. Rather, the meaning of inclusive person is simply incompatible with the meaning of singular pronominal number, which the pronoun in question also bears. So, setting the singular pronouns aside for that reason, English uses the nominative plural pronoun *we* to convey exclusive and inclusive meanings alike, but uses a different form, namely *you*, for second person (aab). Plural agreement in the simple past tense does not contrast for person at all (aaa). So on and so forth – but no matter how many more paradigms of English one considers, those paradigms will converge on an AAB partition. 1IN and 1EX are contrasted nowhere in English pronominal and agreement paradigms. (The meanings may be distinguished periphrastically, of course: *you and us* versus *us, but not you.*)

2.3.2 Zwicky's puzzle

I mentioned in the last section that the typology of partitions is a much more tangible problem for the theorist than the typology of paradigms is. This is because there are some logically possible partitions of person which are unattested (Harbour 2016: 40). The absence of some partitions sets the stage for stronger theories of person, because now there are negative data to derive, data which didn't exist in the world of paradigms where everything is possible. So (in the interest of informing such a theory): which partitions are attested, and which aren't?

   An exhaustive answer to this answer to this question is beyond the scope of the present paper (but see Harbour 2016 and Author 2023 for more exhaustive analyses). Instead, I'll focus on a the subset of the typology that (10) represents. While person partitions with three local persons are common, as are one kind of partition with two local persons (those with a generalized first person), a different kind of partition with two local persons is wholly unattested (Zwicky 1977, Harbour 2016: Ch. 2).

(10)   Partitions over three local persons (not exhaustive)

	Three local persons (common)	Two local persons (common)	Two local persons (unattested)
1EX	A	A	A
1IN	B	A	B
2ND	C	B	B

Purely in light of the meanings that the local person categories seem to have (1), it's surprising that there are so many AAB partitions but no ABB partitions. Under an AAB partition, a language doesn't distinguish individuals that contain the author a from those that contain the author-hearer sum $a{\oplus}h$. That is, (when used referentially) the generalized first person is used to refer to individuals that contain the author, *irrespective* of whether they contain the hearer.

   The unattested ABB partition is the symmetric counterpart of the attested AAB partition: an ABB pattern would be a generalization about a grammar which doesn't distinguish individuals that contain h from those that contain $h{\oplus}a$ ($=a{\oplus}h$). This kind of system would have a generalized *second* person (because the form used for second person meanings is generalized to cover inclusive meanings); this would be used to refer to individuals that

contain the hearer, irrespective of whether they contain the author. Despite its formal resemblance to the commonplace AAB partition, this kind of person system is not attested.

Authors, then, are grammatically privileged over their addressees, in the sense that author containment is more important than hearer containment when inclusive meanings are morpho-syntactically encoded akin to some other local person category (i.e., in languages with two local persons). But why does inclusive always class with exclusive? That is, why does no language grammatically privilege *hearers*? This question was originally posed in Zwicky (1977);[4] I offer an adapted version of it below.

(11)   **Zwicky's (1977) puzzle**:
       Given that ABC and AAB partitions are common, why does no language have an ABB partition?

Note that there is nothing in the ontology that we've been working with thus far which sheds light on this puzzle, since exclusive meanings have the same relationship to inclusive meanings as second person meanings do ($a : a{\oplus}h :: h : a{\oplus}h$).[5] Assuming the ontology itself is sound (for reasons given in Section 2.1), the typology of partitions needs to derive from something else. Person hierarchies (Zwicky 1977) and feature geometries (Harley & Ritter 2002) don't provide any real explanation, as they stipulate the solution outright (Harbour 2016: 190-195).

The central insight of Harbour (2016), in my view, is that an answer to Zwicky's puzzle comes not from the way the person ontology is structured, but rather from the ways that the denotations of person features *interface with* the ontology.

To see why the way that grammars access the ontology matters, consider the implications of the following idea about person features. Recalling that ABC person systems have three local persons – which are semantically defined by the parthood relation that holds between the referent on the one hand, and the author or hearer on the other – we might imagine that there are two universal person features, AUTHOR and HEARER. The first of these (if present) determines that the author is a part of the target referent, while the second (if present) determines that the hearer is. Assuming that feature co-occurrence is commutative and interpreted as something like conjunction, we land the on following picture.

(12)

CATEGORY	REFERENT CONTAINS:	FEATURES:
1EX	*a*, but not *h*	AUTHOR
1IN	both *a* and *h*	AUTHOR, HEARER
2ND	*h*, but not *a*	HEARER

(12) says, for instance, that 1IN is specified for both person features, while 1EX and 2ND are specified only for one. This feature inventory correctly predicts that maximally three local persons can be contrasted, because there are only three ways of valuing a morpho-syntactic expression with at least one person feature.

As Harbour notes, however, what this inventory does *not* offer is a solution to Zwicky's puzzle. To derive AAB partitions, we must adopt the view that one feature specification in the right-hand column of (12) can be conflated with another in some languages –

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[4] Harbour calls the generalized form of the question (namely: which partitions are attested, which aren't, and why?) 'Zwicky's problem' for this reason.

[5] This is precisely why treating inclusives as a 'flavor' of first person is misleading. From a semantic perspective, inclusive meanings relate to exclusive meanings and second-person meanings in exactly the same way, *modulo* alphabetic variance of *a* and *h*.

specifically, we must allow for AUTHOR to be conflated with AUTHOR, HEARER to admit languages like Jarawa and English.

Herein lies the problem. No matter the mechanism by which we achieve that conflation (contextual neutralization, *e.g.*), it's not possible to limit that process, except by stipulation, from allowing HEARER to be conflated with AUTHOR, HEARER – which erroneously derives the unattested ABB partition.

This isn't a problem unique to monovalent (privative) features, nor do the semantics of feature co-occurrence matter in any important way. The problem with the feature inventory in (12) is the way those features' denotations interface with the ontology of person. AUTHOR and HEARER, whose denotations govern the mereological containment of a and h in the referent, put the two discourse participants on the same footing, grammatically speaking: the elements of the ontology (a, h) each correspond to a feature which determines their inclusion in the target referent.

2.3.3   Harbour's solution: no direct access to *h*

The contents of the preceding section motivate a feature inventory that doesn't put the speaker and hearer on grammatical par. This is precisely the kind of inventory that Harbour (2016) argues for in light of Zwicky's puzzle. The key element in his solution is virtuously simple: eschew HEARER. For Harbour, Universal Grammar simply offers no direct way to grammatically encode an addressee *per se*, nor the containment relation it may bear to a referent.

In lieu of HEARER, Harbour uses PARTICIPANT;[6] this feature governs whether both a and h are included in the referential target. His solution retains a correlate of the AUTHOR feature (which, as before, governs author inclusion). Now the features are no longer on par, in the sense that the set of things that PARTICIPANT associates with, namely $\{a, h\}$, is a proper superset of the set of things that AUTHOR does, namely $\{a\}$.

At this juncture the reader will likely wonder how Harbour's AUTHOR and PARTICIPANT actually derive ABC and AAB partitions without deriving ABB. Unfortunately, there isn't space here to delve into the details of his proposal, which involves a lot of technical machinery not relevant to the point at hand.

In broad strokes for the interested reader, however, Harbour's systems works as follows. Personful expressions (local and third-person pronouns, *e.g.*) form a natural class by virtue of containing a person head π. This head denotes a join-complete semi-lattice (essentially: a set closed under the join operation $\vee$, which is for our purposes is equivalent to mereological summation). The elements of this lattice are atomic and plural individuals – participant and non-participant alike – and are the things that can be referred to by a pronoun or other personful expression. The two aforementioned features, AUTHOR and PARTICIPANT, likewise denote join-complete semi-lattices, albeit much smaller ones. AUTHOR denotes the lattice whose sole element is the author, while PARTICIPANT denotes the lattice whose elements are the author a, the hearer h, and their join, which is the plural individual $a \oplus h$.

π is monovalent, but AUTHOR and PARTICIPANT come with binary values $+$ and $-$. Semantically, these values denote two-place operations over lattices that can "add" or "subtract" – not in the arithmetic sense, and sometimes vacuously – elements of the latter two lattices to or from the π lattice, or to or from any lattice derived via prior

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[6] A reviewer points out that a two-feature system with PARTICIPANT and AUTHOR but not HEARER is not in itself original to Harbour: it has antecedents in Kerstens (1993) and Halle (1997). As these authors' reasons for adopting this inventory are not the same as Harbour's (for one thing, they are concerned with paradigmatic syncretisms, not partitions), I won't discuss their proposals here.

operations on the π lattice. Having three basic lattices (π, AUTHOR, and PARTICIPANT) and two ways of putting lattices together (+ and –) yields various different sorts of derived lattices, and the elements of these lattices are, once again, the individuals to which the expressions that contain the lattice- and operation-denoting features and values can refer. [π +AUTHOR] indicates the (vacuous) "addition" of the author to the π lattice, for instance, while [π –PARTICIPANT] is the structured set of all individuals which don't contain a participant, since all the individuals in the PARTICIPANT lattice, as well as any individuals that mereologically contain them, have been "subtracted" out.

In Harbour's system, different person partitions come about because not all languages use ±AUTHOR or ±PARTICIPANT, or they don't use them in the same ways; the cross-linguistic variation is governed by three parameters. One parameter determines whether the ±AUTHOR feature is utilized, the second determines whether ±PARTICIPANT is. If both features are, the third feature governs whether, via the two operations + and –, AUTHOR or PARTICIPANT composes with π first. (Order of composition matters once both features are used due to the fact that one operation, namely –, isn't commutative.)

Again, the mechanics of lattice composition are technical, and don't matter very much for our purposes; suffice it to say that Harbour's solution to Zwicky's asymmetry derives ultimately from the choice of features and the lattices they denote. Not having a ±HEARER feature means that there isn't a way to cook up a derived lattice whose elements are the individuals that contain the hearer – and 'the individuals that contain a hearer' is just a way of describing what the empirically unattested generalized second person is. The only feature that "adds" and "subtracts" hearers is ±PARTICIPANT, but that brings authors along for the ride as well.

The key takeaway is Harbour derives a gap (*viz.*, the unattested ABB) in the typology of person systems with an inventory of features that grammatically encode *a* and *h* not symmetrically, but rather asymmetrically.

(13)   **Harbour's (2016) solution to Zwicky's puzzle:**
        Context authors and hearers are treated asymmetrically in their morpho-syntactic encoding. Something intrinsic to the inventory of person features privileges the encoding of context authors.

Why (13) matters is this: if the grammatical encoding of context authors is relatively direct, it's easy to concoct a pronoun which forms a natural class out of referents that contain the author. If the grammatical encoding of hearers is *less* direct, it's harder to form a natural class out of referents which contain a hearer – which again, is as desired, since generalized second person is unattested.

The proposal I develop in what follows is motivated in part by (13), and in that sense this paper proceeds in the spirit of Harbour (2016). However, I deploy a much more general semantics, one that is (I hope) much more in line with formal analyses of indexicality.

3   Second person contains first

Throughout this section, I will assume that the meanings of linguistic expressions are determined by an interpretation function which is relativized to a context of utterance *c*. The context acts as a record of information about the utterance, one that person indexicals can be semantically valued with respect to (Kaplan 1989). I assume moreover that the interpretation of morphologically or syntactically complex expressions proceeds via Function Application (following Heim & Kratzer 1998: 44 and ultimately Frege 1891).

(14)   **Interpretation**
   a.   The interpretation function is relativized to a context c. Notationally: $[\![\cdot]\!]^c$
   b.   *Function Application*
        If γ is a branching node, $\{\alpha, \beta\}$ is the set of γ's daughters, and $[\![\alpha]\!]^c$ is a function whose domain contains $[\![\beta]\!]^c$, then $[\![\gamma]\!]^c = [\![\alpha]\!]^c([\![\beta]\!]^c)$

The domain of the interpretation function consists of linguistic expressions, for which I will adopt the recursive definition in (15).

(15)   **Linguistic expressions**
   a.   If α is a syntactic feature, then it is a linguistic expression.
   b.   If α and β are linguistic expressions,
        then the phrase $\underset{\alpha \quad \beta}{\frown}$ is a linguistic expression.

In other words, I am assuming that interpretation is compositional at all scales. Features, for my purposes here, are ordinary syntactic objects which Merge to form phrases. There is some precedent for this idea (Malamud 2012, for instance), but most linguistic work has been concerned with larger objects, where one needn't commit themself to an answer to the question of how features semantically compose. The notion that features compose in semantically ordinary ways is, it's worth pointing out, the null hypothesis given what's known about how larger linguistic expressions behave.

   As something of an aside – on the face of it, semantically ordinary feature composition obfuscates the notion of a syntactic head, since a featurally complex head can just be called a phrase, and a featurally simplex head can just be called a feature. Without augmenting (15) by deriving or stipulating the existence of heads, some syntactic problems arise – for instance, how to distinguish head movement from phrasal movement. These problems won't be relevant in the present paper, so I won't dwell on them much, except to say the following.

   On the standard view, a head is notionally a syntactic atom, regardless of how many features it carries. This has one of two consequences, depending on whether, when several features are carried by a single head, those features are understood to be hierarchically structured with respect to one another. If heads have internal structure, something beyond the syntactic component needs to imbue them with it. Harley & Ritter (2002), for instance, who in light of cross-linguistic evidence argue that 'bundles' of φ-features are in fact internally structured, gave this job to the morphological component. By contrast, if heads do *not* have internal structure, a combinatoric semantic operation beyond Function Application is needed to cover the cases when a head carries three or more semantically interpretable features (Function Application is strictly binary). Kratzer (2009: 220-221) goes this route in her analysis of person features.

   I don't know how to derive heads, but the reader who is uncomfortable with stipulating them in light of (14) and (15) may take some solace in the fact that the account presented below avoids both problems; a structure-building operation beyond Merge is not required, and neither is an operation for meaning composition beyond Function Application.

   The rest of this section is organized as follows. I will contextualize my account of pronominal person features (whose *raison d'être*, recall, is to derive the typology of person partitions) by summarizing Elbourne's (2005, 2008) analysis of English demonstratives. The goal there is to introduce a way of thinking about how the different components of meaning that indexical words contain can be put together compositionally, and El-

bourne's template will guide the analysis of local pronouns that I develop in §3.2. In that section, I introduce a conjecture regarding the way utterance contexts are structured formally, and explore its implications on what kind of person features are definable. The resulting inventory of person features predicts a class of pronouns which are predicted to compete pragmatically with one another under certain conditions, and (I argue) they *do* in fact do so, and moreover they do so in a way that derives Zwicky's asymmetry.

3.1 Indices, indexicals, and deferred reference

Local persons and local pronouns belong to the larger class of indexical expressions. I use the term *index* as Nunberg does, to refer to "the contextual element picked out by the linguistic meaning of an indexical expression like *you*, as well as for the thing picked out by a demonstration associated with the use of a word like *that*" (Nunberg 1993: 4). He is careful here to not equate indices with the referents of indexical expressions, the reason being that index and referent are teased apart in cases of *deferred reference*.[7] Nunberg illustrates the distinctness of indices and referents with the following example (*ibid.*: 24).

> ... suppose I point in sequence at two sample plates in my china shop, the first sitting in front of me, the second on a table across the room. I say:
>
> (i)   *These* are over at the warehouse, but *those* I have in stock here.
>
> If I had "really" been pointing at the referents of the terms, it would have made more sense to have reversed *these* and *those*.

In (i), sets of plates are being referred to, but reference is 'deferred' in the sense that it's not those *sets* of plates that are being pointed at, but rather the individual sample plates that serve as the indices (*i.e.*, the entities used to *recover* the referent).

  Note that the proximate/distal contrast in (i) does not track the proximity of the referent, but rather the proximity of the index. Interestingly and by contrast, grammatical number tracks the cardinality of the referent, not that of the index – the words used in (i) weren't 'this' and 'that' despite the sample plates being atoms. This shows that the paradigmatic contrasts between an indexical expression like *those* and the expressions with which it alternates may come in different flavors.

(16)

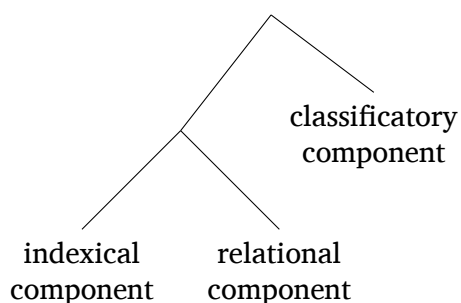|		*referent*	
		SG	PL
index	PROX	this	these
	DIST	that	those

The takeaway is that while some paradigmatic contrasts relay information about the index itself, others relay information about the referent that the index is used to recover. The former kind of contrast has to do with what Nunberg calls the *indexical component* of a demonstrative (or an indexical expression more generally). This component introduces the index to the semantic derivation, and may also introduce features which assert or presuppose certain things about that index – *e.g.*, that the index is distal to the speaker in the case of *that* and *those*. The latter kind of contrast belongs to the *classificatory component*, which deals in the characterization of the referents of (nominal) indexical words, and to which the contrasts in grammatical number in (16) belong.

---

[7] Also known by Quine's (1956) original term, *deferred ostension*.

There is a third component to indexical expressions, namely the *relational component*, which determines how indices and the referents they aid in recovering relate to another. For the china shop example, this relation would be the one a display plate bears to the corresponding sets for sale.

Elbourne (2005, 2008), building in part on Nunberg's work, put forward an idea about how these components are syntactically arranged. That idea is illustrated in (17).

(17)   A template for indexicals, à la Elbourne

classificatory
component

indexical   relational
component   component

The components are arranged such that that the relational component, which Elbourne understands to introduce a function from indices to referents determined contextually, is situated between the two: indices are introduced, are (potentially) modified in certain ways, and then mapped to a referent, at which point the classificatory component can modify that referent. By way of illustration, the demonstrative *those* can be decomposed along the lines of (18), where n is a variable over numerals (numeric indices, in another sense of 'index'), whose values are fixed by a contextually-given assignment function g, and where REL denotes a variable over functions from indices to referents.

(18)   *those*, à la Elbourne

PL

REL

n DIST
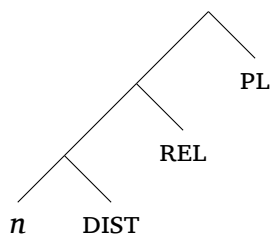
Here the indexical component consists of the smallest phrase containing the numeric index n and the distal feature DIST. We could imagine that the English DIST feature denotes an identity function over entities, one whose output is defined only for entities distal to the speaker.

(19)   a. $[\![\, n \,]\!]^{c,g} = \ g(n)$
        b. $[\![\, \text{DIST} \,]\!]^{c,g} = \ \lambda x_{\mathrm{e}} \, . \, x$, only if x is distal to a
        c. $\left[\!\left[\, \overset{\frown}{n \ \ \text{DIST}} \,\right]\!\right]^{c,g} = \ g(n)$, only if $g(n)$ is distal to a

REL stands in for the relational component, and for the moment can be valued by the reader's favorite pragmatic mechanism. The indexical component [n DIST] and the relational component REL come together to form the phrase [[n DIST] REL], which by Function Application denotes the referent. The plural feature, which constitutes the classificatory component, rounds off the demonstrative by contributing the assertion or presupposition that the referent is a plural individual (again, by the reader's favorite mechanism).

In (18) there is a single instance of a component-internal phrase, namely [n DIST], but other components could contain multiple features in principle. The western Romance languages, for instance, which have two forms of *those* as a function of grammatical gender, show that another feature (*e.g.*, FEM) can join PL in the classificatory component. (My picture in (17) seems to indicate that FEM and PL would have to form a constituent, but this isn't necessary – a feminine feature could Merge with the top node of the graph in (18) to give us the Spanish demonstrative *esas* 'those.FEM', for instance.)

Elbourne's treatment of English demonstratives is notable not only in that it features binary branching and is semantically compositional throughout. It is, in addition, a proof of concept that a single Nunbergian component (indexical, relational, or classificatory) may, in principle, contain multiple features which *themselves* are situated under binary-branching nodes that Function Application can use as fodder. I adopt this approach to morphological decomposition in the next section, which returns to the topic of person.

3.2   Local pronouns from the ground up

The task now is to find a set of features which interact compositionally and which do not over-generate the typology of person contrasts. Some of these will be indexical in nature, and one will be relational; I will not deal with classificatory features (like number features) here, though the analysis I offer extends to number-contrasting pronoun series as well – see Author (2023: Ch. 2). The indexical component will be tackled first.

3.2.1   Second-person indices are derived compositionally

I will claim that the source of Zwicky's asymmetry lies ultimately in the way utterance contexts are structured. In Author (2023), I argue that utterance contexts are best conceived of as author-centric, in the sense that they formally privilege the author as a primitive.

Besides the fact that it derives a solution to Zwicky's puzzle, one of the primary pieces of evidence for this position is the fact that utterance authors have a monopoly on the referents of local person indexicals: though hearers might *misunderstand* what the author was referring to when she uttered *we* or *you*, the value of such expressions is fixed by that author regardless. This is easily illustrated by a scenario where the author addresses a stranger on the street: 'Hey, you!' The addressee may of course not hear the speaker, or simply misunderstand, thinking the author was talking to someone else, but it seems undeniable that the referent of *you* here is solely determined by speaker intentions. Likewise, a speaker's utterance of *we* might be misunderstood by a hearer (and that hearer might then chastise the speaker for being unclear), but at the end of the day the hearer cannot contest what the semantic value of that pronoun actually was. The upshot is that utterance hearers simply have no say in the value of local person indexicals. Informally, then, the reader can think of an utterance context c as a record of the author's mental state and communicative intentions.

There are a variety of ways to formalize this notion of author-centricity; what I do here will rely on the notion of a *centered situation*. Situations are parts of worlds (Barwise & Perry 1981, Kratzer 1989), and they may be centered on an entity just like worlds can be (Lewis 1979). A general definition for centered situations is given in (20), where the characteristic set of [λy. COGNITIVE.AGENT(y)] is co-extensive with the set of entities that hold a *de se* attitude. (*De se* attitudes are relevant to person because attitude holders, *i.e.* entities that can self-ascribe properties, constitute the kinds of things that we communicate with.)

(20)   **Centered situations**
        The tuple $\langle x, s \rangle$ is a centered situation *iff* $x \lesssim s \land$ COGNITIVE.AGENT(x) .

'$\lesssim$' is the relation of parthood that holds between an entity and a situation. Thus, a centered situation is a situation that contains a *de se* attitude holder which is formally privileged with respect to the other entities in that situation.

I define a context of utterance c as a special case of (20): a tuple whose elements are an author a and an utterance situation $s\star$. The situation again stands in a parthood relation to a world, and as shown in (21) I define it as the smallest situation which contains all the participants of the utterance: the author and any hearers.

(21)   **Criteria specific to utterance contexts**
        a.   The utterance author a is the center of an utterance context.
        b. $s\star$ is the smallest situation which contains a and which contains all the cognitive agents with whom a intends to communicate.

a and $s\star$ are termed *coordinates* of the utterance context. Nothing in this paper hinges on whether locations or times constitute independent coordinates, or whether $s\star$ determines them. Crucially, however, in this system contexts do *not* contain a hearer coordinate.

(22)   **The Centered Contexts Hypothesis**
        a.   Utterance contexts are centered situations (20). Their center is the author a; there is no hearer coordinate. The entities in the utterance situation exhaustively consist of a and the cognitive agents with which a intends to communicate (21).
        b. $c = \langle a, s\star \rangle$
        c. $c \neq \langle a, h, s\star \rangle$

I take (22) to be the case, and will show in the following pages how it derives a new kind of solution to Zwicky's puzzle, one which makes a broader set of predictions than the solution presented in Harbour (2016).

The main effect of (22) is that while the author index can be introduced into a semantic derivation by a single feature (AUTH below), the addressee index cannot be – at the very least, not in a qualitatively similar fashion. The *a priori* sensible feature HEARER as defined in (23b), for instance, can't be used to pick out an addressee atom as soon as (22) is adopted, since its denotation, h, is a free variable not valued by any context.

(23)   a.   AUTH is a **possible** feature.
             $⟦$ AUTH $⟧^c =$ $⟦$ AUTH $⟧^{\langle a, s\star \rangle} =$ a
        b.   HEARER below is a **defunct** feature; h cannot be valued by the context.
             $⟦$ HEARER $⟧^c =$ h

Empirically, of course, second person has a very real morpho-syntactic and semantic life, so it must be resurrected in a way consistent with (22). In Author (2023), picking up on an idea from Rebuschi (1994), Charnavel (2015), *i.a.* that first and second person can be defined relationally with respect to one another, I argue that the best way to conceive of utterance hearers is as potential, non-default centers of $s\star$ (a being the default per (21)). Being a hearer is not a primitive in this system: being a hearer amounts to being a cognitive agent that a stands in a particular kind of relation to the author. That relation, to be formalized in a moment, is partially determined by the utterance situation $s\star$, which

is in turn defined by the author's intentions. (This gives a handle on why hearers cannot contest what a speaker's utterance of *you* referred to.)

(24), which defines an irreflexive *distinct-centers* relation, formalizes what it means for two centered situations to have distinct centers.

(24)   **The *distinct-centers* relation**
         For all *x, y,* and *s, distinct-centers*($\langle x,s \rangle, \langle y,s \rangle$) holds whenever $\langle x,s \rangle$ and $\langle y,s \rangle$ are well-defined centered situations and $\langle x,s \rangle \neq \langle y,s \rangle$.

$\langle x,s \rangle$ and $\langle y,s \rangle$ being well-defined hinges only on *x* and *y* being valid centers (*i.e.*, they must be atoms with *de se* attitudes and they must both a part of *s*). The two tuples being distinct hinges only on the entities *x* and *y* being distinct, since the situation variables they contain are identified.

This relation checks whether two centered situations have the same situation variable but distinct centers, and it plays a crucial role in the denotation of the ADDR feature given below in (25). This feature uses *distinct-centers* to collect the set of distinct centers *y* within the utterance situation $s\star$, and subsequently applies a choice function f to that set, outputting one of them.

(25)   ⟦ ADDR ⟧$^c = \quad \lambda x_e \, . \, f(\{y_e : distinct\text{-}centers(\langle x,s\star \rangle, \langle y,s\star \rangle)\})$

I suggest that the indexical component of a second-person pronoun comes about compositionally when AUTH and ADDR constitute a phrase, as in (26b). This a non-simplex indexical component, just as the indexical component of *those* is.

(26)   a.   **The (generalized and exclusive) first person index**
               ⟦ AUTH ⟧$^c = \quad a$
         b.   **The second-person index**

$$
\left\llbracket\ \overset{\frown}{\text{ADDR} \quad \text{AUTH}}\ \right\rrbracket^c = \qquad\qquad\qquad \text{by Function Application}
$$

⟦ ADDR ⟧^{c}(⟦ AUTH ⟧^{c}) = $\qquad\qquad\qquad$ by ((23a)), ((25))

$[\lambda x_e \, . \, f(\{y_e : distinct\text{-}centers(\langle x,s\star \rangle, \langle y,s\star \rangle)\})](a) = \qquad \beta\text{-reduction}$

$f(\{y_e : distinct\text{-}centers(\langle a,s\star \rangle, \langle y,s\star \rangle)\})$

When composed with AUTH in this way, we see that ADDR serves to pick out an atomic addressee. Note that the second-person indexical component is strictly more complex than the first-person indexical component; this will be a key element of my solution to Zwicky's asymmetry.

Which addressee the phrase [ADDR AUTH] denotes depends only on the value of the choice function variable in (26b); that choice function applies to a set of atoms (by virtue of the fact that a plurality cannot hold a *de se* attitude). This means at an utterance context with multiple addressees, exactly one addressee atom will constitute the second-person index. The choice-functional indeterminacy of the denotation of [ADDR AUTH] – indeterminacy in the sense that the atomic addressee index is determined by a choice function – is a feature of this system, not a bug. If an index that consisted of a *particular* atomic addressee were possible, there should be a way of distinguishing between that particular addressee and a different one. But as we saw in §2.1.1, a system that can distinguish between addressee atoms overgenerates the typology of person contrasts.

(26b) constructs a second-person index in the compositional morphosyntax, then, rather than directly introducing an addressee from the context into the semantic derivation by way of a single feature like HEARER. Author indices, however, are introduced more directly by AUTH (26a).

A remark is warranted about the relation between Harbour's account and mine. Recall that Harbour's inventory consists of AUTHOR and PARTICIPANT, and that these associate with a and $a{\oplus}h$ respectively. Nothing associates with only h, which rules out ABB partitions (though I only gave a cursory explanation why, since his feature semantics requires a lot of background). But the upshot is that Harbour codifies Zwicky's asymmetry in a hypothesis about features that UG makes available and their denotations. By contrast, I am offering a hypothesis about how interpretation proceeds, not about the kinds of morphemes UG does and doesn't make available. That is, the feature inventory *isn't* the hypothesis here, rather it *follows* from the hypothesis. Consequently, my account has an answer to the question of why there isn't a HEARER feature (namely: one doesn't follow naturally from the structure of utterance contexts that I am assuming).

My solution will, however, resemble Harbour's in a deep way: contexts, as I envision them, are a tuple $\langle a, s\star \rangle$. Note that the sum of entities in $s\star$ is just the sum of participants, so the relationship between a and $s\star$ on my account is very similar to the relationship between a and $a{\oplus}h$ (or more precisely, the author and participant semi-lattices) on Harbour's. There's a resemblance here because Harbour's insight into Zwicky's puzzle (13) – that there *exists* an author-hearer grammaticalization asymmetry – is, I believe, on the right track.

Because I am situating the author-hearer asymmetry in the interpretation algorithm, though, new predictions follow from this account; particularly strong ones are made about indexical shift. Because there will be only one non-derived person index in this system – namely the author index, from which all local persons will be built – any operator that manipulates the value of that person index will necessarily affect the interpretation of all personful expressions that are evaluated with respect to it. So for instance it's predicted that, in the complement of an attitude verb, clause-mate first- and second-person pronouns cannot shift independently of one another.[8]

A final difference between the proposals, and an advantage of the current one, is that there is independent need for centered situations; these (in the guise of 'doxastic alternatives') have productively been put to use in analyzing the semantics of attitude verbs, for example. Perhaps not coincidentally, it is in the precisely in scope of attitude verbs that person indexical shift occurs. The structure of Harbour's solution, by contrast, is tailored only to the purpose of providing an answer to Zwicky's puzzle (or rather its generalized version; see fn. 2).

Now, both expressions in (26) denote individuals which are the indices of the pronominal words that contain them, so I will call each of the maximal *constituents* therein an "index" as well (a sloppy but standard terminological convenience). Note that (26b) actually contains two metalanguage indices: the one that AUTH denotes, and the one that the phrase [ADDR AUTH] does.

Strictly type-wise, ⟦ ADDR ⟧^{c} is free to compose with any expression of type e (*i.e.*, no selectional requirements are stipulated). However, the first conjunct in its denotation requires that its argument be a part of the utterance situation. This means that expressions like ⟦ ADDR ⟧^{c}(⟦ *Andreas* ⟧^{c}) will be undefined even when ⟦ *Andreas* ⟧^{c} is of type e if whoever *Andreas* refers to is not a part of $s\star$. Thus, relativizing the relation of addresseehood to the utterance situation mitigates a kind overgeneration resulting from ADDR's sister being anything other than AUTH.

---

[8] It has been argued, *e.g.* in Anand (2006), Sundaresan (2012), and Deal (2017, 2020), that a few languages – Malayalam, Tamil and Slave – allow first person to shift in the complement of attitude verbs without second person doing so. None of these languages uncontroversially demonstrates this, however (Keren Rice [p.c.] for Slave, Spadine [2020: 88-92] for Malayam and Tamil, and see Author [2023: Ch. 4] for more on this point).

As mentioned, I will for the moment refrain from discussing inclusive indices. Instead, I'll introduce a feature that constitutes the relational component of local pronouns. Though the inventory we then will have at our disposal is partial (in the sense I won't discuss classificatory features like number or gender, and in the sense that we have yet to consider inclusive pronouns), taken in tandem with the indices in (26) and an independent fact about definite descriptions, it is sufficient to derive the commonness of the AAB partition and the absence of ABB partitions.

3.2.2   The relational component of local pronouns

Recall from Section 2.2.1 that the referents of personal pronouns, free from the confounding influence of grammatical number, relate to their indices via mereological parthood. Recall also from Section 2.2.2 that the referents of local pronouns only ever consist of animate (which we can now take to mean 'cognitively agentive') atoms. To capture these facts, I will for the purposes of this paper simply stipulate that the relational feature REL takes on an allosemic denotation when its syntactic sister is a person index, but see Author (2023: Ch 2) for more discussion on this point. The allosemy is stipulated out of empirical need, to capture the facts about number-indifference and animacy that we saw local pronouns reveal.

The denotation for REL I adopt is given in (27), where '$\leq$' again denotes mereological parthood and f again is a variable over choice functions. That denotation also recruits, a more generalized version of the property of cognitive agency (28), which, unlike the predicate $[\lambda y.\ \text{COGNITIVE.AGENT}(y)]$ introduced earlier, can hold of pluralities.

(27) $[\![\ \text{REL}\ ]\!]^c = \quad \lambda x_e\ .\ f(\ \{y_e : [\ P_{CA}(y)\ ] \wedge [\ x \leq y\ ]\}\ )$

(28) $P_{CA} = \quad \lambda x_e\ .\ \forall y_e : [\text{ATOM}(y) \wedge y \leq x] \rightarrow \text{COGNITIVE.AGENT}(y)$

When fed a person index, then, (27) will serve to map that index to some (choice-functionally-determined) entity (i) whose atoms are each a cognitive agent (*i.e.*, a *de se* attitude holder), and (ii) that the index is a reflexive mereological part of. So in broad strokes, REL contributes the parts of the meaning of local pronouns that were discussed in Section 2, and that are not already contributed by the meanings of the indices.

3.2.3   Pronouns pragmatically compete

Recall that Jarawa has the same local persons as English (second and generalized first). This is the common AAB pattern. Recall also that the crux of Zwicky's puzzle is why the ABB pattern is never found, where inclusive meanings are communicated with the same pronoun as second-person meanings are.
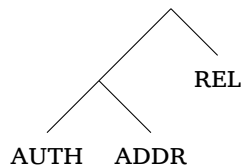
(29)   *Jarawa* (Ongan; Kumar 2012)

1EX	mi
1IN	
2ND	ŋi

Suppose that *mi* and *ŋi* are just the ways that the phrases in (30) and (31), respectively, are pronounced by Jarawa speakers. These phrases have the meanings given in (32) and (33).

(30)   (31)

      AUTH   REL   REL

                                    AUTH   ADDR

(32) $[\![(30)]\!]^c = f(\ \{y_e : [\ P_{CA}(y)\ ] \wedge [\ a \leq y\ ]\}\ )$

(33) $[\![(31)]\!]^c = f(\ \{y_e : [\ [\ P_{CA}(y)\ ] \wedge$
$[\ f'(\{z_e : \textit{distinct-centers}(\langle a,s\star\rangle,\ \langle z,s\star\rangle)\}) \leq y\ ]\ ]\ \}\ )$

The second denotation looks rather complicated, but it's identical to the first save that the term a, a variable over authors, has been replaced with $f'(\{z_e : \textit{distinct-centers}(\langle a,s\star\rangle, \langle z,s\star\rangle)\})$, which just denotes some atomic addressee.

(32) picks out a potentially plural individual whose atoms are cognitive agents and to which the context author stands in the reflexive parthood relation, while (33) picks out a potentially plural individual whose atoms are cognitive agents and to which an addressee stands in the parthood relation. These, I think, are the desired meanings for number-neutral first- and second-person pronouns: modulo cognitive agency, the former refers entities that contain the author; the latter refers to entities that contain an addressee.

A crucial point about (32) and (33) is that in terms of their literal (*i.e.*, non-enriched) meanings, the set of individuals they can refer to are not disjoint for any value of c. If the intended referent contains the author but no addressee, then only (32) can be used; if the referent contains an addressee but not the author, only (33) can be. But both are truth-conditionally valid ways to refer to individuals that contain an author-addressee sum. Because of this, I will say that there is an overlap in the *reference potential* of (32) and (33); the reference potential of these pronouns overlaps precisely where inclusive meanings are concerned.

(32), however, derives from a less complex syntactic phrase than (33) does. As it happens, there is independent reason to think that the more syntactically parsimonious of two competing definite descriptions is preferred when both have the same value. I illustrate this with (34), which is from Marty (2017: 157), and with (35). Each (a) example is judged to be less acceptable than its (b) counterpart.

(34)   Context: *It is presupposed that the person named 'Mary' married her childhood sweetheart. The speaker wants to express the thought that she is about to leave.*

    a.   *The wife of Mary's childhood sweetheart is about to leave.

    b.   Mary is about to leave.

(35)   Context: *Scarecrow and Dorothy are sitting with Dorothy's only dog, whose coat happens to be brown. Scarecrow wants to tell Dorothy that the dog is well-behaved. He says:*

    a.   *Your brown dog is so well-behaved!

    b.   Your dog is so well-behaved!

The wife of Mary's childhood sweetheart in (34a) can't refer to Mary, even though the context provided biases us toward this interpretation. Likewise, relative to the context provided, *your brown dog* is not a good way of referring to Dorothy's only dog if *brown* is being interpreted intersectively.

To be clear: there are ways in which the badness of the (a) examples can be overcome. (35a), for instance, stripped of the context provided, could involve felicitous reference to

Dorothy's dog in two different ways. For one, if Dorothy were to have a black dog around in addition to the brown one, then *brown* (again, interpreted intersectively) would play a crucial role in disambiguating which dog is being talked about. Another way that (35a) could be felicitous is if *brown* is contributing some (non-intersective) pragmatic content having to do with a speaker attitude (see Schlenker 2005 for extensive discussion of these kinds of cases). The sentence might convey Scarecrow's surprise that dogs with brown coats can be well-behaved, for instance. (A reviewer suggests also the following sentence, which brings out a speaker attitude beautifully: *That brown dog of yours is so lovely!* It's easy to see how the speaker might believe the brownness of the dog is precisely what makes it lovely.) I want to set these two ways of ameliorating the badness of (35a) aside for the moment, but I'll return to them below. The point is that, relative to the contexts provided, there's something wrong the (a) examples.

An intuition about the deviance of the (a) examples is that the underlined expressions therein are somehow too roundabout a way of referring to the individuals that the underlined expressions in the (b) examples successfully do. The (a) examples do not fail because their truth-conditional meaning prevents them from picking out the referent, though. Rather, they seem to fail because there are more parsimonious alternatives available, namely the (b) examples. With Schlenker (2005), Katzir (2007), Marty (2017), and others, I'll cash out the relevant notion of parsimony syntactically, specifically with (36).

(36) **Minimize definite descriptions!**
      Let α and β be any syntactic constituents. β is a deviant way of referring to what α refers to at c if all three of the following hold:
      a. α and β can both be spelled out morpho-phonologically, and the morpho-phonological reflexes of these expressions are non-identical
      b. α can be derived from β by a finite number of deletions within β of referentially relevant expressions
      c. The set of possible referents for $[\![\beta]\!]^c$ is not a proper subset of the set of possible referents for $[\![\alpha]\!]^c$ when both are well-defined

If all of these conditions hold, I'll say that α and β are competitors, and that α is the parsimonious alternative. I define a 'referentially relevant expression' negatively, as anything that does not serve to convey speaker attitudes of the sort discussed above.

For the purposes of illustrating how (36) works, consider again the contrast between (35a) and (35b). The phrase spelled out as *your brown dog* is deemed deviant because all three conditions are met. What satisfies (a) is that the morpho-phonological strings *your brown dog* and *your dog* are distinct. (b) is satisfied because the phrase spelled out as *your dog* can be derived from the one spelled out as *your brown dog* by deleting the Adjective node, and moreover, relative to the context given, *brown* is a referentially relevant expression. (It's referentially relevant because, as per the provided context, Scarecrow only intends to communicate that the dog is well-behaved; he does *not* wish to convey surprise at brown dogs being well-behaved.) Condition (c) is satisfied because the set of possible referents for the latter phrase is not a proper subset of the set of possible referents for the former: there is only one dog that's Dorothy's. Both *your dog* and *your brown dog* can refer to only that dog, in other words, and there is no proper subset relation between the sets of referents the two competitors pick out.

Put more succinctly: *your brown dog* brings with it additional syntactic material (and, incidentally, additional morpho-phonological material) – but that material, which is referentially *relevant*, doesn't actually *do* anything to restrict the range of referents that the expression might pick out. *Brown* needs to be jettisoned for that reason.

Let's return to the cases where the sentence in (35a) becomes felicitous. The sentence is totally well-formed if Dorothy has two dogs and only one is brown. In such an event it *is* the case that the referent set for the phrase pronounced as *your brown dog* is a proper sub-set of the referent set for phrase pronounced as *your dog* (assuming the latter is defined), the two phrases are not competitors, and the speaker is free to use the more syntactically complex expression. (Even if *your dog* is not well-defined – perhaps due a uniqueness presupposition – then it can't be a competitor, and *your brown dog* is predicted to be felicitous anyway.)

(35a) is also predicted to be felicitous by (36) if Scarecrow intends to convey his surprise that brown dogs can be well-behaved. In this case, *your dog* can't be derived from *your brown dog* by deleting referentially relevant nodes, (as *brown* is not referentially relevant here), the two expressions are not competitors, and the speaker is free to use the more complex one.

Let's return to pronouns. Imagine that you are a Jarawa speaker, and that you want to refer to an individual that contains both the author and hearer. You don't have an inclusive pronoun, but in terms of their literal interpretations, either (30) or (31) can do the trick. (Recall that these pronouns overlap in reference potential exactly in the space of inclusive meanings.)

Per (36), the second person pronoun *ŋi* (31) is deemed deviant. Its pronunciation and that of *mi* (30) are distinct, so condition (a) is met. Moreover, *mi* can be derived from *ŋi* by the deletion of a single node, namely ADDR (which I assume is referentially relevant – see below). Thus condition (b) is met. Finally, the set of possible referents for *mi* and *ŋi* are not in a proper subset relation at the context (as *mi* can't refer to an atomic hearer and *ŋi* can't refer to an atomic author), which satisfies condition (c). *mi* and *ŋi* are thus competitors when it comes to communicating inclusive meanings, and *mi* is the parsimonious one.

We have just derived the Jarawa person partition, and in fact we've derived Zwicky's puzzle more generally. The first- and second-person indices (26a)-(26b) naturally follow from the Centered Contexts Hypothesis. The first- and second-person pronouns (*e.g.,* Jarawa *mi* and *ŋi*) that are built from these indices (and from REL) can *both* refer to inclusive referents in terms of their truth-conditional content; and thus (in principle!) *either* could be generalized to cover inclusive meanings. (36) pits the two pronouns against one another in the space of inclusive meanings, however, and the parsimonious alternative – the first-person pronoun – wins out.

Before moving on to inclusive pronouns, two issues merit discussion. The first issue is: can ADDR ever be used in a referentially irrelevant way? We've seen that the adjective *brown* can – that when it conveys a particular kind of speaker attitude about brownness or brown dogs, one is free to use a syntactically complex expression like *your brown dog* even when there's only one dog around. If this analysis is on the right track, then we should expect to find some sort of pragmatic content that would allow plural *you* (and Jarawa *ŋi*) to take on an inclusive meaning. I don't know of any clear cases of this happening, though generic uses of second-person pronouns might be an instance of it. My utterance of *You shouldn't eat dirt* (using generic *you*) implies that I, the speaker, shouldn't eat dirt just as much as it implies that you, my addressee, shouldn't do so. That in itself looks a bit like an inclusive meaning being communicated by a second-person pronoun. Of course, generic *you* also ranges over cognitively agentive individuals that aren't in the utterance situation at all, so things are a bit murky here, and I leave this as an issue for further research.

The second thing worth discussing has to do with the relative strength of the 'deviance' effect that (36) brings about: (35a) and (34a) seem much *less* deviant than using a second-person pronoun for an inclusive meaning. While (35a) is certainly an odd thing to say, the referent of the noun phrase is still recoverable. But saying *You like each other* to mean what *You and I like each other* means seems downright impossible. I want to suggest a tentative explanation for this difference, though it's unclear how well it generalizes to other cases. In (35a), there's only one individual that the definite description could possibly refer to: Dorothy's only dog. It's plausible, then, that *your brown dog* is simply accommodated in light of there being no other possible interpretation for this expression. But (at least for number-neutral pronouns like *ŋi* and *you*) there are always two truth-conditionally licit referents at any context with an author and a hearer: the hearer, and the author-hearer sum. So the strength of the effect may have something to do with this indeterminacy that the number-neutrality of person brings along, though this issue also warrants further investigation.

3.2.4   Inclusive indices and inclusive pronouns

Let's turn to the question of what the indexical component of an inclusive pronoun consists of. One idea, found in Kratzer (2009) and elsewhere, is that inclusive indices are simply sums formed from the author and hearer indices. This possibility is theoretically parsimonious, since we already have the means to create author and hearer indices individually. The only other thing that's needed is a feature whose denotation sums two entities. I'll call this feature SUM; its denotation is given in (37).

(37) $[\![\ \text{SUM}\ ]\!]^c = \quad \lambda x_e \, . \, \lambda y_e \, . \, x \oplus y$

SUM may not be an indexical person feature specifically; some analyses of conjunction recruit a semantically identical object. The graph below uses this feature to create an inclusive index.

(38)

```
                         AUTH
                  SUM
          AUTH   ADDR
```
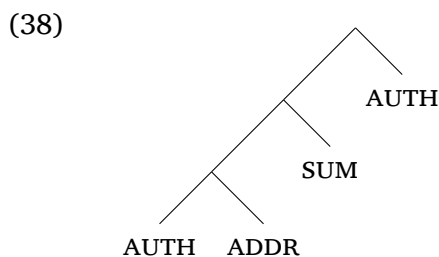
(39) $[\![(38)]\!]^c = \quad [\ f(\{y_e : \textit{distinct-centers}(\langle a, s\star \rangle, \langle y, s\star \rangle)\}) \ ] \quad \oplus \quad a$

Beyond theoretical parsimony, there is suggestive morphological evidence for the conception of inclusive indices as composite: the inclusive pronoun in some languages is transparently composed of the exclusive and second-person forms. Tok Pisin, for example, has *yumi-* for 1IN, *yu-* for 2ND, and *mi-* for 1EX (Foley 1986).

Now, what's notable about the index in (39) is that it characterizes sums which in addition to the author *necessarily* contain an addressee. This matters a great deal, because the set of referents in the co-domain of the denotation of REL is now strictly smaller than it would've been if the indexical component consisted of either AUTH or [ADDR AUTH]. When fed (38), REL returns only those referents that contain the author *and* some addressee.

Inclusive pronouns thus have a strictly stronger meaning (in terms of reference potential) than generalized/exclusive first-person pronouns do. In other words, one form is associated with a meaning that wholly subsumes that of the other, though as they're actually used by speakers the forms are associated with usually disjoint interpretations. Stating this in terms independent of meaning, we observe that one form has *general* applicability while the other is more *specific*. As far back as Pāṇini, the following sort of relation between the general and the specific has been observed: in contexts where both the specific and general forms should be applicable, by some mechanism the specific one appears to *block* the general one, such that the specific form must be used in that context, not the general one. The corollary is that the general form is used only when the specific one doesn't apply.

I capture this generalization (or at least, the part of it that's relevant here) with (40).[9]

(40) **Be Specific!**
      Don't use a definite description α if there's a grammatical alternative β such that the set of potential referents given by $[\![\, \beta \,]\!]^c$ is a proper subset of the potential referents given by $[\![\, \alpha \,]\!]^c$

In AAB languages like Jarawa, *Be Specific!* won't ever adjudicate between the second-person pronoun and the generalized first-person pronoun. This is because at any at any context that includes at least one addressee, neither of the set of referents these pronouns determine is a subset of the other. (Only the first-person pronoun can be used to refer to the atomic author, and only the second-person pronoun can be used to refer to an atomic addressee.) But in languages like Imonda that *do* have an inclusive form, *Be Strong!* will force that pronoun to be used for inclusive meanings, even though the (exclusive) first-person pronoun and the second-person pronoun would be valid ways of picking out such referents in terms of their literal meanings.

The interaction between *Minimize Definite Descriptions!* and *Be Specific!* is graphically represented in (41). The three nodes are identified with three kinds of pronoun: the bottom left node with (30), the bottom right with (31), and the top node with the inclusive pronoun, whose indexical component looks like (38). The arrows point to the winners of the pairwise competitions between two pronouns which can, in terms of their truth-conditional meanings, refer to the same referent.

(41) **Competitions between pronominal definite descriptions**

---
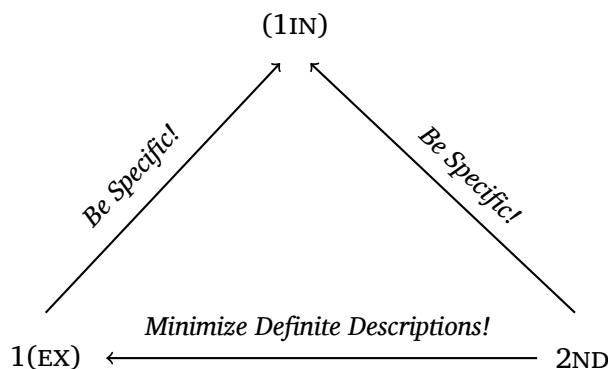
[9] A different version of this blocking principle, under the guise of 'Lexical Complementarity', also plays a crucial role in Harbour (2016) in determining pronominal reference.

1IN is in parentheses because not all languages make use of it, while EX is in parentheses because this kind of pronoun only gets restricted (by *Be Specific!*) to exclusive meanings when there's an inclusive pronoun in the same language.

I've now shown that three features (AUTH, ADDR, and SUM) are sufficient to build the indexical component of each of the three kinds of local pronouns. Depending on whether SUM is recruited, from these one can concoct either a pronominal system like that of Jarawa (generalized first vs. second) or a system like Imonda's (exclusive first vs. inclusive vs. second, where exclusive first is syntactically identical to Jawara's generalized first). Under either kind of person partition, pragmatic constraints partially determine which kinds of syntactic phrases can be used to refer to which individuals.

This analysis moreover predicts there is no way to get ABB partitions. The only local person indices are ⟦AUTH⟧, ⟦⟦ADDR AUTH⟧⟧, and their sum, and the pronouns these indices partially constitute necessarily compete along the lines of (41).

3.2.5 Alternative feature inventories?

Given the existence of paradigms like that of Tok Pisin, it would be unappealing to posit that the syntactic makeup of inclusive pronouns could just be a single feature. To get the meaning of inclusive pronouns right, that feature – let's call it INCL – would have to have the same denotation as (39), namely (42):

(42)   ⟦ INCL ⟧^{c} =   [$f(\{y_e : \textit{distinct-centers}(\langle a, s\star\rangle, \langle y, s\star\rangle)\})$] $\oplus$ a

Not only would this feature make Tok Pisin *yumi-* morpho-phonologically resemble the concatenation of the exclusive and second-person forms by total accident, it would be anti-decompositional in the sense that the components of meaning which are already present in the theory would not be utilized to construct the more complex meanings.

Incidentally, the same reasoning applies to second person. As a reviewer rightly points out, it's not impossible to define a HEARER feature in a way that's consistent with the Centered Contexts Hypothesis, of course. The following denotation, for instance, is certainly well-defined under the current assumptions about utterance contexts:

(43)   ⟦ HEARER ⟧^{c} = $f(\{y_e : \textit{distinct-centers}(\langle a, s\star\rangle, \langle y, s\star\rangle)\})$

This feature just directly picks out a participant in the utterance situation, and it does so without using the problematic unvalued h variable that was present in (23b). Picking out a participant atom is exactly what (26b) does with two features – and in fact the denotations of (26b) and (43) are identical. So HEARER's denotation is, in principle, a possible one under current assumptions, but it goes against the decompositional spirit in that the ontologically more accessible variable a is not introduced by its own feature, despite the fact that that sort of thing already happens with the index of the generalized/exclusive pronoun.

4   Conclusion

In this paper I have aimed to put us in a position where an answer to Zwicky's (1977) puzzle (why ABC and AAB, but never *ABB?) follows from an particular conception of the formal content of utterance contexts. I envisioned (*pace* Harbour) that the ultimate source of the AAB/*ABB asymmetry lies not in the inventory of features that are assumed to be available, but in the assumed structure of utterance contexts, which in turn *determine* the kinds of features that are definable; in particular, the lack of a hearer coordinate

makes deriving the second person index compositionally a more natural move. Because the feature inventory flows from how contexts are structured, predictions about more semantically-oriented phenomena (like indexical shift) follow concomitantly.

I built second person from two features, one denoting the author index and the other a relation that maps authors to their addressees. Second-person pronouns are thus more syntactically complex than generalized/exclusive first-person pronouns, which correctly predicts – in light of an independently motivated condition on definite descriptions – that the former cannot refer to inclusive referents in the way that the latter can. The use of specialized inclusive pronouns remains possible, despite these having greatest syntactic complexity, due to the referential specificity they bring along.

Abbreviations

DIST = distal, EX = exclusive, IN = inclusive, NSG = non-singular, PROX = proximal, SG = singular, PL = plural

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