

About ‘Us’: Clusivity □ exh¹

Jonathan David BOBALJIK (orcid: 0000-0002-7897-1857) — *Linguistics, Harvard University*
Uli SAUERLAND (orcid: 0000-0003-2175-535X) — *Leibniz-Centre General Linguistics, Berlin*

Abstract. This paper argues that two generalizations about person pronouns and agreement point towards a semantic account where both exhaustification and cumulative coordination can apply word-internally. Both generalizations involve reference to pluralities that include both the author and the addressee for which many languages use an inclusive first person morph distinct from exclusive first person and second person. The first generalization (originally due to Zwicky 1977, *CLS Proceedings*) holds that in terms of person categories, in languages that lack an inclusive/exclusive contrast the inclusive neutralizes with the first person and never the second person, despite overlapping meaning with both. The second generalization, which we argue is exemplified by Mandarin and Daur, is that in languages which mark clusivity only in some subsystems, but not others, then not only will the inclusive meaning be expressed as a first (not second) person, but where there are common forms between the (sub)systems, then it will be the exclusive, not the inclusive that expresses the general first person in environments that lack a clusivity contrast. Our account assumes only the two person features AUTHOR and PARTICIPANT, but uses exhaustivization instead of feature negation or Maximize Presupposition and assumes that feature conjunction can be cumulative coordination. By analyzing the first person inclusive as AUTHOR cumulatively conjoined with exhaustivized PARTICIPANT, we derive the two generalizations noted.

Keywords: Person, clusivity, exhaustification, cumulativity, pronouns, agreement, typology

1. Introduction

It is well known that roughly a third of the world’s languages make a distinction in clusivity in person marking (pronouns and/or agreement). The semantic category expressed by English *we* in such languages is divided into two: an *inclusive* first person, which includes the author and the addressee of the speech act (and possibly others), and an *exclusive* first person, which includes the author and others, but does not include the addressee. The plural pronouns of Evenki (ISO 639-3: evn, Tungusic, Nedjalkov 1997: 200-201) presented in (1) illustrate this. Next to Evenki, a language like English may be said to have a ‘general *we*’ category: a group that includes the AUTHOR but is neutral as to whether the ADDRESSEE is or is not included.

¹The authors are joint first authors—names are listed alphabetically. For feedback, we would like to thank Nina Haslinger, Mora Maldonado, Viola Schmitt, audiences at *Sinn und Bedeutung 27* at Charles University Prague and at Humboldt University, our class participants at Harvard University, and anonymous reviewers at various stages of this project. This project has received funding from the European Research Council (ERC) under the European Union’s Horizon 2020 research and innovation programme (grant agreement No. 856421).

(1)

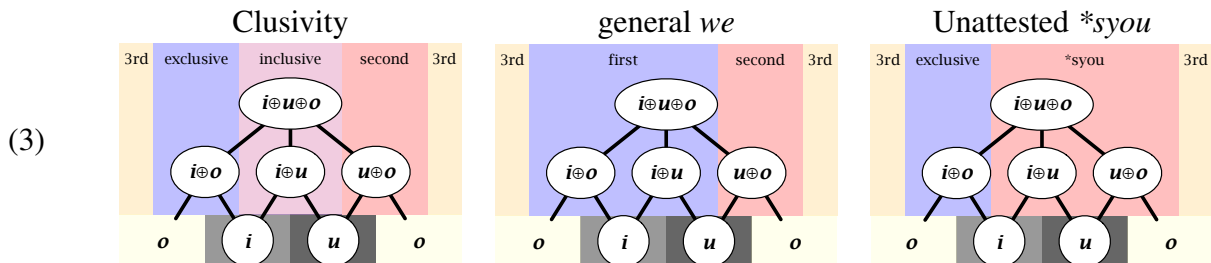
Referents	a. Clusivity Evenki	b. General <i>we</i> English	c. * <i>syou</i> * <i>n/a</i> *
<i>AUTH</i> (not <i>ADDR</i>)	bu	we	* <i>swe</i>
<i>AUTH</i> and <i>ADDR</i>	mit	we	* <i>syou</i>
<i>ADDR</i> (not <i>AUTH</i>)	su	you	* <i>syou</i>
neither	nungartyn	they	they

The final column (1c) represents a robust typological generalization from Zwicky (1977):

- (2) Languages without an inclusive/exclusive contrast treat inclusive meaning as 1st person not 2nd person.

Even though the inclusive group contains, by definition, both the *AUTHOR* and *ADDRESSEE*, when there is no dedicated inclusive category, the inclusive meaning always neutralizes with the *AUTHOR*-group and not with the *ADDRESSEE*-group.² Put differently, in a language with no clusivity contrast, the first person (non-singular) may or may not include the *ADDRESSEE*, but the second person never includes the *AUTHOR*.

The same point can be represented schematically as in (3)—the space of possible person meanings is universal (here represented as a lattice over the atoms *i* = *AUTHOR*, *u* = *ADDRESSEE*, *o* = *OTHER*), but the linguistic categorization of these meanings (represented by colours) varies:



Alongside this cross-linguistic generalization are patterns in individual languages in which clusivity contrasts occur only in some grammatical subsystems. Mandarin provides a particularly clear example. In Mandarin, there are three plural pronouns which are derived from the corresponding singulars with the suffix *-men*. In some varieties, there is a fourth pronoun, the inclusive *zánmen* (Ross and Ma 2006: 25).

²Various qualifications could be made at this point. Zwicky (1977); McGinnis (2005); Harbour (2016) stress that the generalization in (2) holds over the system of contrastive person **categories** in a language as a whole, not over every individual **paradigm**. The Algonquian prefixes are the most well-known example of morphological paradigms with a *syou*-like element, but the suffixes show the general *we* pattern. That is, the languages as a whole draw the four-way distinction with clusivity, but not every paradigm marks all the contrasts. By contrast, some two-thirds of the world’s languages have, like English, no morphological clusivity contrast in any paradigm, and have absolute neutralization of the inclusive and exclusive categories. Putative examples of absolute neutralization of inclusive and addressee (as in (1c)) are extremely rare, though not totally unattested; see McGinnis (2005); Harbour (2016) for discussion.

About ‘Us’: Clusivity □ exh

(4) “Optional” clusivity (Mandarin PL pronouns)

	SUBJ only	elsewhere
AUTH (not ADDR)	wǒmen	wǒmen
AUTH and ADDR	(% zánmen)	wǒmen
ADDR (not AUTH)	nǐmen	nǐmen
NEITHER	tāmen	tāmen

As Ross and Ma describe it, *zánmen* receives only an inclusive interpretation, and moreover is used only as a subject, never as an object, even though Mandarin has no case marking or other formal distinction between subject and non-subject. When standing in contrast to *zánmen*, *wǒmen* has an exclusive interpretation. But otherwise, *wǒmen* is ambiguous or vague between an inclusive and exclusive sense, exactly like English general *we*. Both typological patterns are thus evidenced in the same language.

Examples similar to Mandarin may also be drawn from languages with clusivity distinctions in one subsystem (e.g., pronouns) but not in another (e.g., agreement). Siewierska and Bakker (2005: 162) provide examples from Daur (ISO 693-3: dta, Mongolic) free pronouns and non-past subject person suffixes to illustrate. We give the plural forms only here. As in Mandarin, there is a morph (*ba:*) which has only an exclusive sense when in paradigmatic contrast with an inclusive morph, but where the inclusive morph is unavailable, *ba:* is a general first person plural.

(5) Mixed clusivity (Daur)

	Pronouns	Agreement
AUTH (not ADDR)	ba:	-bəi-ba:
AUTH and ADDR	bed	-bəi-ba:
ADDR (not AUTH)	ta:	-bəi-ta:
NEITHER	a:n	-bəi-sul

The Mandarin and Daur paradigms seem to neatly illustrate competition effects, of a type with a long tradition in the literature going back at least to de Saussure (1959: Part 2, Ch IV): one could say that the lexical meaning of *wǒmen* is the general first person, consistent across all of its uses, but where a stronger alternative (the inclusive) is available, the meaning of *wǒmen* excludes this stronger alternative.

In this paper, we develop an account of both the typological generalization in (1) and the language-internal mixed patterns like Mandarin and Daur, which gives a central role to this competition. Any account should explain, as ours does, why the general *we* corresponds to the exclusive in mixed patterns, as well as explaining Zwicky’s original generalization that inclusive meaning neutralizes with first, rather than second, person. We take it as a further desideratum that the account should derive the relative strength of alternatives intrinsically, from the definition of the features, and without appeal to an external, arguably ad hoc, hierarchy, as Zwicky posited (see below). We provide some brief remarks on the differences between our theory and existing alternatives highlighting the advantages of our theory from this per-

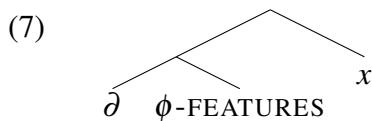
spective. Although we draw in part on existing accounts, our proposal has two key ingredients which set it apart from these: First, we argue that the right tool for modeling competition effects is via an exhaustivity operator, **exh** (Chierchia et al. 2012), rather than, for example, Maximize Presupposition (Sauerland 2002; Heim 2008). Second, we argue that word internal features must be composed via cumulative, rather than via Boolean conjunction, as Link (1983) proposes for overt conjunctions such as English *and* (see Schmitt 2020 for a recent overview). The success of our proposal thus constitutes an argument that these devices—exhaustification and cumulative conjunction—both established in sentence grammar, apply also to the word-internal composition of features.

2. Towards an account

We sketch briefly the key ingredients of two families of approaches to person features, and then present our account, which is in some ways a hybrid of the two. In focusing on the key ingredients, we will omit much discussion of detail, returning to some of those points below. For the sake of concreteness, we assume that person markers (pronouns or bound markers) are indices and that person features contribute presuppositions on the value assigned to an index (see also Cooper 1979; Sauerland 2003).³ We assume moreover that the basic meaning of person features is not inherently presuppositional as in prior work, but that an operation ∂ can ‘presuppositionalize’ properties, i.e. ∂P indicates that property P is presupposed. We adopt an approach to presuppositions as domain restrictions. In the notation of Heim and Kratzer (1998), the presuppositionalizer morpheme ∂ would then be defined as follows – it maps P to a property that is only defined if P is satisfied, but is true whenever defined:

$$(6) \quad [[\partial]]^c(P) = \lambda x : P(x) . 1$$

The presuppositional semantics of ϕ -features (Heim 2008; Sauerland 2009) can then be captured by the following structure of a pronoun:



In this structure, ϕ -FEATURES includes the person features (potentially also number, gender, etc.) interpreted as individual predicates and x is the referential index of the pronoun (or agreement marker). Furthermore, it is assumed that when there are multiple person features of ∂ , these are intersected by a Boolean operation, specifically predicate intersection—an assumption we come back to in the following. Finally, we note that a central role will be played in our account, as in all competing accounts, by a competition principle. In our proposal, we will argue that this should be implemented via exhaustification of alternatives in the course of the derivation, but we will for the time being just talk of a generalized ‘competition principle’, for which the reader may think of Maximize Presupposition or other similar principle.

³Most of the morphological and typological literature is not explicit about the formal semantics of the features, in particular regarding whether person features should be characterized as presuppositions. We make an explicit assumption here for the purpose of commensurability among approaches.

2.1. Inclusive-Exclusive

Classic accounts of person categories (Silverstein 1976; Zwicky 1977) and those building on these (McGinnis 2005; Bobaljik 2008; Pertsova 2022) invoke at a minimum the features AUTHOR and ADDRESSEE, defined here, where, for example, a pronoun with the feature AUTHOR refers to a group that includes the author of the speech act:⁴

- (8) a. $[[\text{AUTHOR}]]^c = \lambda x . \text{author}(c) \sqsubseteq x$
 b. $[[\text{ADDRESSEE}]]^c = \lambda x . \text{addressee}(c) \sqsubseteq x$

Using only these two features to characterize the categories of person succeeds in describing both of the attested person systems in (1) and excludes various universally unattested possible systems (see Bobaljik 2008). The inclusive category is readily defined as the conjunction of the two features in (8). This ensures that the inclusive is stronger (narrower) than AUTHOR alone and thus any version of the competition principle will ensure that the general first person will have only an exclusive meaning when it competes with the inclusive, as in Mandarin.

But this account, as it stands, does not answer Zwicky’s question regarding (1): when there is no dedicated inclusive category, why is the inclusive meaning (ADDRESSEE and AUTHOR) always expressed by the first person, never by the second? For this, Zwicky and many subsequent authors resort to an independent person hierarchy, as in (9).⁵

- (9) The Person Hierarchy
 +AUTHOR > +ADDRESSEE > OTHER

While this provides an adequate description of the generalization, it does so at the cost of treating some competition as an intrinsic ranking among features (in the sense that complexity/strength is part of the definition of the features) and some as extrinsic, an irreducible add-on to the feature definitions.

2.2. Participant

The problem for the classic account arises because AUTHOR and ADDRESSEE are both part of the inventory, and neither makes a stronger presupposition than the other, without an additional person hierarchy or equivalent assumption that effectively stipulates that AUTHOR is privileged.

An alternative account (McGinnis 2005; Sauerland 2003, 2008; Singh 2011) resolves this by starting instead from the assumption that the atomic features are AUTHOR and PARTICIPANT,

⁴Different labels are used by different authors. The choice of AUTHOR, ADDRESSEE rather than SPEAKER, HEARER or other labels reflects the assumption that the feature system is not modality-specific, and applies to sign as well as spoken languages. A further distinction, orthogonal to the point made here, is whether the features are binary or privative. Defining features via the predicate “included in (the referent of the pronoun)” is motivated by the observation that first (and arguably second) person plurals universally have an associative plural semantics: the first person plural is a group that contains the author, not a plurality of authors (Lyons 1968: 277, Moravcsik 1978: 354, Bobaljik 2008; Wechsler 2010).

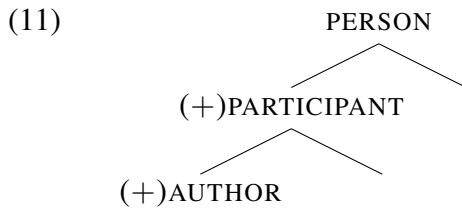
⁵For McGinnis (2005) this is expressed as a stipulation that if only one of the two features in (8) is active, it is universally AUTHOR. Zaslavsky et al. (2021) propose an information-theoretic account of (2) which encodes the hierarchy in (9) as a relative weighting 16:1:0.1 of the features AUTHOR:ADDRESSEE:OTHER.

but not ADDRESSEE:

- (10) a. $[[\text{AUTHOR}]]^c = \lambda x . \text{author}(c) \sqsubseteq x$
 b. $[[\text{PARTICIPANT}]]^c = \lambda x . \text{author}(c) \sqsubseteq x \vee \text{addressee}(c) \sqsubseteq x$

Note that while participant may be defined as “including author or including addressee”, these are terms of the meta-language here. ADDRESSEE is not defined as a feature in this system, and the definition in (10b) is not defined as a disjunction among features.⁶

Since the author is a participant, there is an entailment relationship among the features, and the relationship may be diagrammed as follows: A first cut picks out participants in the speech act, and a second cut then singles out the author among the participants.



The competition principle ensures that in the absence of a specific inclusive element, the inclusive meaning will always be grouped under the first, not the second, person, as desired:

(12)

	CONTEXT	FORM
a.	[AUTHOR]	we
b.	[PARTICIPANT]	you
c.	[]	they

Unlike the classic account, which requires an independent hierarchy to order [1]>[2], on this account the ordering is determined by the relative strengths of the presuppositions: since the presupposition “includes author” is a proper subset of “includes a participant (author or addressee)”, the morph with the narrower presupposition (12a) will always win out with first person referents. For the same reason, since the competition (presupposition maximization) principle blocks the use of the PARTICIPANT form with first person referents, that form is effectively limited to second person referents. And the third person is captured by an empty feature content of ∂ which as a null predicate intersection is interpreted as true of all entities. Again competition (presupposition maximization) applies to block the null feature set with first or second person referents.

But although this approach elegantly encodes the person hierarchy in the definition of features, and thereby accounts for Zwicky’s puzzle without appeal to an independent hierarchy, this approach cannot straightforwardly derive clusivity. Recall that in the classic account, the clusivity

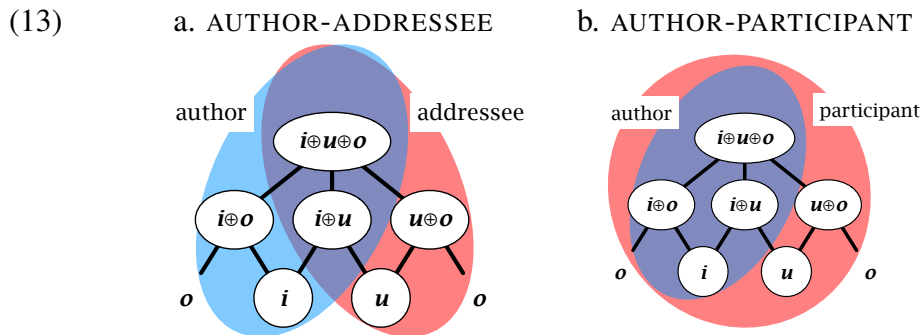
⁶One could represent it equivalently as follows:

(i) $[[\text{PARTICIPANT}]]^c = \lambda x . \text{participant-in-speech-act}(c) \sqsubseteq x$

However, this formulation does not reflect the logical entailment relations as perspicuously as (10) does.

parameter is expressible simply as whether a language does or does not admit conjunction of person features: the inclusive is simply the conjunction of the two basic features. But under the author-participant approach, precisely the entailment relation that determines the crucial markedness asymmetry renders conjunction of the two features redundant. Since AUTHOR entails PARTICIPANT, $[\text{AUTHOR} \wedge \text{PARTICIPANT}]$ is not meaningfully distinct from $[\text{AUTHOR}]$ and in particular, does not draw an inclusive/exclusive distinction. Adding the feature ADDRESSEE (as McGinnis 2005 does) allows for the description of the clusivity distinction but returns us to the classic account and Zwicky’s puzzle.

The key properties of the two families of accounts just discussed can be seen in terms of the lattice diagrams we used in the introduction. The AUTHOR-ADDRESSEE system is symmetrical, which allows for the inclusive to be stated as a conjunction of the two features (purple), but requires an independent hierarchy to enforce the fundamental asymmetry in (1). The AUTHOR-PARTICIPANT system is asymmetrical: AUTHOR is a proper subset of PARTICIPANT, so the asymmetry in (1) is intrinsic to the system, but the conjunction of the two features is not distinct from author, so the inclusive-exclusive contrast would need an extra postulate:



3. Our proposal: the best of both worlds

We suggest here that using exhaustification (Chierchia et al. 2012) rather than Maximize Presupposition will allow for a refinement of the ‘author-participant’ account which will overcome the issue with conjunction and allow for an integration of the classic assumption that the inclusive is the conjunction of the other two features. A further consequence of this assumption is that we must recognize (drawing on Harbour 2016) that conjunction of morphological features may be non-Boolean, specifically in our case via appeal to a version of the cumulativity operator in Schmitt (2013).⁷

We adopt the structure of the semantic analysis in (7) and also the two features AUTHOR and PARTICIPANT from (8). For exhaustification, we adopt the proposal of Mayr (2015) for the predicate-level exhaustification operator exh in (14).⁸ Exhaustification applied to a predicate P creates a new predicate with stronger truth conditions than the original predicate P depending on the alternative predicates in the set Alt . Namely the exhaustified predicate $\text{exh}_{\text{Alt}} P$ is true

⁷Schmitt extends earlier work by Link (1983); Krifka (1990).

⁸Mayr uses the notations exh for proposition-level and exh_2 for predicate-level exhaustification. In our discussion, only property-level exhaustification plays a role. Furthermore, the proposal could be restated using only proposition level exhaustification, for example in the type-inflexible semantics that Hirsch (2017) argues for.

only if P is true and all predicates Q in Alt are false (i.e. Q is excluded) with the exception of predicates Q that are fully entailed by P .⁹

$$(14) \quad [[\mathbf{exh}_{\text{Alt}}]]^w = \lambda P \in D_{et} \lambda x \in D_e . P(x)(w) \wedge \forall Q \in \text{Alt} . \neg Q(x)(w) \vee (\forall x (P(x) \rightarrow Q(x)))$$

The **exh** operator in (14) does not make reference to presupposition directly, but this is sufficient for our purposes since **exh** contributes to the assertive meaning in the scope of the presuppositionalizer ∂ from (6). Application of **exh** with a single, strictly stronger alternative has the same effect as earlier pragmatic principles including Maximize Presupposition and Harbour’s (2016) Lexical Complementarity. For example, the account of second person is similar to that in (12), namely, the set of participants, excluding those picked out by the stronger alternative AUTHOR:

$$(15) \quad \mathbf{exh}_{\{\text{AUTHOR}, \text{PARTICIPANT}\}}(\text{PARTICIPANT})(x) = \begin{cases} 1 & \text{if } x \in \{u, uo\} \\ 0 & \text{otherwise} \end{cases}$$

How is the set of alternatives of **exh** determined? We follow Katzir (2007) and subsequent work that the alternatives are determined from the sister constituent of **exh** by replacement or deletion operations. The alternatives always include the sister P of **exh**—PARTICIPANT in (15)—, which never directly lead to any exclusion because P always entails itself, but their presence can have an effect in cases of recursive application of **exh**. In the following, we only show elements of the set of alternatives that are actually excluded.

Comparing exhaustification with the classical and the PARTICIPANT-based account we introduced in section 2.2, observe that it is fully aligned with the PARTICIPANT-based account: The result of (15) is strictly stronger than the feature ADDRESSEE because ADDRESSEE is true of the inclusive referent *iu* and *iuo* while (15) is false. But the result of exhaustification in (15) is the same as that for PARTICIPANT after blocking by AUTHOR in (12). But as we show in the following, that **exh** captures blocking in the grammar is crucial for our account. With Magri (2009), Meyer (2015), and others, we furthermore assume that application of **exh** is obligatory when it can exclude a strictly stronger alternative as in the above case. We return to further applications of **exh** below, but first turn to the second piece of our proposal, non-Boolean conjunction.

Recall from above that individuals can be formally understood as a lattice, where atoms are singular objects and the join operation \sqcup corresponds to forming a group $a \sqcup b$ out of two distinct objects a and b (Link 1983 and others). Recent work by Haslinger and Schmitt (2018) and Schmitt (2013, 2019) argues that non-Boolean conjunction is generally available as the meaning of the coordinator *and* across different categories. In particular Schmitt (2019: 12) proposes a \sqcup -operator that predicts (16) for P and Q of type $\langle e, t \rangle$:¹⁰

⁹More recent work on exhaustification has argued that it can also include certain alternatives (Bar-Lev and Fox 2020) and presuppose at least exclusion (Bassi et al. 2021). As far as we can see, our proposal can be easily adjusted to these developments, but we do not do so here for presentational reasons.

¹⁰As we introduced above, Harbour (2016) uses \sqcup for the join operation of type e , while he defines \oplus for sets. It is easy to see though that Harbour’s \oplus could be subsumed under (16) by viewing sets as their characteristic functions – i.e. the property of being a member of a set.

About ‘Us’: Clusivity \sqcup exh

$$(16) \quad P \sqcup Q = \lambda x \exists y, z \in D_e [y \sqcup z = x \wedge P(y) \wedge Q(z)]$$

The work cited above concerns conjunction in sentential semantics, not morphological processes. They argue that English conjunction *and* cannot be interpreted as Boolean conjunction, but must be interpreted as \sqcup . Consider briefly the account of (17) Schmitt (2019) argues for. She observes that (17) is entailed by the truth of the two sentences *Abe danced* and *Bert smoked*, and proposes to capture this from the application of \sqcup twice: Once to form a plural entity **abe** \sqcup **bert** as the subject denotation, and a second time to form a predicate **danced** \sqcup **smoked**. Since (16) determines the interpretation of the predicate conjunction, (17) is correctly predicted to be true if *Abe danced* and *Bert smoked*.

(17) Abe and Bert danced and smoked. (Schmitt 2019: p. 32)

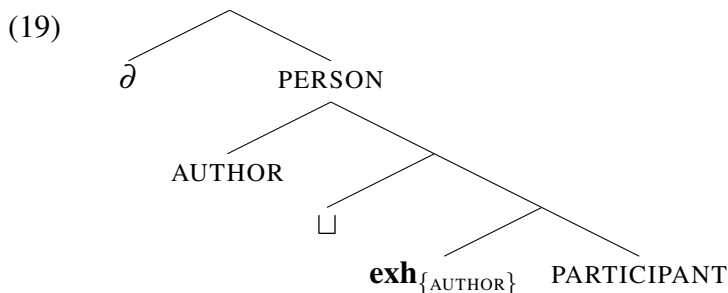
In Schmitt’s account pluralities of meanings are combined compositionally by a general cumulative composition. Generally, composition of two pluralities *A* and *B* results in the plurality of meanings derived by combining parts of *A* with parts of *B* for any way of dividing up *A* and *B* into parts and lining up the parts with one another. The interpretation Schmitt provides for (17) is as in (18), where *d* and *s* are the lexical predicates *danced* and *smoked* and *a* and *b* the individuals *Abe* and *Bert* respectively:

$$(18) \quad [d \sqcup s] (a \oplus b) = \{d(a) \oplus s(b), d(b) \oplus s(a), d(a) \oplus d(b) \oplus s(b), \dots, d(a) \oplus d(b) \oplus s(a) \oplus s(b)\}$$

The truth-conditions of (18) are given by the condition there must be at least one element of (18) such that all elementary propositions that are part of that element are true. This accounts for the observation that (17) is judged true, for example, if Abe danced and Bert smoked, but also if Abe smoked and Bert danced.

3.1. Deriving the Typology

The central idea of our proposal is that exhaustification and non-Boolean conjunction predict a different interpretation for the feature combination [AUTHOR,PARTICIPANT] from other frameworks. The predicted interpretation derives from the following structural representation:



In (19), **exh** applies to PARTICIPANT, which is thus interpreted as second person as we showed

in (15).¹¹ We then assume furthermore that non-Boolean conjunction combines the meanings of AUTHOR and **exh**(PARTICIPANT). Since AUTHOR is true of *i*, *iu* and *iuo* and **exh** PARTICIPANT of *u* and *uo*, the non-Boolean conjunction results in the property true of only *iu* and *iuo*. Note that applying Boolean conjunction in (20) would result in a contradiction.¹²

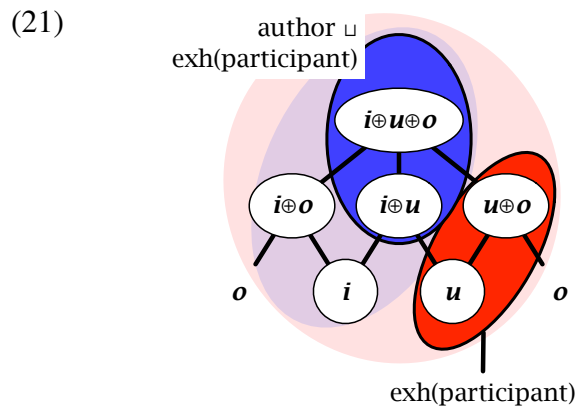
$$(20) \quad [\text{AUTHOR} \sqcup \mathbf{exh}_{\{\text{AUTHOR}\}}(\text{PARTICIPANT})](x) = \begin{cases} 1 & \text{if } x \in \{iu, iuo\} \\ 0 & \text{otherwise} \end{cases}$$

The result as shown in (20) is the meaning of the inclusive as in (3).

The crux of our proposal is this: Without exhaustification, conjunction (whether Boolean or cumulative) of AUTHOR and PARTICIPANT is vacuous. It is exhaustification (and non-Boolean conjunction) that allows us to import into the author-participant account the idea from the classic account that the inclusive is the coordination of the first and second persons.

Thus, just as the classic account could state a clusivity parameter as whether conjunction of features is allowed, our proposal also allows us to assume that languages morphologically vary as to whether the PERSON-position is restricted to a single feature or allows multiple features. Furthermore we assume that at most the two person features AUTHOR and PARTICIPANT are available, and that **exh** and non-Boolean conjunction must apply in the person system.

Graphically:



The general *we* paradigm results straightforwardly if only a single feature is allowed:

- (22) a. first person: $\mathbf{exh}_{\{\}}(\text{AUTHOR})$
 b. second person: $\mathbf{exh}_{\{\text{AUTHOR}\}}(\text{PARTICIPANT})$

¹¹If **exh** was to apply to AUTHOR too, the application would be vacuous. Hence we don't represent **exh** for AUTHOR in (19).

¹²Schmitt (2013: 97–102) presents arguments that Boolean conjunction may never be available as the interpretation of conjunction in sentential semantics, i.e. *and* in English or *und* in German. A Boolean interpretation in (20) results in a contradictory predicate, and may therefore not be available. But in the account of the exclusive in (23), we exclude the inclusive. This would not result in the exclusive interpretation if Boolean conjunction could apply in the inclusive. This suggests that a Boolean interpretation is also impossible for morphological conjunction of person features and thereby corroborates Schmitt's conclusion.

c. third person: **exh**_{AUTHOR,PARTICIPANT} (NULL)

The procedure of Katzir (2007) predicts that the alternative set for all three cases of **exh** in (22) is {AUTHOR, PARTICIPANT, NULL}, but recall that we show only the excluded alternatives. Because all alternatives are entailed by AUTHOR, none are shown for the first person. The interpretation of third person follows analogously to that of second person shown in (15).

The paradigm with clusivity, we propose, results if more than one person feature can occur under PERSON, i.e. in a language where the feature conjunction AUTHOR and PARTICIPANT is possible. This feature conjunction makes the account of the inclusive in (20) available. To derive the exclusive in this system, we assume that the inclusive also becomes available as an alternative for exhaustification whenever it is morphologically possible. Specifically, we assume that, if **exh** applies to the PERSON-node and the language has a clusivity distinction (i.e. allows multiple features under PERSON), [AUTHOR, PARTICIPANT] is an alternative to [AUTHOR].¹³ Then the exclusive meaning is captured by exhaustification of AUTHOR:

$$(23) \quad \mathbf{exh}_{\{AUTHOR \sqcup \mathbf{exh}_{\{AUTHOR\}}(PARTICIPANT)\}}(AUTHOR)(x) = \begin{cases} 1 & \text{if } x \in \{i, io\} \\ 0 & \text{otherwise} \end{cases}$$

The account of the second and third person in a quadripartition (Harbour’s term for a system with a clusivity contrast, and thus four person categories) can be as in our proposal (22) for a tripartition.¹⁴

4. Excluding an alternative: against Harbour’s marked exclusive

We see it as a positive aspect of our proposal that it treats the variation across subsystems in Mandarin and Daur in the same way as the cross-linguistic variation. Mandarin *wǒmen*, on our account, is always simply specified as spelling out [AUTHOR]. Where a competitor (inclusive *zánmen*) is available, exhaustification limits *wǒmen* to the exclusive reading (see (23)), but where no alternative is available (as in object position), *wǒmen* is a general *we*. This is a special case of the more general aspect of our proposal that only inclusive and general *we* may be represented directly. There is no combination of features that is inherently exclusive—exclusive readings only arise via exhaustification (competition).

In this, our proposal contrasts with the proposals in Harbour (2016). We do not have the space

¹³Buccola et al. (2021) propose that in specific circumstances also primitive concepts that cannot be pronounced in a language-specific way may be available as alternatives for **exh**. But we assume that the inclusive cannot be available as an alternative to AUTHOR in languages with a tripartition. The conflict between the two proposals is only apparent, however, because Buccola et al. address cases where the alternative is a primitive, while the inclusive is a structurally complex meaning. One implementation directly sensitive to this difference would be to represent the exclusive as **exh** [AUTHOR, **exh** AUTHOR] or **exh** [AUTHOR, **exh** NULL]. Then the inclusive is a structural alternative for the outer **exh** in the sense of Katzir (2007). In sum, Buccola et al.’s (2021) proposal makes interesting, novel predictions when combined with our approach to person marking that we hope future work will explore.

¹⁴There is a small technical difference. Namely, while only AUTHOR and PARTICIPANT occur in (22) as elements of the alternative set, also the complex [AUTHOR, PARTICIPANT] is an alternative in the quadripartition. But the semantic result is the same because of the entailment relations from [AUTHOR, PARTICIPANT] to [AUTHOR] and further to [PARTICIPANT].

to engage fully with Harbour’s innovative approach here, but we make a few brief remarks. Harbour addresses Zwicky’s typological observation in (2), and also aims to develop a proposal that derives this observation directly from the inventory of features in UG and constraints on their combination, without appeal to an extrinsic hierarchy. Among the ways in which Harbour’s proposals differ from ours, his theory is set up such that in a system with clusivity, it is the exclusive (not the inclusive) which is the more specific category: the inclusive only arises as a general *we* ([AUTHOR]) which is limited to inclusive contexts by competition with the more specified exclusive. When we look at the typological, cross-linguistic comparison of languages as whole systems (Evenki versus English, say) then there is no a priori way to decide which of the two first person categories is more marked. But for languages such as Mandarin and Daur, we contend that the available evidence points to our approach (the more conservative one) over Harbour’s.¹⁵ If it is reasonable to see clusivity as applying in some, but not all, subsystems in a language, then these examples suggest the characterization as we have given: one element is a general *we* and the competition (for us, via exhaustification) which limits that to a restricted meaning is competition with a more specific inclusive, the opposite of what an approach built on Harbour’s proposal would expect.

An important caveat is in order here: strictly speaking, Harbour does not allow for a single language to have mixed clusivity. He claims that the clusivity parameter applies at the level of the entire language, establishing the categories once for the language as a whole. Any differences among subsystems, as in Mandarin and Daur, must therefore arise as morphological syncretism from an underlying inclusive-exclusive system.¹⁶ This is, as far as we can see, a methodological choice that Harbour makes in assembling data, and does not follow from any postulates in his framework. Observationally, differences in clusivity like that in Daur, between agreement and pronouns for example, are common. Siewierska and Bakker (2005: 161-165) looked at 151 languages that have both bound and free person marking and have a clusivity contrast. Only half of these languages (74/151) have clusivity in both bound and free person marking, in the other half (77/151) there is a difference between the sub-systems. Patterns in which clusivity is contrastive only in free person marking (pronouns) outnumber those, like Daur, in which it is only marked in the bound person markers by about 4:1, though both types are non-negligibly attested in their sample. While acknowledging that there are non-trivial questions about how to define and delineate “subsystems”, we take it as nevertheless a reasonable application of theories of clusivity, including Harbour’s (even if unsanctioned), to evaluate them against generalizations over subsystems in a language, and not just against each language as a whole. The striking way in which Mandarin and Daur show the same effect across subsystems that Zwicky identified across languages suggests to us that a unified account should be sought. More specifically, we contend that Mandarin and Daur support our implementation of the familiar idea, contra Harbour, that there is no inherent category of first-person exclusive, and that the category arises only via competition with a stronger alternative, the inclusive.

¹⁵But see Pertsova (2022) for a contrasting opinion based on other types of evidence.

¹⁶Here mention should also be made of Ackema and Neeleman (2013, 2018) who, in effect, deny the existence of a clusivity parameter at the level of categories. In their account, all languages have four person categories, abstractly distinguishing inclusive from exclusive, but morphological syncretism neutralizes the distinction. They treat (2) and the distributional claim in (3) as a trend (which they leave unexplained), rather than a universal. We disagree, but cannot reasonably do justice to this difference in the limits of this paper.

5. Conclusion and open questions

A long established (but by no means consensus) view in the discussion of clusivity holds that there is no genuine category of first person exclusive. Instead there is a general *we* denoting a group that contains the AUTHOR, and in many, but not all, languages a more specific category of inclusive. The general *we* is restricted to exclusive readings when it competes with a more specific first person inclusive plural. We have offered here an implementation of this approach which characterizes this competition as exhaustification at the property level, internal to the feature bundles in the morphology. We suggest that this provides an account of both the typological generalization we started with and of the language-internal patterns of the Mandarin and Daur sort, allowing for a characterization of the cross-linguistically marked category ‘inclusive’ as conjunction of the independently needed features, and for the characterization of Zwicky’s typological generalization strictly in terms of logical entailments without appeal to an independent and arguably ad hoc hierarchy.¹⁷

There is clearly more to be said. We have focused specifically on the inventory of person categories in a language or a subsystem. Other authors, including Moskal (2018); Ackema and Neeleman (2018); Pertsova (2022) look instead at patterns of morphological syncretism and marking, for example, whether the inclusive appears to be derived from the exclusive or vice versa (Pertsova 2022 concludes that both patterns are attested). Moskal (2018) investigates stem allomorphy and argues that if only one of the first person plural elements (inclusive or exclusive) shares a stem with the first person singular, then it is the exclusive, consistent with the view that the exclusive is merely the non-singular [AUTHOR], but Pertsova (2022) reports examples of the opposite pattern. Despite these (and other) open issues, we hope here to have shown a way to reconcile two established but conflicting approaches to person, by (i) extending the use of exhaustification to features/properties at the sub-morphemic level, and (ii) extending cumulative rather than Boolean conjunction to morpheme-internal feature composition. In doing so, we aim to have added one further set of considerations to the general theory of person features and thus to discussions about (the formal characterization of) ‘us’.

References

- Ackema, P. and A. Neeleman (2013). Person features and syncretism. *Natural Language and Linguistic Theory* 31, 901–950.
- Ackema, P. and A. Neeleman (2018). *Features of Person: From the Inventory of Persons to Their Morphological Realization*. Cambridge MA: MIT Press.
- Adger, D., D. Harbour, and S. Béjar (Eds.) (2008). *Phi Theory: Phi-Features Across Modules and Interfaces*. Oxford, UK: Oxford University Press.
- Bar-Lev, M. E. and D. Fox (2020). Free choice, simplification, and innocent inclusion. *Natural Language Semantics* 28, 175–223.
- Bassi, I., G. Del Pinal, and U. Sauerland (2021). Presuppositional exhaustification. *Semantics and Pragmatics* 14(11).

¹⁷Pertsova (2022) adopts an additional argument from Cormier (2005) that exclusive, not inclusive is marked. The argument relies on the existence, in various languages, of a putative first person inclusive dual category, with allegedly no corresponding first person dual exclusive. A well-established account is that such systems are better treated as showing a minimal:augmented number contrast, where the putative first person inclusive dual is actually a minimal inclusive, and there is no argument for a markedness asymmetry (see Bobaljik 2008; Daniel 2005: among others).

- Bobaljik, J. D. (2008). Missing persons: A case study in morphological universals. *The Linguistic Review* 25(1-2), 203–230.
- Buccola, B., M. Križ, and E. Chemla (2021). Conceptual alternatives. *Linguistics and Philosophy* 45, 265–291.
- Chierchia, G., D. Fox, and B. Spector (2012). Scalar implicature as a grammatical phenomenon. In K. von Stechow, C. Maienborn, and P. Portner (Eds.), *Handbook of Semantics*, Volume 3, pp. 2297–2331. Mouton de Gruyter.
- Cooper, R. (1979). The interpretation of pronouns. In F. Heny and H. Schnelle (Eds.), *Selections from the Third Groningen Round Table, Syntax and Semantics, Volume 10*, pp. 61–92. New York: Academic Press.
- Cormier, K. (2005). Exclusive pronouns in American Sign Language. See Filimonova (2005), pp. 231–258.
- Daniel, M. (2005). Understanding inclusives. See Filimonova (2005), pp. 3–48.
- Filimonova, E. (Ed.) (2005). *Clusivity: Typology and case studies of the inclusive-exclusive distinction*. Amsterdam: John Benjamins.
- Harbour, D. (2016). *Impossible Persons*. MIT Press.
- Haslinger, N. and V. Schmitt (2018). Scope-related cumulativity asymmetries and cumulative composition. In *Semantics and Linguistic Theory*, Volume 28, pp. 197–216.
- Heim, I. (2008). Features on bound pronouns. See Adger et al. (2008), pp. 35–56.
- Heim, I. and A. Kratzer (1998). *Semantics in Generative Grammar*. Oxford, UK: Blackwell.
- Hirsch, A. (2017). *An inflexible semantics for cross-categorial operators*. Ph. D. thesis, Massachusetts Institute of Technology, Cambridge, Mass.
- Katir, R. (2007). Structurally-defined alternatives. *Linguistics and Philosophy* 30, 669–690.
- Krifka, M. (1990). Boolean and non-boolean ‘and’. In *Papers from the Second Symposium on Logic and Language*, pp. 161–188. Akadémiai Kiadó Budapest.
- Link, G. (1983). The logical analysis of plurals and mass terms: A lattice theoretical approach. In R. Bäuerle, C. Schwarze, and A. von Stechow (Eds.), *Meaning, Use, and the Interpretation of Language*, pp. 302–323. Berlin: de Gruyter.
- Lyons, J. (1968). *Introduction to Theoretical Linguistics*. Cambridge: Cambridge University Press.
- Magri, G. (2009). A theory of individual-level predicates based on blind mandatory scalar implicatures. *Natural Language Semantics* 17(3), 245–297.
- Mayr, C. (2015). Plural definite NPs presuppose multiplicity via embedded exhaustification. In *Semantics and Linguistic Theory*, Volume 25, pp. 204–224.
- McGinnis, M. (2005). On markedness asymmetries in person and number. *Language* 81(3), 699–718.
- Meyer, M.-C. (2015). Redundancy and embedded exhaustification. In S. D’Antonio, M. Moroney, and C. Little (Eds.), *Semantics and Linguistic Theory (SALT) XXV*, pp. 491–511.
- Moravcsik, E. A. (1978). Agreement. In J. H. Greenberg (Ed.), *Universals of Human Language: IV: Syntax*, pp. 331–374. Stanford: Stanford University Press.
- Moskal, B. (2018). Excluding exclusively the exclusive: Suppletion patterns in clusivity. *Glossa: a journal of general linguistics* 3(1), 130.
- Nedjalkov, I. (1997). *Evenki*. London: Routledge.
- Pertsova, K. (2022). A case for a binary feature underlying clusivity: the possibility of ABA. *Morphology* 32, 389–429.

- Ross, C. and J. Ma (2006). *Modern Mandarin Chinese grammar: a practical guide*. Abingdon, UK: Routledge.
- Sauerland, U. (2002). The present tense is vacuous. *Snippets* 6, 12–13.
- Sauerland, U. (2003). A new semantics for number. In R. B. Young and Y. Zhou (Eds.), *The Proceedings of SALT 13*, Ithaca, N.Y., pp. 258–275. Cornell University: CLC-Publications.
- Sauerland, U. (2008). The semantic markedness of ϕ -features. See Adger et al. (2008), pp. 57–82.
- Sauerland, U. (2009). The presuppositional approach to ϕ -features. Unpublished ms., lingbuzz/003877.
- de Saussure, F. (1959). *Course in General Linguistics*. New York: The Philosophical Library.
- Schmitt, V. (2013). *More Pluralities*. Ph. D. thesis, University of Vienna, Vienna, Austria.
- Schmitt, V. (2019). Pluralities across categories and plural projection. *Semantics and Pragmatics* 12, 17.
- Schmitt, V. (2020). Boolean and non-Boolean conjunction. In *The Wiley Blackwell Companion to Semantics*, pp. 1–32.
- Siewierska, A. and D. Bakker (2005). Inclusive and exclusive in free and bound person forms. See Filimonova (2005), pp. 151–178.
- Silverstein, M. (1976). Feature hierarchies and ergativity. In R. M. Dixon (Ed.), *Grammatical categories in Australian languages*, pp. 112–171. Canberra: Australian Institute of Aboriginal Studies.
- Singh, R. (2011). Maximize presupposition! and local contexts. *Natural Language Semantics* 19, 149–168.
- Wechsler, S. (2010). What ‘you’ and ‘I’ mean to each other: Person indexicals, self-ascription, and theory of mind. *Language* 86(2), 332–365.
- Zaslavsky, N., M. Maldonado, and J. Culbertson (2021). Let’s talk (efficiently) about us: Person systems achieve near-optimal compression. In *Proceedings of the Annual Meeting of the Cognitive Science Society*, Volume 43, pp. 938–944.
- Zwicky, A. M. (1977). Hierarchies of person. In *CLS 13*, pp. 714–733.