Omnivorous Person, Number and Gender in Mundari: A Cyclic Agree Analysis*

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Abstract
Mundari, an Austroasiatic language spoken by the Mundari tribes from the Jharkhand region of the Indian subcontinent, exhibits an omnivorous pattern for person, number, and gender. This pattern can be seen with ditransitives where both the indirect and direct object compete for a single object-marking slot in the verbal complex. The choice between them is determined by an interplay of prominence scales for person (1 > 2 > 3) and number (SG > PL > DU), acting alongside a animacy-based gender system. We provide an analysis of scale-driven Agree in Mundari that makes use of both bivalent features for person and number in addition to Cyclic Agree. Furthermore, we argue that syntactic probes must be able to probe for contextually unmarked values. This is motivated by the theoretical challenge posed by the number scale in Mundari, which seems to express a preference for unmarked number values over marked ones. Finally, we consider which other omnivorous patterns for person and number exist cross-linguistically and explore the predictions that our analysis makes for other languages.

1 Introduction

The term 'omnivorous' was proposed by Nevins (2011*b*), who uses it to refer to an agreement pattern in which the agreement slot is associated with a particular φ-value that can come from any of the arguments in the agreement domain, irrespective of the argument's grammatical function. The following example from Georgian illustrates this pattern, where plural agreement come from either the subject or the object and, in certain contexts, both.[1]

(1) g-xedav-<u>t</u>
2OBJ-saw-<u>PL</u>
'I saw you all; We saw y'all; He saw y'all; We saw you.'
(Nevins 2011*b*: 941 (2))

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[1]In order to highlight omnivorous agreement markers from other morphemes, throughout the paper, we will highlight the agreement morpheme and its gloss by underlining.

Based on the observation that an omnivorous agreement pattern is found only with number but not with person marking, Nevins (2011*b*) argues that person features are binary and fully specified whereas number features are unary and singular is underspecified.[2] However, Béjar (2011), in her detailed commentary on Nevins' paper, points out the existence of omnivorous person effects. The Kichean Agent Focus construction, for instance, exhibits an omnivorous person effect (Preminger 2014). The second singular agreement marker tracks the subject in (2a) and the object in (2b).

(2) *Kichean Agent-Focus*

a. ja rat x-<u>at</u>-ax-an ri achin
FOC you(SG) COM-<u>2SG</u>-hear-AF the man
'It was you(SG) that heard the man.'

b. ja ri achin x-<u>at</u>-ax-an rat
FOC the man COM-<u>2SG</u>-hear-AF you(SG)
'It was the man that heard you(SG).' (Preminger 2014: 18 (15))

In this paper, we will discuss omnivorous object marking in the Austroasiatic language Mundari. Similar to Georgian and Kichean, Mundari exhibits an omnivorous pattern for both person and number. Based on novel fieldwork data, we show that omnivorous object marking is found in ditransitives, where both the indirect object (IO) and the direct object (DO) compete for a single slot. The choice between IO and DO is determined based on the following scales:

(3) *Mundari hierarchies*

a. Person hierarchy: 1 > 2 > 3
b. Number hierarchy: SG > PL > DU

Both of these scales are subject to an animacy-based gender restriction, where the IO or DO must be animate in order to be eligible targets for object marking. In other words, these scales are operative only when both the IO and DO are animate but not when one or both are inanimate.

As we will discuss in greater detail, the person and number scales in Mundari (3) also differ from the previously described omnivorous patterns in Kichean and Georgian. In Kichean, there is no hierarchy between 1st and 2nd person arguments, while in Mundari, the 1st person outranks the 2nd person. In the case of Georgian, the relevant number scale is PL > SG as already seen in (1), but the Mundari number scale in (3b) goes in the opposite direction. Furthermore, the person and number scales are not subject to any additional gender restrictions in either Kichean or Georgian, unlike in Mundari. The independent scales for different φ-values in Mundari provide a rare opportunity to empirically determine how person and number scales interact with one another, especially in the case of a mismatch when a higher-ranked argument on scale (e.g. person) competes with with a lower-ranked argument that ranks higher on another scale (e.g. number), for example the scenario 1PL → 2SG.

To give a derivational account of the scales in (3) and their interaction with one another, we propose an analysis based on Béjar & Rezac's (2009) Cyclic Agree model, where a probe agrees with a second goal only if this goal has some feature sought by the probe that was not present on the first goal. By using this model of Agree, along with a bivalent feature system

[2] Nevins's (2011*b*) approach, in fact, predicts two things: The first is the presence of a person-case constraint and absence of number-case constraint, and the second is the presence of omnivorous number and the absence of an omnivorous person.

for person and number (Nevins 2007, Harbour 2011*b*, 2014, 2016), it is possible to account for the role of scales in determining which argument is tracked by the object marker based on the inherent structure of the features that are used to represent a given grammatical category such as person or number. While this is reasonably straightforward for the person hierarchy (1 > 2 > 3), we will show that the number hierarchy in Mundari (SG > PL > DU) poses a significant challenge to the Cyclic Agree model, given the prevailing views about the decomposition of number features. The reason for this, we argue, is that this scale has a hybrid nature in that it encodes not only a preference for certain number values over others, but also a preference for unmarked feature combinations. We argue that it is therefore necessary to encode markedness as part of the probing algorithm and show how that can be reconciled with the general Cyclic Agree architecture that we adopt.

Finally, we situate the Mundari data in the broader cross-linguistic context by considering further examples of languages that exhibit omnivorous patterns for person and/or number. We discuss two dimensions along which omnivorous systems can vary, one concerns the level of elaboration of the probe (Béjar 2003, Béjar & Rezac 2009), while the other relates to the nature of the values a probe can search for (including whether a particular value is contextually marked or unmarked).

The remainder of this paper is structured as follows: In section 2, we introduce the inflection system in Mundari. Section 3 provides an overview of the data that motivates the scales in (3). In section 4, we develop an analysis that derives person, number, and gender hierarchies and their interaction with each other. Section 5 goes on to discuss the cross-linguistic landscape of omnivorous agreement and how it relates to Mundari. Finally, section 6 concludes.

2 Inflection in Mundari

Mundari belongs to the Kherwarian group of the North Munda branch of the Austroasiatic language family and is mainly spoken in the eastern Indian state of Jharkhand. Apart from a handful of descriptive works including Hofmann (1978), Anderson (2007), Osada (1992, 2008), Mundari is one of the many understudied languages of the Indian subcontinent.[3] It is an SOV language, where the nominals show number marking but do not inflect for case. Singular is unmarked, while plural and dual exhibit overt inflections through *-ko* and *-kin* respectively, as can be seen in (4).

(4) *Number inflections in nouns* (Osada 2008: 108)

a. hon 'child' hon-ko 'child-PL' hon-kin 'child-DU'

b. ipil 'star' ipil-ko 'star-PL' ipil-kin 'star-DU'

Verbs in Mundari usually carry an elaborate set of suffixes which follow the template in (5).

(5) VERB-ASPECT-VALENCY-OM-MOOD-SM

In this template, SM and OM correspond to subject and object markers, which cross-reference the φ-features of the subject and the object respectively. The morphology of the SM and the OM paradigms in (6) correspond in large part to the morphology of the pronominal paradigm in (7).

[3] Though the 2011 census of Government of India reports that there are about 11,28,011 Mundari speakers, the reality is very different. The younger generation of speakers are no longer proficient and are eventually yielding to the pressure of switching over to the more socially dominant Hindi.

(6) *SM and OM paradigm*
(Osada 2008: 120 (3.16))

	SG	DU	PL
1(INCL)	-ñ	-laŋ	-bu
1(EXCL)		-laŋ	-le
2	-m	-ben	-pe
3	-eʔ/-iʔ/-e/-i	-kin	-ko

(7) *Pronominal paradigm*
(Osada 2008: 109 (3.7))

	SG	DU	PL
1(INCL)	añ	alaŋ	abu
1(EXCL)		alaŋ	ale
2	am	aben	ape
3	aeʔ	akin	ako

The following simple transitive sentence exemplifies both the basic SOV order and all the relevant inflectional markers on the verb.

(8) pusi-kin seta-ko hua-ke-d-ko-a-kin
cat-DU dog-PL bite-COMPL-TR-3PL.OM-IND-3DU.SM
'The two cats bit the dogs.'

As pointed out by Osada (2008), the distribution of the SM in particular can freely alternate as a suffix to any preverbal constituent. Compare (8), where the subject marker appears on the verb, with (9), where it surfaces on the direct object.

(9) pusi-kin seta-ko-kin hua-ke-d-ko-a
cat-DU dog-PL-3DU.SM bite-COMPL-TR-3PL.OM-IND
'The two cats bit the dogs.' (Osada 2008: 108 (9))

There is also no categorical restriction that governs the distribution of SM, as it can be suffixed even to an adverb in the preverbal position (10).

(10) kumbuɽu-kin hola-kin sab-ja-n-a
thief-DU yesterday-3DU.SM catch-INGR-ITR-IND
'Two thieves were caught yesterday' (Osada 2008: 122 (39))

This particular distribution of the SM in Mundari has the properties of Klavans' (1985) Type 5 clitic.[4] In contrast, the OM does not show the same positional flexibility in Mundari. In the remainder of the paper, we will focus on the OM since it displays an intriguing omnivorous pattern in ditransitive constructions, which we turn to in the next section.

3 Omnivorous object marking in Mundari

In ditransitive constructions in Mundari, it is usually the DO that linearly precedes the IO. In the literature on Munda languages, there is no consensus regarding which one of the two

[4] In Klavans' typology, clitics are divided into 8 distinct types based on following three parameters:

(i) a. Parameter 1: If the clitic is in an initial or final position in a sentence.
b. Parameter 2: If the clitic is before or after a given constituent.
c. Parameter 3: If the clitic is proclitic or enclitc.

The distribution of the SM in Mundari falls under the set of parameter combinations that Klavans classifies as Type 5, see Murugesan 2020, who accounts for the distribution of the SM clitic in terms of postsyntactic movement. In Kidwai (2005, 2020), the same phenomena in Santali is analyzed as a stranded clitic.

internal arguments is cross-referenced as the OM.[5] Kidwai (2005) observes that it is the DO that is tracked by OM in Santali (Santali and Mundari belong to the same sub-groupings of the North Munda branch of the Munda language family). However, Gosh (2008: 34) makes the opposite observation, where he remarks that 'if there are two objects and both are animate, only the indirect is marked in the verb'. For Mundari, Osada (2008) does notice variability between DO and IO as the argument encoded by the OM, but he relates it to the aspect of the given sentence. Contra Osada (2008), in this section, we will show that IO and DO can alternate in the OM slot even under the same aspect and that the choice between them is determined by their φ-featural content.[6]

First, let us consider different combinations of person for the internal arguments of a ditransitive verb, while keeping number and gender constant. In (11a), where the DO is 1st person and the IO is 2nd person, the OM slot tracks the 1st person DO. In (11b), when DO is 2nd person, and IO is 1st person, it is the 1st person IO that is cross-referenced by the OM. It should also be noted that the corresponding marker that occurs in the given OM slot is the only possible option. The OM cannot refer to anything other than what is given in the examples.[7]

(11) *1 > 2*[8]

a. hon-ko aiɲ ke am ke-ko ɛm-a-iɲ-ta-n-a
children-pl 1sg emp 2sg emp-3pl.sm give-appl-1sg.om-prog-itr-ind
'Children are giving me to you.' 1sg do & 2sg io

b. hon-ko am ke aiɲ ke-ko ɛm-a-iɲ-ta-n-a
children-pl 2sg emp 1sg emp-3pl.sm give-appl-1sg.om-prog-itr-ind
'Children are giving you to me.' 2sg do & 1sg io

Similarly, in the combination of 2nd and 3rd person internal arguments, it is the 2nd person that is cross-referenced by the OM slot irrespective of whether the 2nd person is the DO or the IO.

(12) *2 > 3*

a. hon-ko am ke Ravi ke-ko ɛm-a-m-ta-n-a
children-pl 2sg emp Ravi emp-3pl.sm give-appl-2sg.om-prog-itr-ind
'Children are giving you to Ravi.' 2sg do & 3sg io

b. hon-ko Ravi ke am ke-ko ɛm-a-m-ta-n-a
children-pl Ravi emp 2sg emp-3pl.sm give-appl-2sg.om-prog-itr-ind
'Children are giving Ravi to you.' 3sg do & 2sg io

Finally, in the combination of 1st and 3rd person, the OM slot tracks the 1st person argument.

[5] However, when the IO binds the DO, the basic order must be reversed, see section 4.2 for further discussion.

[6] Unless stated otherwise, all Mundari data in this section and elsewhere in the paper comes from the fieldwork carried out in Jharkhand, India.

[7] The combination of 1st and 2nd person in (11) presents a violation of person-case constraint (Perlmutter 1968, Bonet 1991) but they are nevertheless well-formed sentences in Mundari. As we will argue in section 5.2, the Person Case Constraint does not arise since the *Person Licensing Condition* (Béjar & Rezac 2003, Anagnostopoulou 2003) is not active in Mundari.

[8] Hierarchy statements like '1 > 2' are meant to indicate that 1st person outranks 2nd person irrespective of whether the 1st person occurs is the DO or the IO. Also, for ease of reference, the φ-values of the DO and IO are given at the right side of each example, where the framed box indicates the agreement controller.

(13) *1 > 3*

a. hon-ko aiɲ ke Ravi ke-ko ɛm-a-iɲ-ta-n-a
children-PL 1SG EMP Ravi EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving me to Ravi.' 1SG DO & 3SG IO

b. hon-ko Ravi ke aiɲ ke-ko ɛm-a-iɲ-ta-n-a
children-PL Ravi EMP 1SG EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving Ravi to me.' 3SG DO & 1SG IO

As clearly shown by the examples above, the choice between whether OM cross-references the features of the IO or the DO is determined by which of them is higher on the person scale in (14).

(14) Person hierarchy: 1 > 2 > 3

Now, to illustrate the number scale, let us keep the person and gender values constant and vary the number values. In the combination of SG and PL (15), it is the singular object that is marked by the OM.

(15) *SG > PL*

a. aiɲ ke Ravi ke hon-ko-iɲ ɛm-a-i-ta-n-a
1SG EMP Ravi EMP children-PL-1SG.SM give-APPL-3SG.OM-PROG-ITR-IND
'I am giving Ravi to children.' 3SG DO & 3PL IO

b. aiɲ hon-ko ke Ravi ke-iɲ ɛm-a-i-ta-n-a
1SG children-PL EMP Ravi EMP-1SG give-APPL-3SG.OM-PROG-ITR-IND
'I am giving children to Ravi.' 3PL DO & 3SG IO

In the combination of plural and dual internal arguments, the OM tracks the features of the plural argument.

(16) *PL > DU*

a. aiɲ bhilai-kin hon-ko ke-iɲ ɛm-a-ko-ta-n-a
1SG cat-DU children-PL EMP-1SG.SM give-APPL-3PL.OM-PROG-ITR-IND
'I am giving two cats to children.' 3DU DO & 3PL IO

b. aiɲ bhilai-ko ke hon-kin-iɲ ɛm-a-ko-ta-n-a
1SG cat-PL EMP children-DU-1SG.SM give-APPL-3PL.OM-PROG-ITR-IND
'I am giving cats to two children.' 3PL DO & 3DU IO

In the combination of singular and dual, the OM slot refers to the singular argument:

(17) *SG > DU*

a. aiɲ Ravi ke hon-kin-iɲ ɛm-a-i-ta-n-a
1SG Ravi EMP children-DU-1SG.SM give-APPL-3SG.OM-PROG-ITR-IND
'I am giving Ravi to two children.' 3SG DO & 3DU IO

b. aiɲ hon-kin Ravi ke-iɲ ɛm-a-i-ta-n-a
1SG children-DU Ravi EMP-1SG.SM give-APPL-3SG.OM-PROG-ITR-IND
'I am giving two children to Ravi.' 3DU DO & 3SG IO

The examples in (15-17) therefore clearly show that the relevant number hierarchy for determining which argument controls the OM must be as in (18).

(18) Number hierarchy : sg > pl > du

Finally, coming to gender, there are only two genders in Mundari that are based on the animacy of a given referent, that is whether they are animate and inanimate.[9] With the combination of animate and inanimate arguments, the OM slot refers only to the animate argument.

(19) a. aiɲ bhilai-ko ke oɽak'-iɲ ɛm-a-ko-ta-n-a
1sg cat-pl emp house-1sg.sm give-appl-3pl.om-prog-itr-ind
'I am giving cats to the house.' anim do & inanim io

b. aiɲ oɽak bhilai-ko ke-iɲ ɛm-a-ko-ta-n-a
1sg house cat-pl emp-1sg.sm give-appl-3pl.om-prog-itr-ind
'I am giving a house to the cats.' inanim do & anim io

Given (19), it would be tempting to posit a separate scale for gender on par with person and number, as in (20).

(20) Gender hierarchy: animate > inanimate

However, there is an important difference between gender and person/number. An argument that ranks lowest on the person and number scales (i.e., 3du) can still be cross-referenced by the OM in the absence of corresponding higher-ranking argument, as in (21). An inanimate argument, on the other hand, can never be referred to by the OM even in the absence of an animate argument as in (22).

(21) aiɲ bhilai-kin hon-kin ke-iɲ ɛm-a-kin-ta-n-a
1sg cat-du children-du emp-1sg.sm give-appl-3du.om-prog-itr-ind
'I am giving two cats to two children.'

(22) aiɲ oɽak daru ke-iɲ ɛm-a(*-i)-ta-n-a
1sg house tree emp-1sg.sm give-ben(*-3sg.om)-prog-itr-ind
'I am giving a house to the tree.'

Given this fact, the animacy is arguably better viewed as an absolute restriction on possible referents for the OM, where only animate arguments may be cross-referenced by the OM, rather than the result of a dedicated hierarchy for gender. Nevertheless, the example in (19) shows that gender does still exhibit an omnivorous pattern in that the OM will always refer to the animate argument, regardless of whether it is the IO or the DO.

The patterns we have seen so far are summarized in the tables in (23)–(25):

(23) *Summary of omnivorous marking for person*

	DO	IO		DO	IO		DO	IO
(11a)	1	2	(12a)	2	3	(13a)	1	3
(11b)	2	1	(12b)	3	2	(13b)	3	1

[9] Animacy in Mundari is not based on a clear-cut semantic distinction. There are many nominals which denote objects belonging to the group of celestial bodies and spiritual beings which are classified as animate. Similarly, inanimate objects like thorns, shells, mushrooms, etc, are also considered as animate in Mundari.

(24) *Summary of omnivorous marking for number*

	DO	IO		DO	IO		DO	IO
(15a)	SG	PL	(16a)	PL	DU	(17a)	SG	DU
(15b)	PL	SG	(16b)	DU	PL	(17b)	DU	SG

(25) *Summary of omnivorous marking for gender*

	DO	IO
(19a)	animate	inanimate
(19b)	inanimate	animate

Note that in the overview table for person in (23), we have kept the number values constant, and in the number table in (24), we have kept the person values constant. Now, we can vary both person and number values to determine how the OM is cross-referenced in cases where the scales conflict. A non-exhaustive sample of the possible person and number combinations is given in (26–32).

(26) *Combination of 1SG and 3PL*

a. hon-ko aiɲ ke ako ke-ko ɛm-a-iɲ-ta-n-a
children-PL 1SG EMP 3PL EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving me to them.' 1SG DO & 3PL IO

b. hon-ko ako ke aiɲ ke-ko ɛm-a-iɲ-ta-n-a
children-PL 3PL EMP 1SG EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving them to me.' 3PL DO & 1SG IO

(27) *Combination of 3SG and 2PL*

a. hon-ko Ravi ke ape ke-ko ɛm-a-pe-ta-n-a
children-PL Ravi EMP 2PL EMP-3PL.SM give-APPL-2PL.OM-PROG-ITR-IND
'Children are giving Ravi to you(PL).' 3SG DO & 2PL IO

b. hon-ko ape ke Ravi ke-ko ɛm-a-i-ta-n-a
children-PL 2PL EMP 3SG EMP-3PL.SM give-APPL-3SG.OM-PROG-ITR-IND
'Children are giving you(PL) to Ravi.' 2PL DO & 3SG IO

(28) *Combination of 2SG and 1PL*

a. hon-ko am ke abu ke-ko ɛm-a-bu-ta-n-a
children-PL 2SG EMP 1PL EMP-3PL.SM give-APPL-1PL.OM-PROG-ITR-IND
'Children are giving you(SG) to us.' 2SG DO & 1PL IO

b. hon-ko abu ke am ke-ko ɛm-a-m-ta-n-a
children-PL 1PL EMP 2SG EMP-3PL.SM give-APPL-2SG.OM-PROG-ITR-IND
'Children are giving us to you(SG).' 1PL DO & 2SG IO

(29) *Combination of 3SG and 1PL*

a. hon-ko Ravi ke abu ke-ko ɛm-a-bu-ta-n-a
children-PL Ravi EMP 1PL EMP-3PL.SM give-APPL-1PL.OM-PROG-ITR-IND
'Children are giving Ravi to us(PL).' 3SG DO & 1PL IO

b. hon-ko abu ke Ravi ke-ko ɛm-a-i-ta-n-a
children-PL 1PL EMP Ravi EMP-3PL.SM give-APPL-3SG.OM-PROG-ITR-IND
'Children are giving us(PL) to Ravi.' 1PL DO & 3SG IO

(30) *Combination of 1SG and 2PL*

a. hon-ko aiɲ ke ape ke-ko ɛm-a-iɲ-ta-n-a
children-PL 1SG EMP 2PL EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving me to you(PL).' 1SG DO & 2PL IO

b. hon-ko ape ke aiɲ ke-ko ɛm-a-iɲ-ta-n-a
children-PL 2PL EMP 1SG EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving you(PL) to me.' 2PL DO & 1SG IO

(31) *Combination of 1DU and 2PL*

a. Ravi ape ke alaŋ ke-i ɛm-a-laŋ-ta-n-a
Ravi 2PL EMP 1DU EMP-3SG.SM give-APPL-1DU.OM-PROG-ITR-IND
'Ravi is giving you(PL) to us(DU).' 2PL DO & 1DU IO

b. Ravi alaŋ ke ape ke-i ɛm-a-pe-ta-n-a
Ravi 1DU EMP 2PL EMP-3SG.SM give-APPL-2PL.OM-PROG-ITR-IND
'Ravi is giving us(DU) to you(PL).' 1DU DO & 2PL IO

(32) *Combination of 2PL and 3DU*

a. aiɲ ape ke akin ke-iɲ ɛm-a-pe-ta-n-a
1SG 2PL EMP 3DU EMP-1SG.SM give-APPL-2PL.OM-PROG-ITR-IND
'I am giving you(PL) to them(DU).' 2PL DO & 3DU IO

b. aiɲ akin ke ape ke-iɲ ɛm-a-pe-ta-n-a
1SG 3DU EMP 2PL EMP-1SG.SM give-APPL-2PL.OM-PROG-ITR-IND
'I am giving them(DU) to you(PL).' 3DU DO & 2PL IO

A summary of the data presented above is given in (33).

(33) *Summary of omnivorous marking for person and number*

	DO	IO		DO	IO
(26a)	1SG	3PL	(30b)	2PL	1SG
(26b)	3PL	1SG	(30a)	1SG	2PL
(27a)	3SG	2PL	(31a)	2PL	1DU
(27b)	2PL	3SG	(31b)	1DU	2PL
(28a)	2SG	1PL	(32a)	2PL	3DU
(28b)	1PL	2SG	(32b)	3DU	2PL
(29a)	3SG	1PL			
(29b)	1PL	3SG			

The empirical picture in (33) may seem somewhat arbitrary at first glance, as the OM tracks different arguments in (26a&b), (30a&b) and (32a&b), while the same argument (the IO) is cross-referenced in the remaining person/number combinations. However, a closer examination of the data reveals an interesting pattern. In those feature combinations in which the OM variably tracks the IO or the DO, both the person and number values of the privileged argument outrank that of the other argument on the relevant scales. For instance, in (26a&b), the 1SG argument is higher ranked than the 3PL argument on both the person (1 > 2 > 3) and number (SG > DU > PL) scales. As a result, it is the 1SG argument that is cross-referenced by the OM. Similarly, in (30a&b), the 1SG argument ranks higher than the 2PL one on both scales, which results in the former being tracked by the OM regardless of its grammatical function. The same rationale can be applied to (32a&b).

In all other cases where the OM varies in the argument it tracks, the person and number of one argument do not together outrank both the person and number of the other argument. For instance, in the case of (28a&b), the 2SG argument outranks the 1PL argument in number but not in person. Similarly, the 1PL argument outranks the 2SG argument in person but not in number. As a result of this conflict between the person and number hierarchies, there is no omnivorous pattern and the OM simply defaults to the IO in such cases.

Having seen how each of the person and number combinations works, we can summarize the crucial empirical generalizations in Mundari as in (34).

(34) a. In ditransitives, the choice between IO and DO for the OM slot is determined by the following hierarchies:
   i. Person hierarchy: 1 > 2 > 3
   ii. Number hierarchy: SG > PL > DU

b. Given these scales, the DO can be cross-referenced by the OM slot if and only if the DO outranks the IO on both the person and number scales. If the IO outranks the DO on either the person or number scale, the OM tracks the IO instead.

c. The hierarchies and their interaction are subject to a gender restriction: Only animate arguments may be cross-referenced by the OM.

In the following section, we will propose an analysis that accounts for (34) by appealing to Béjar & Rezac's (2009) theory of Cyclic Agree.

4 Analysis

In this section, first, we will lay out our assumptions regarding the mechanism of Cyclic Agree that we will adopt. Second, we will discuss the structure of Mundari ditransitives and clitic doubling which will also both be relevant in our account. Finally, we provide analysis that can derive the empirical generalizations summarized in (34).

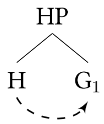
4.1 Cyclic Agree

Béjar & Rezac (2009) situate their model of Cyclic Agree in the framework of Chomsky (2000) where the conditions on Agree are given as follows:

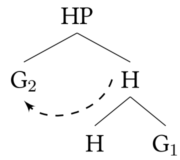
(35) Matching is a relation that holds of a probe P and a goal G. Not every matching pair induces Agree. To do so, G must (at least) be in the domain D(P) of P and satisfy locality conditions. The simplest assumptions for the probe-goal system are shown [below:]
a. Matching is feature identity.
b. D(P) is the sister of P.
c. Locality reduces to "closest c-command."
(Chomsky 2000: 122 cited in Béjar & Rezac 2009: 41 (5))

Given this view of Agree, Béjar and Rezac allow for two probing outcomes: the standard locality profile involving strict c-command and so-called ‘cyclic expansion’ of the probe’s search domain. For instance, when a head H bearing a probe P is merged with a complement G_1, P’s search space comprises the c-command domain of P, i.e. G_1. If P matches all or any of its features within G_1, then the standard locality pattern applies in Agree between P and G_1 as in (36). On the other hand, if P fails to match any of its features within G_1, then upon Merge of a specifier G_2, P’s search space cyclically expands to include G_2, enabling the second cycle of Agree with G_2 as in (37).

(36) First cycle Agree



(37) Second cycle Agree



Furthermore, when it comes to the status of features before and after undergoing Agree, Béjar and Rezac relate them to the distinction in their ‘activity’. Thus, when features enter into the derivation, they are active, and once they have undergone Agree, they are no longer active. This state of affairs is explained in Béjar and Rezac’s basic assumptions for Agree given in (38).

(38) Assumptions for Agree (Béjar & Rezac 2009: 45 (12))
  a. Each feature that seeks to Agree is active upon being inserted into the derivation.
  b. When a feature [uF] matches with a goal [F’], Agree copies the feature structure containing [F’] (i.e., all features that entail [F’]) to [F]; this constitutes valuing.
  c. An active feature that is locally related to a nonactive feature (i.e., a feature that stands in the configuration created by (38b)) is no longer active.

An idea implicit in (38) is that each feature can agree only once. Consequently upon Agree, where the feature are copied and valued, the probing features become inactive and they can no longer undergo further Agree relations.

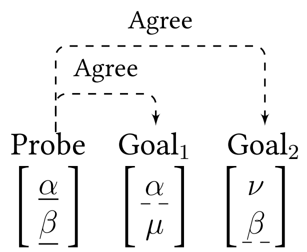
Now, for the sake of concreteness, let us consider a couple of model derivations that determine the choice between the first and second cycle Agree in the light of assumptions given in (35) and (38). In (39), the probe has the features [α] and [β] and both Goal_1 and Goal_2 have the corresponding features [α] and [β]. Here, Agree will be established only with Goal_1 because Goal_2 has no additional feature that is not already present on Goal_1. Thus, having undergone the first cycle Agree with Goal_1, both [α] and [β] are valued, which are indicated by an underline. Furthermore, the features are no longer active in order to establish a second cycle Agree with Goal_2.

(39)

$$\begin{array}{ccc} \multicolumn{2}{c}{\text{Agree}} & \\ \text{Probe} & \text{Goal}_1 & \text{Goal}_2 \\ \begin{bmatrix} \underline{\alpha} \\ \underline{\beta} \end{bmatrix} & \begin{bmatrix} \underline{\alpha} \\ \underline{\beta} \end{bmatrix} & \begin{bmatrix} \alpha \\ \beta \end{bmatrix} \end{array}$$

In (40), on the other hand, Goal_2 has an additional feature [β] that is not present in in Goal_1. Thus, probe will establish first cycle Agree with Goal_1 for [α] and second cycle Agree with Goal_2 for [β]. As a result of this Agree, both [α] and [β] of the probe are valued.

(40)

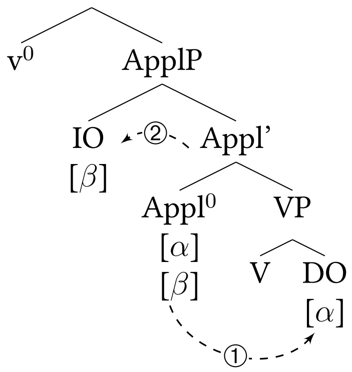


In the derivation in (40), both Goal$_1$ and Goal$_2$ have additional features [μ] and [ν] that are not present on the probe. These other features do not interfere in Agree, and they are just simply copied as a part of the valuation of [α] and [β].[10]

4.2 The structure of Mundari ditransitives

Béjar and Rezac apply the Cyclic Agree model to account for agreement displacement between subject and object. We extend this model to a new empirical domain in the ditransitive construction in order to account for agreement displacement between the direct object and indirect object. The structural configuration for Mundari ditransitives, however, will ultimately be the same as what we saw for first and second cycle Agree above. The structure we assume for a ditransitive verb in Mundari is given in (41), where the probe is located on the head of ApplP and the indirect object is merged in the specifier of Appl.[11] Assuming that the probe comes from Appl^0 with the features [α] and [β], in the first cycle, the probe agrees with DO for the feature [α] and in the second cycle, the probe agrees with IO for the feature [β].

(41) *Structure of Mundari ditransitives*



One piece of evidence in support of Appl^0 as the probing head in Mundari ditransitives comes from comparing the verbal templates of simple transitives ((5) repeated as (42a) below) with ditransitives (42b). In simple transitives, the OM follows aspect and valency and in ditransitives, the OM follows the applicative marker but precedes the aspect and valency morphemes. The position of the OM suggests that the v^0 head that encodes valency is the probe in simple transitives and the Appl^0 is the probe in ditransitives.[12]

[10] Similarly, if the probe has any additional feature [γ] that is not present as a part of both the goals, Béjar and Rezac assume that such unmatched feature pose no problem and they would be deleted at the interface level.

[11] The structure in (41) is the standard structure for ditransitives and 'high applicatives' originally proposed in Marantz (1993) and later adopted in works including Anagnostopoulou (2003) as well as by Bruening (2010) for English.

[12] The fact that v^0 does not agree in ditransitives can be noted by the difference in valency marker, which is always marked as intransitive in ditransitive constructions (11)-(32). Though it is unclear to us why ditransitives carry an intransitive marker, it clearly suggests that v^0 is not probing here. Thus, probing can only come from the lower head, Appl^0.

(42) a. Simple transitives: VERB-ASPECT-VALENCY-$\boxed{\text{OM}}$-MOOD

b. Ditransitives: VERB-APPL-$\boxed{\text{OM}}$-ASPECT-VALENCY-MOOD

When it comes to the order of IO and DO, the structure in (41) should ideally reflect the surface word order by having IO preceding the DO but in all the ditransitive constructions that we have seen in section 3, it is always the DO that precedes IO. This apparent mismatch between the structure and the linear order of arguments can be reconciled, as it can be shown that DO preceding IO is a scrambled order, and underlyingly, it is the IO that c-commands DO. A piece of evidence for this underlying structural configuration comes from binding facts in Mundari. Whenever IO binds DO, then DO can no longer precede IO (43a). The only available order in such a case is IO preceding DO (43b).[13]

(43) a. * aiɲ inku-aʔ$_i$-puti hon-ko$_i$-iɲ ɛm-a-ko-ta-n-a
1SG their-GEN-books children-3PL-1SG give-APPL-3PL-PROG-ITR-IND
'I am giving their$_i$ books to children$_i$.'

b. aiɲ hon-ko$_i$ inku-aʔ$_i$-puti-iɲ ɛm-a-ko-ta-n-a
1SG children-3PL their-GEN-books-1SG give-APPL-3PL-PROG-ITR-IND
'I am giving their$_i$ books to children$_i$.'

The absence of DO < IO order in binding can, in fact, suggest two things: The first one is that IO < DO is the base order of Mundari ditransitives and in the absence of binding, DO scrambles to a higher position than IO. The other option is that DO < IO order is the base order, and in the presence of binding, IO scrambles to a higher position than DO. The problem with the latter option is that IO needs to be scrambled only in the context of binding, which would require further stipulations. The first option can be straightforwardly implemented in terms of a general ban against backward binding in the output configuration (or for the lack of the availability of reconstruction with scrambling). Thus, the binding facts suggest that IO < DO is the most likely base order in Mundari ditransitives. We therefore assume that scrambling of the DO to a position above the IO is obligatory unless this would lead to a violation of the ban against the relevant binding requirements. This fact coupled with evidence from the morphological template shows that Agree happens in a structure like (41) for Mundari, where the probe from Appl^0 agrees with DO before it agrees with IO.[14]

4.3 Clitic doubling

One final clarification concerns the status of the OM as a doubled clitic or agreement inflection. While both are compatible with the general approach that we are pursuing here, we will treat the OM as an instance of doubled clitic. The evidence favoring its clitic status comes from the morpho-phonological similarity with the pronominal paradigm. We have already seen in section 2 that except for the initial vowel *-a*, the pronominal paradigm (6) is identical to the SM and OM paradigm (7). Following Kramer (2014) and Preminger (2019), we take this kind of similarity to be one of the diagnostics to distinguish clitics from agreement. Moreover, we have seen in Section 2 that the SM exhibits Klavans' (1985) Type 5 characteristics in the typology of clitic distribution. Therefore, if we consider the fact that the SM and OM are expressed by the same morpho-phonology, it is unlikely that one is a clitic and the other is an agreement marker.

[13] See Mahajan (1990) for a similar kind of observation from Hindi-Urdu.

[14] See Abramovitz (2020), who also posits movement of DO over IO in Koryak (Chukotko-Kamchatkan).

In addition, another property that distinguishes agreement and clitic doubling is an instance of 'default agreement'. If the agreement fails, it does not lead to a crash in the derivation, but it can resort to 'default' agreement morphology (Preminger 2014). This default agreement morphology can be considered as a property of agreement rather than clitic doubling (Preminger 2009). As we have already seen in section 3, when an inanimate argument fails to control agreement (22), there is no default agreement, but it is null. In fact, there is no default agreement morphology anywhere in Mundari. Therefore, the absence of default agreement also suggests OM to be a doubled clitic rather than agreement inflection.

Another piece of evidence comes from Kidwai (2005), who argues for the clitic status of SM and OM in Santali. Among her list of diagnostics, she points out that the Santali verbal stem exhibits no phonological process triggered either by the SM or the OM. Agreement affixes often participate in some form of morphophonological process that affects the verbal stem. However, similar to Santali, the verbal stem in Mundari is also immune to any such process affected either by the SM or the OM. This can be noticed in all the examples that we have seen section 3, where the verbal stem remains constant with different OMs. All these three pieces of evidence taken together suggest that we are dealing with clitic doubling rather than agreement inflection.

Clitic doubling can be modeled in line with the standard 'Big DP' analysis (Torrego 1992, Belletti 2005, Uriageraka 1995, Cecchetto 2005, Craenenbroeck & Koppen 2008, Arregi & Nevins 2012, Preminger 2019). More precisely, following Harbour (2008, 2011*b*), we assume that when Agree happens between an external probe H^0 and a DP, the probe can only access D^0 and the features that are contained as a part of D^0. We will come back to the question of how D^0 inherits its features in detail in section 4.6 but for now, let us assume that whatever features that are available as a part of NP are also available as a part of D^0. Thus, Agree happens with D^0 and it is the D^0 that moves and adjoins to the probing head as a doubled clitic:

(44)

Agree

$[_{H^0}\ D^0_i \quad H^0\ ] \quad \ldots \quad [_{DP}\ t_i \quad DP]$

Move

With this clitic doubling mechanism in place, we are in a position to assemble together all the parts that are required to implement Cyclic Agree for Mundari ditransitives. In the first step in the derivation, the probe from $Appl^0$ tries to agree with D^0 of DO and if D^0 has any feature with which a match can be established, then Agree is successful. This results in the movement of D^0 to $Appl^0$.

(45) *Step 1:*

Agree

$[_{Appl^0}\ D^0 \quad Appl^0\ ] \quad \ldots\ldots \quad DO \quad \ldots\ldots \quad IO$

Move

Following step 1, if there are still active features that are left as a part of the probe's specification, then the derivation proceeds to cyclically expand its search domain to include the IO in Spec-ApplP. If D^0 of IO has any corresponding features, then Agree and subsequent movement to target the D^0 of the IO as well.

(46) *Step 2:*

Agree

Agree

$[_{\mathrm{Appl}^0}\ \mathrm{D}^0 \quad [_{\mathrm{Appl}^0}\ \mathrm{D}^0 \quad \mathrm{Appl}^0\ ]] \ \ldots\ldots \ \mathrm{DO} \ \ldots\ldots \ \mathrm{IO}$

Move

Move

In the illustration in (46), there are two clitics adjoined to Appl^0, but Mundari allows for just one clitic to occur as OM. This restriction in Mundari can be compared with clitic cluster restrictions found in Romance languages. Perlmutter (1968) proposes a set of constraints on clitics in Spanish (also see Pescarini 2010 on Italian). Nevins (2007) models the ban on the **le lo* cluster in Spanish with a rule given in (47).

(47) Delete/alter the features corresponding to 3rd person on a dative when it precedes another 3rd person. (Nevins 2007: 275)

Though Nevins treats (47) as a dissimilation rule, we propose the more general deletion rule in (48) for Mundari.

(48) $\mathrm{D}^0 \longrightarrow \emptyset\ /\ [_{\mathrm{Appl}^0}\ \mathrm{D}^0\ [\ \_\_\ \mathrm{Appl}\ ]]$

This deletion rule does not refer to any featural content of D^0 but simply deletes the inner D^0 node whenever the syntax generates two D^0's adjoined to Appl.[15] In this sense, it is more akin to what Arregi & Nevins (2012) call *Obliteration.* In other words, it eliminates a D^0 hrad from the representation when it is c-commanded by an another D^0 with in the domain of the same Appl head. Thus, the deletion rule applies only when the output of syntax has two D^0 (46) instead of just one D^0 (45).

With this deletion rule in place, we complete the description of all the ingredients that are required for deriving the omnivorous patterns. We will next turn to the hierarchies of person, number, and gender and then move to the combinations between them.

4.4 The person hierarchy

In section 3, we saw that the preference hierarchy in Mundari for person is such that 1st person outranks 2nd person, and 2nd person outranks 3rd person. The scale is repeated in (49).

(49) 1 > 2 > 3

Recall that the relevant empirical generalization is that, when both arguments have the same number, the OM agrees with the argument bearing the person value that is highest on the scale in (49). The table summarizing omnivorous agreement for person is repeated in (50).

(50) *Summary of omnivorous marking for person*

	DO	IO		DO	IO		DO	IO
(11a)	$\underline{1}$	2	(12a)	$\underline{2}$	3	(13a)	$\underline{1}$	3
(11b)	2	$\underline{1}$	(12b)	3	$\underline{2}$	(13b)	3	$\underline{1}$

[15] As the reader can verify, a rule that would delete the outer instead of the inner clitic (15) would result in a language where the OM would only ever track the DO.

(i) $\mathrm{D}^0 \longrightarrow \emptyset\ /\ [_{\mathrm{Appl}^0}\ \_\_\ [\ \mathrm{D}^0\ \mathrm{Appl}\ ]]$

In theories employing Cyclic Agree, such as Béjar & Rezac (2009), patterns of omnivorous agreement following a prominence scale such as the one above are derived by the assumption that probes may encode a particular probing preference. Furthermore, the guiding idea is that prominence scales such as (49) correspond to decomposed feature structures in which higher members on the scale match more sub-features of the probe than lower members. An abstract example of this is given in (51) for the toy hierarchy A > B > C.

(51)
$$\begin{array}{ccccccc} \text{Probe} & & \text{A} & > & \text{B} & > & \text{C} \\ \begin{bmatrix} \alpha \\ \beta \\ \gamma \end{bmatrix} & & \begin{bmatrix} \alpha \\ \beta \\ \gamma \end{bmatrix} & & \begin{bmatrix} \alpha \\ \beta \end{bmatrix} & & \begin{bmatrix} \alpha \end{bmatrix} \end{array}$$

Assuming that the feature values A, B and C are decomposed into sub-features $[\alpha]$, $[\beta]$ and $[\gamma]$ and these features form superset relations going down the hierarchy, a fully-specified probe will only trigger a second cycle of Agree if the first goal that it finds does not exhaust the feature specification of the probe and there is another potential goal matching the leftover feature(s). Thus, if the first goal encountered by the probe has the features corresponding to A, then no second cycle of Agree will be initiated. If the probe first finds a goal bearing the feature set corresponding to B, then it will agree with a second argument only if this goal bears $[\gamma]$.

We can now apply this logic to the person scale in (49). Following a long tradition of work including Nevins (2007) and Harbour (2016), let us assume that the representations of different person values are defined in terms of bivalent features.[16] The following table presents the feature specifications for all three persons, following the decomposition in Noyer (1992). We assume the bivalent features [±author] and [±participant] to be potential values of the feature $[\pi]$.

(52) *Decomposition of person features*

1st person	2nd person	3rd person
$\left[\pi\text{:}\ \begin{array}{l}\text{+author}\\ \text{+participant}\end{array}\right]$	$\left[\pi\text{:}\ \begin{array}{l}-\text{author}\\ \text{+participant}\end{array}\right]$	$\left[\pi\text{:}\ \begin{array}{l}-\text{author}\\ -\text{participant}\end{array}\right]$

Given this decomposition, we can derive the person hierarchy in Mundari by assuming that the person probe is specified as in (53).

(53) *Person probe in Mundari*

$$\left[\pi\text{:}\ \begin{array}{l}\text{+author}\\ \text{+participant}\end{array}\right]$$

This specification derives the fact that the person probe in Mundari encodes a preference for speakers ([+author]) over non-speakers ([−author]) and local persons ([+participant]) over non-local persons ([−participant]). This corresponds to the two steps of the hierarchy in (49).

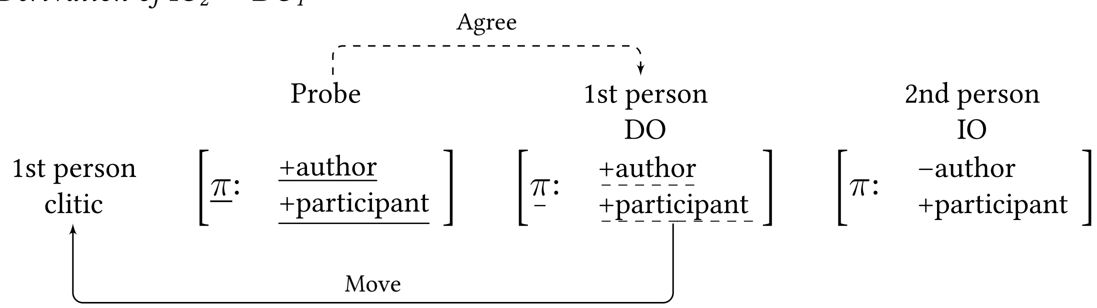
[16] According to Nevins (2007), in the binary feature [±participant], a positive value denotes that the referring expression contains one of the discourse participants, and in the binary features [±author], a positive value denotes that the referring expression contains the author.

With this feature specification of the probe, a 3rd person goal only matches [π], 2nd person matches [π, +participant], while 1st person matches [π, +author, +participant].[17]

Let us first consider a case in which the DO outranks the IO on the person scale, as in example (11a) repeated below as (54). Here, the IO is 2nd person and the DO is first person. The relevant derivation is given in (55). The probe first encounters the 1st person DO, which matches all the features of the probe. These feature correspondences result in Agree followed by the movement of the 1st person D^0 as a doubled clitic. Since there are no active features left on the probe after the first cycle Agree, there is no second cycle Agree with IO. Consequently, the D^0 from the 2nd person indirect object cannot undergo clitic movement and the OM therefore tracks the direct object.

(54) hon-ko aiɲ ke am ke-ko ɛm-a-iɲ-ta-n-a
children-pl 1sg emp 2sg emp-3pl.sm give-appl-1sg.om-prog-itr-ind
'Children are giving me to you.' 1sg do & 2sg io

(55) *Derivation of $IO_2 \rightarrow DO_1$*



There is a different outcome when we reverse the grammatical functions as in (11b), repeated below as (56). In the derivation of a 1st person IO and a 2nd person DO, given in (57), the probe first encounters the 2nd person DO, which has a corresponding π-feature with the value [+participant]. Though this results in Agree and movement of the 2nd person DO, it does not stop further probing because the [+author] specification of the probe remains active. Therefore, the derivation proceeds to the second cycle to include the 1st person IO for probing, resulting in Agree for [+author] and followed by movement of the 1st person DO. Having two clitics in (57) triggers the application of the deletion rule that we posited in (48), which deletes the inner clitic, i.e., the 2nd person one. In essence, the IO clitic replaces the DO clitic.

(56) hon-ko am ke aiɲ ke-ko ɛm-a-iɲ-ta-n-a
children-pl 2sg emp 1sg emp-3pl.sm give-appl-1sg.om-prog-itr-ind
'Children are giving you to me.' 2sg do & 1sg io

[17] This understanding of matching, in which features are attribute-value pairs, entails that a goal may match either the attribute of the feature, in this case π, or the attribute and any of its values.

(57) *Derivation of* $IO_1 \rightarrow DO_2$

		Probe	2nd person DO	1st person IO
1st person clitic	~~2nd person clitic~~	$\left[\underline{\pi}: \begin{array}{l}\underline{\text{+author}}\\ \underline{\text{+participant}}\end{array}\right]$	$\left[\underline{\pi}: \begin{array}{l}\text{−author}\\ \underline{\text{+participant}}\end{array}\right]$	$\left[\pi: \begin{array}{l}\underline{\text{+author}}\\ \text{+participant}\end{array}\right]$

Agree

Agree

Move

Move

The derivations for 1/3 and 2/3 combinations will work in a similar manner to (55) and (57).

In this section, we have shown how the person hierarchy 1 > 2 > 3 that governs whether or not the OM agrees with DO or the IO can be derived. Recall that we only have a DO clitic if the DO outranks the IO on the person hierarchy. Otherwise we will have an IO clitic. In the Cyclic Agree model, we can only ever have a second cycle of Agree with the IO if the DO does not fully exhaust the specification of the probe by matching all of its feature. Whenever there is a second cycle of agree, the DO clitic is ‘overwritten’ by the IO one. This derives the omnivorous effect for person.

4.5 The number hierarchy

Now let us turn to the number hierarchy in Mundari. Recall that the choice of which argument is tracked by the OM in Mundari is also governed by the number hierarchy in (58).

(58) SG > PL > DU

This can be seen in the table summarizing the patterns of omnivorous number repeated in (59). The choice between whether the OM references the features of the IO and DO is determined by which argument ranks higher on the number hierarchy in (58).

(59) *Summary of omnivorous marking for number*

	DO	IO		DO	IO		DO	IO
(15a)	<u>SG</u>	PL	(16a)	<u>PL</u>	DU	(17a)	<u>SG</u>	DU
(15b)	PL	<u>SG</u>	(16b)	DU	<u>PL</u>	(17b)	DU	<u>SG</u>

As with the person scale discussed in the preceding section, a Cyclic Agree analysis would have to derive the number hierarchy in (58) from the featural makeup of each number value. As shown abstractly in (51), repeated below, the general requirement for scale-driven agreement on a Cyclic Agree approach is that the highest value on the scale, i.e. the most preferred value, will match a superset of the features matched by the next point on the scale and so on.

(60)
$$\begin{array}{ccccccc} \text{Probe} & & \text{A} & > & \text{B} & > & \text{C} \\ \begin{bmatrix}\alpha\\ \beta\\ \gamma\end{bmatrix} & & \begin{bmatrix}\alpha\\ \beta\\ \gamma\end{bmatrix} & & \begin{bmatrix}\alpha\\ \beta\end{bmatrix} & & \begin{bmatrix}\alpha\end{bmatrix} \end{array}$$

Given standard conceptions of number, however, this is problematic. A well-established view of the decomposition of grammatical number seeks to derive it from the cross-classification of two binary features [±singular] and [±augmented] (Noyer 1992, Harbour 2008), alternatively named [±atomic] and [±minimal] (Harbour 2014; also see Silverstein 1976). A three-way number contrast has the semantically well-motivated feature decomposition in (61).

(61) *Decomposition of number features (bivalent)*

singular	plural	dual
$\left[\#: \begin{array}{l}+\text{singular}\\ -\text{augmented}\end{array}\right]$	$\left[\#: \begin{array}{l}-\text{singular}\\ +\text{augmented}\end{array}\right]$	$\left[\#: \begin{array}{l}-\text{singular}\\ -\text{augmented}\end{array}\right]$

Here, it is important to notice that plural and dual form a natural class of non-singular ([−singular]). Equally, singular and dual correspond to the natural class of non-augmented values ([−augmented]). This feature decomposition yields no natural class of singular and plural to the exclusion of dual.

The problem now is that there is no way to generate the desired hierarchy SG > PL > DU for Mundari on a standard Cyclic Agree account. Given the standard feature decomposition, a Cyclic Agree analysis can only derive the scales in (62). The first is the scale DU > PL > SG that we get by specifying the probe for dual. A goal specified for dual will fully match the probe for [#], [−sing] and [+aug], while plural constitutes a partial match (both [#] and [+aug]). If we specify the probe for plural, then we derive the scale PL > DU > SG, as found in Onondaga (Barrie 2016) (see section 5.1 for discussion). We cannot derive the desired Mundari scale SG > PL > DU, however. If we were to specify the probe for singular values ([+sing, −aug]), then it would not agree with plurals over duals, as the dual would match more of the probe's specification ([#] and [−aug]). So, we can derive SG > DU > PL, but not with a plural over dual preference. If we tried to remedy this by instructing the probe to look for the unnatural number combination [+sing, +aug], then we would lose the SG > PL preference as the probe would not be fully satisfied after finding a singular goal in the first cycle and would continue to agree with a plural goal in the second cycle to check the remaining [+aug] feature.

(62) *Possible scales given the decomposition in (61)*

$$
\begin{array}{cccccc}
\text{Probe} & \textsc{du} & > & \textsc{pl} & > & \textsc{sg} \\
\left[\#: \begin{array}{l} -\text{singular} \\ -\text{augmented} \end{array}\right] &
\left[\#: \begin{array}{l} \underline{-\text{singular}} \\ \underline{-\text{augmented}} \end{array}\right] & &
\left[\#: \begin{array}{l} \underline{-\text{singular}} \\ +\text{augmented} \end{array}\right] & &
\left[\#: \begin{array}{l} +\text{singular} \\ -\text{augmented} \end{array}\right] \\
 & \text{(3 matches)} & & \text{(2 matches)} & & \text{(1 match)}
\end{array}
$$

$$
\begin{array}{cccccc}
\text{Probe} & \textsc{pl} & > & \textsc{du} & > & \textsc{sg} \\
\left[\#: \begin{array}{l} -\text{singular} \\ +\text{augmented} \end{array}\right] &
\left[\#: \begin{array}{l} \underline{-\text{singular}} \\ \underline{+\text{augmented}} \end{array}\right] & &
\left[\#: \begin{array}{l} \underline{-\text{singular}} \\ -\text{augmented} \end{array}\right] & &
\left[\#: \begin{array}{l} +\text{singular} \\ -\text{augmented} \end{array}\right] \\
 & \text{(3 matches)} & & \text{(2 matches)} & & \text{(1 match)}
\end{array}
$$

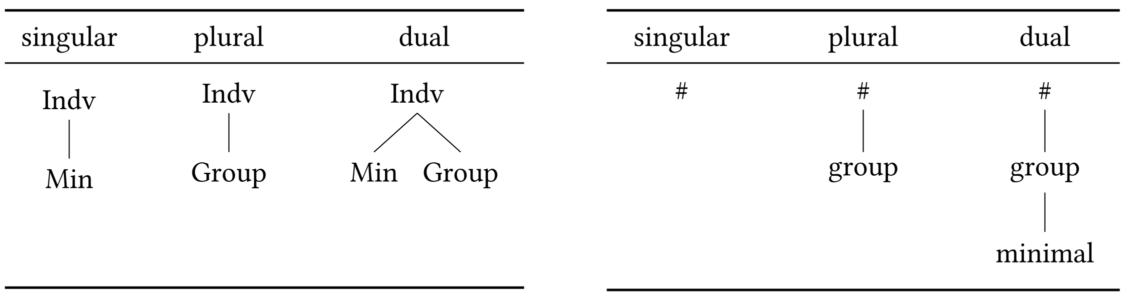
$$
\begin{array}{cccccc}
\text{Probe} & \textsc{sg} & > & \textsc{du} & > & \textsc{pl} \\
\left[\#: \begin{array}{l} +\text{singular} \\ -\text{augmented} \end{array}\right] &
\left[\#: \begin{array}{l} \underline{+\text{singular}} \\ \underline{-\text{augmented}} \end{array}\right] & &
\left[\#: \begin{array}{l} -\text{singular} \\ \underline{-\text{augmented}} \end{array}\right] & &
\left[\#: \begin{array}{l} -\text{singular} \\ +\text{augmented} \end{array}\right] \\
 & \text{(3 matches)} & & \text{(2 matches)} & & \text{(1 match)}
\end{array}
$$

$$
\begin{array}{cccccc}
\text{Probe} & \textsc{sg} & = & \textsc{pl} & > & \textsc{du} \\
\left[\#: \begin{array}{l} +\text{singular} \\ +\text{augmented} \end{array}\right] &
\left[\#: \begin{array}{l} \underline{+\text{singular}} \\ -\text{augmented} \end{array}\right] & &
\left[\#: \begin{array}{l} -\text{singular} \\ \underline{+\text{augmented}} \end{array}\right] & &
\left[\#: \begin{array}{l} -\text{singular} \\ -\text{augmented} \end{array}\right] \\
 & \text{(2 matches)} & & \text{(2 matches)} & & \text{(1 match)}
\end{array}
$$

At the heart of the problem here is the fact that the standard decomposition of number in (61) yields no natural class consisting of singular and plural to the exclusion to dual, as would be required by the Cyclic Agree approach.

It is important to mention that this problem is not an artefact of encoding number distinctions with bivalent features. The same problem holds for theories that decompose number into privative features arranged into geometries. For example, Harley & Ritter (2002) propose the feature-geometric view of a three-number system in (63) where non-singulars are distinguished from singulars by a feature [group] and singular and dual form a natural class defined by the feature [minimal] (McGinnis 2005). Here, we have the same problem faced above, these features offer no way to specify a probe such that a singular goal matches a superset of the features matched by plural or dual goals. The same is true for proposals that envisage stricter containment relations between the number values, e.g. assume that both dual and plural are featural supersets of singular with either dual (Harley 1994, Smith et al. 2019) or plural (Cowper 2005, Barrie 2016) having the most richly specified structure. The former view is shown in the geometric feature structures in (63).

(63) *Decomposition of number features (privative)*



For this reason, the prominence scale for number in Mundari would appear to defy a Cyclic Agree approach, given the prevailing views about number features. Assuming that we do not wish to allow feature structures to vary idiosyncratically across languages, implementing omnivorous number agreement in Mundari constitutes a serious challenge. Is it nevertheless possible to uphold a Cyclic Agree analysis, as developed for person, for omnivorous number in Mundari? We will argue that it is.

What makes the number scale in Mundari particularly problematic is that it is the inverse of the universal markedness hierarchy in which singular is the cross-linguistically least-marked number value and dual is the most marked, i.e. DU > PL > SG. The kind of Silverstein prominence hierarchies that appear to be active in scale-driven agreement processes typically express a preference for agreement with more the cross-linguistically more marked value, as is the case for the person scale 1 > 2 > 3. Mundari instead appears to express the opposite preference, namely for agreement with the least marked number value (SG > PL > DU).

We would therefore like to suggest that the reason why the number scale dictating the probing preference in Mundari is unusual and problematic for standard theories is because it actually encodes two distinct aspects of the feature structure of number values. Unlike the person scale, which encodes a simple preference for speakers over non-speakers (1 > 2, 3) and local persons over non-local persons (1, 2 > 3), the number scale in Mundari expresses a preference for singular numbers over non-singular numbers (SG > PL, DU) and *unmarked* feature constellations over marked ones (SG, PL > DU).

This view entails particular commitments about markedness. As mentioned above, there is a tradition of assuming that there is a universally valid markedness hierarchy that is inherent to the values of a particular grammatical feature like number. Based on various morphological criteria going back to Greenberg (1966), it is widely accepted that dual is a crosslinguistically more marked number value than plural and that plural is more marked than singular (e.g. Noyer 1992, Nevins 2011*a*, Smith et al. 2019). While there are varying conceptions of markedness in the literature (see e.g. Zwicky 1978, Harbour 2011*a*), the general idea we wish to adopt here is that, given the four possible combinations of two binary values such as [±singular] and [±augmented], there will be two marked combinations and two unmarked combinations of these values. Taking what is frequently assumed to be the cross-linguistically valid markedness hierarchy in (64), we see that singular and plural will constitute the unmarked feature combinations, while dual and the impossible feature combination [+sing, +aug][18] are the marked combinations.

(64) *Universal markedness hierarchy for number*

$$\begin{array}{ccccccc} * & > & \text{DU} & > & \text{PL} & > & \text{SG} \\ \begin{bmatrix} \text{+singular} \\ \text{+augmented} \end{bmatrix} & & \begin{bmatrix} -\text{singular} \\ -\text{augmented} \end{bmatrix} & & \begin{bmatrix} -\text{singular} \\ \text{+augmented} \end{bmatrix} & & \begin{bmatrix} \text{+singular} \\ -\text{augmented} \end{bmatrix} \\ \text{(marked)} & & \text{(marked)} & & \text{(unmarked)} & & \text{(unmarked)} \end{array}$$

Considering the sub-features that make up each step on the scale, this hierarchy can be understood in terms of contextual markedness (Noyer 1998, Nevins 2011*a*). Concretely, we can state that [+augmented] is the unmarked value in the context of [−singular] since together they

[18]As shown by Harbour (2011*a*), when the semantics of these features is fully spelled out, this combination yields an empty set and therefore has little utility in expressing number.

yield a less marked category (plural) than the alternative value [−augmented] (corresponding to dual). Similarly, the category singular is less marked than the category dual since [+singular] is the unmarked value in the context of [−augmented] (giving us singular) compared to the marked value [−singular] in the context of [−augmented] (giving us dual).

As previously stated, the intuition that we wish to pursue about why the number scale in Mundari is problematic is that it encodes a preference for singulars ([+singular]) over non-singulars ([−singular]) and for unmarked combinations of number features (singular and plural) over marked ones (dual). Contextual markedness now gives us a way to specify singular and plural as a natural class, as they both contain contextually unmarked values for [±augmented]. This can be seen in the language-specific preference hierarchy for Mundari in (65). Here, we have indicated whether a particular [±]-specification is contextually marked or unmarked via a subscripted m for marked or u for unmarked. For example, the [+augmented] feature on a plural is unmarked since, in the context of [−singular] it constitutes the less marked category than [−augmented] in the context of [−singular] (the dual).

(65) *Decomposed number hierarchy in Mundari*

$$\overset{\textsc{sg}}{\begin{bmatrix} +\text{singular}_u \\ -\text{augmented}_u \end{bmatrix}} > \overset{\textsc{pl}}{\begin{bmatrix} -\text{singular}_u \\ +\text{augmented}_u \end{bmatrix}} > \overset{\textsc{du}}{\begin{bmatrix} -\text{singular}_m \\ -\text{augmented}_m \end{bmatrix}}$$

Since contextual markedness can yield the natural class we are looking for, the question now is how one can operationalize markedness in a Cyclic Agree analysis with a relativized probe. There are various conceivable ways this could be achieved. The idea we wish to pursue here builds on the proposal in Nevins (2007) that a probe may look for a marked value in place of the usual [±]-specification. This means that a probe will prefer either the + or − value of a given feature depending on which features co-occur with it. While Nevins (2007) considers only probes that may search for marked and contrastive values, Mundari clearly favours the unmarked values. For this reason, we extend Nevins' proposal to contextually unmarked values, too.[19]

For the sake of explicitness, we will use ᴜ to stand for a contextually unmarked specification of a given feature and ᴍ for a marked one (though the latter will not be directly relevant to the present discussion; but see section 5). In order to derive the correct scale interactions, the probe on Appl in Mundari must be specified to search for [+singular] and [ᴜaugmented], as in (66).

(66) *Number probe in Mundari*

$$\begin{bmatrix} \#: & \begin{matrix} +\text{singular} \\ \textsc{u}\text{augmented} \end{matrix} \end{bmatrix}$$

This expresses the intuition that this probe has a hybrid nature. On the one hand, it is looking for [+singular] goals, while also having a preference for a contextually-unmarked [±augmented] value. It is the latter assumption that derives the missing natural class of singular and plural that is required for a Cyclic Agree analysis to be viable.

With these assumptions in place, the derivations of omnivorous agreement for number follow in the same way as for the person hierarchy. Let us first consider the example in (67), repeated from (15a), in which the DO outranks the IO in number but not person.

[19] As the reader can verify, searching for a marked value of either [±singular] or [±augmented] will result in a preference for duals over singulars and plurals. For further discussion of cross-linguistic predictions of probing for (un)marked features, see section 5.

(67) aiɲ ke Ravi ke hon-ko-iɲ ɛm-a-i̲-ta-n-a
1SG EMP Ravi EMP children-PL-1SG.SM give-APPL-3SG.OM-PROG-ITR-IND
'I am giving Ravi to children.' 3SG DO & 3PL IO

Here, the probe will only initiate a single cycle of Agree with the DO (68). The DO fully matches the probe as [−augmented] is the unmarked specification of [augmented] in the context of [+singular].

(68) *Derivation of IO$_{pl}$ → DO$_{sg}$*

Agree

	Probe	Singular DO	Plural IO
singular clitic	[#: +singular, uaugmented]	[#: +singular, −augmented$_u$]	[#: −singular, +augmented$_u$]

Move

Things are different in the reverse scenario where the IO outranks the DO on the number scale. This is the case in (15b), repeated below as (69), where the DO is plural and the IO is singular.

(69) aiɲ hon-ko ke Ravi ke-iɲ ɛm-a-i̲-ta-n-a
1SG children-PL EMP Ravi EMP-1SG give-APPL-3SG.OM-PROG-ITR-IND
'I am giving children to Ravi.' 3PL DO & 3SG IO

As the derivation in (70) makes clear, the feature [+singular] on the probe is not checked on the first cycle of Agree, thereby triggering a second cycle of Agree with IO. Consequently, the inner clitic tracking the DO is deleted.

(70) *Derivation of IO$_{sg}$ → DO$_{pl}$*

Agree
Agree

		Probe	Plural DO	Singular IO
singular clitic	~~plural clitic~~	[#: +singular, uaugmented]	[#: −singular, +augmented$_u$]	[#: +singular, −augmented$_u$]

Move
Move

We derive the same outcome with combinations of singular and dual arguments. This successfully derives the the SG > DU, PL part of the hierarchy.

This analysis also captures the PL > DU preference, as in (71). If the DO is dual and the IO is plural, then the probe will only match [#] on the DO, since [−augmented] is the marked value in the context of [−singular]. This will lead to a second cycle of Agree in which the [+augmented] feature on the IO is matched, causing the generation of a second clitic for the IO and deletion of the DO clitic.

(71) *Derivation of* $IO_{pl} \rightarrow DO_{du}$

Agree

Agree

$$\begin{array}{cccccc} & & \text{Probe} & & \text{Dual DO} & \text{Plural IO} \\ \text{plural clitic} & \cancel{\text{dual clitic}} & \left[\underline{\#:}\ \begin{array}{l}+\text{singular}\\ \underline{u\text{augmented}}\end{array}\right] & & \left[\underline{\#:}\ \begin{array}{l}-\text{singular}\\ -\text{augmented}_m\end{array}\right] & \left[\#:\ \begin{array}{l}-\text{singular}\\ \underline{+\text{augmented}_u}\end{array}\right] \end{array}$$

Move

Move

As this section has illustrated, the hierarchy governing omnivorous number agreement in Mundari is challenging for a Cyclic Agree approach given standard assumptions of number features. We have shown that this apparently typologically unusual inverted markedness scale can be accounted for by a probe that is relativized not just for sub-classes of number values but also for contextually unmarked values.

4.6 The gender restriction

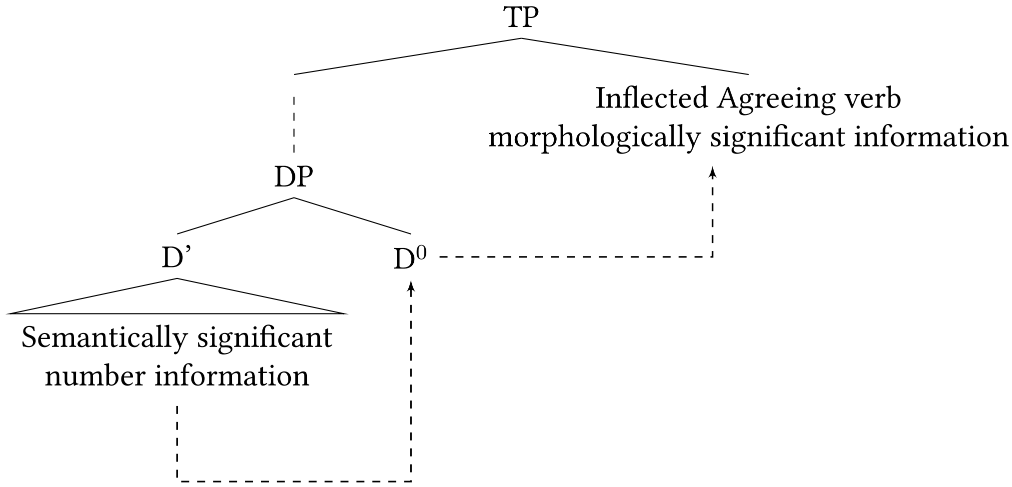
In section 3, we have seen that there is also a gender restriction in Mundari, where the OM can refer to any animate argument, regardless of whether it is the DO or the IO (72).

(72) *Summary of omnivorous marking for gender*

	DO	IO
(19a)	<u>animate</u>	inanimate
(19b)	inanimate	<u>animate</u>

Unlike person and number, there is no actual hierarchy involved in the case of gender, rather it is an absolute restriction on possible targets for the OM, as inanimate arguments are never cross-referenced by the OM. For this reason, the gender restriction can be explained by making inanimate arguments generally unavailable for Agree. In order to derive this fact, we need to consider how D^0 inherits its features. In section 4.3, we posited that when an external probe agrees with a DP, only D^0 and those features that are contained as a part of D^0 are accessible to the external probe. This assumption follows from Harbour's (2008, 2011*b*) analysis of inverse marking in Kiowa, where the syntactic transmission of number information flows through D^0 as in (73).

(73)



Following the same intuition, let us assume that D^0 does not inherently have any φ-features, but instead inherits its φ-features via DP-internal Agree. We assume that Agree is established between the probe D^0 and its complement φP that inherently contains the φ-features (Déchaine & Wiltschko 2002, Danon 2011). When it comes to the probing features, we assume that D^0 is specified for [+animate] as a feature meant for probing.

Having [+animate] as a precondition for the possible goals for D^0 means that Agree will only be successful if φP has the corresponding [+animate] and in which case, all the features of φP are copied onto D^0. On the other hand, if φP does not have a corresponding [+animate], then Agree will not be successful. In this case, D^0 cannot copy the features of φP and end up having no features.[20] The featural difference between an animate and an inanimate DPs are given in (74).

(74) *Animate and inanimate DPs with 3SG features*

$$\underset{\mathrm{DP_{animate}}}{\overset{D^0}{\begin{bmatrix} \gamma: & \text{+animate} \\ \pi: & \begin{matrix}\text{−author}\\ \text{−participant}\end{matrix} \\ \#: & \begin{matrix}\text{+singular}\\ \text{−augmented}_u\end{matrix} \end{bmatrix}} \overset{\varphi P}{\begin{bmatrix} \gamma: & \text{+animate} \\ \pi: & \begin{matrix}\text{−author}\\ \text{−participant}\end{matrix} \\ \#: & \begin{matrix}\text{+singular}\\ \text{−augmented}_u\end{matrix} \end{bmatrix}}} \qquad \underset{\mathrm{DP_{inanimate}}}{\overset{D^0}{\begin{bmatrix} \quad \end{bmatrix}} \overset{\varphi P}{\begin{bmatrix} \gamma: & \text{−animate} \\ \pi: & \begin{matrix}\text{−author}\\ \text{−participant}\end{matrix} \\ \#: & \begin{matrix}\text{+singular}\\ \text{−augmented}_u\end{matrix} \end{bmatrix}}}$$

The difference between animate and inanimate DPs reflected at the level of D^0 is projected to the DP level. Thus, the features of inanimate DP can never be accessed by the external probe. As a result, inanimate DPs are unable to participate in Agree leading to an omnivorous pattern given in (72).

An immediate consequence of this analysis is that there is no need to have the gender probe represented as a part of the external probe's feature inventory. Since the animacy preference is already taken care of at the level of DP, there is no need to specify it as a part of an external probe's specification at the level of Appl^0. Given the absence of a probing

[20]Harbour (2008, 2011*b*) considers that the featural content of D^0 is semantically inert. Therefore, the absence of features at D^0 is not going to affect the semantic interpretation of an inanimate DP.

specification for gender, the proposed analysis is in line with Preminger's (2019) observation that clitic doubling itself is generally not sensitive to animacy, specificity or definiteness but the operation that feeds clitic doubling is. For Preminger, the feeding operation is phrasal movement of a non-human or non-definite nominal, which may not take place from a position from which such nominals are accessible to the clitic doubling operation. Similarly, in our analysis, the feeding operation involves Agree between D^0 and φP, which is not possible for an inanimate DP. As a result, the inanimate DP remains inaccessible for clitic doubling.

4.7 Scale interactions

Thus far, we have seen how a Cyclic Agree analysis can resolve situations in which the internal arguments match with regard to one scale, but mismatch with regard to another. In all of the examples analyzed so far, the second scale was definitive in determining which argument is tracked by the OM. We now turn to examples in which arguments are mismatched on both scales.

Recall that the empirical generalization we identified earlier in (34) is that the DO is cross-referenced by the OM only if it is not outranked by the IO on either the person or the number scale (both are repeated below for convenience).

(75) a. Person scale: 1 > 2 > 3
b. Number scale: SG > PL > DU

Whenever this condition is not met, the OM will cross-reference the IO. This can be seen in the table below, which contains all examples in which the person and number scales converge on the highest ranking argument. Only in those cases in which both scales pick out the DO (26a, 30a, 32a) do we find the OM indexing the features of the DO.

(76) *One argument outranks the other on both scales*

	DO	IO		
(26a)	<u>1SG</u>	3PL	person = DO	number = DO
(26b)	3PL	<u>1SG</u>	person = IO	number = IO
(30a)	<u>1SG</u>	2PL	person = DO	number = DO
(30b)	2PL	<u>1SG</u>	person = IO	number = IO
(32a)	<u>2PL</u>	3DU	person = DO	number = DO
(32b)	3DU	<u>2PL</u>	person = IO	number = IO

This can be seen further by considering scenarios in which the person and number scales diverge in which argument they prefer. As summarized below in (77), whenever there is a mismatch between the scales, the OM tracks the IO. Thus, the OM uniformly targets the IO in all of the scenarios in (77).

(77) *Each argument outranks the other on a different scale*

	DO	IO		
(27a)	3SG	2PL	person = IO	number = DO
(27b)	2PL	3SG	person = DO	number = IO
(28a)	2SG	1PL	person = IO	number = DO
(28b)	1PL	2SG	person = DO	number = IO
(29a)	3SG	1PL	person = IO	number = DO
(29b)	1PL	3SG	person = DO	number = IO
(31a)	2PL	1DU	person = IO	number = DO
(31b)	1DU	2PL	person = DO	number = IO

As we will show, this all follows naturally from what we have said so far if we combine both the specifications of the number and person probes we have already posited and assume that they function simultaneously as a single probe on Appl, as in (78).[21]

(78) *Specification of Appl in Mundari*

$$\begin{bmatrix} \pi: & \begin{array}{l} +\text{author} \\ +\text{participant} \end{array} \end{bmatrix} + \begin{bmatrix} \#: & \begin{array}{l} +\text{singular} \\ \upsilon\text{augmented} \end{array} \end{bmatrix} = \begin{bmatrix} \pi: & \begin{array}{l} +\text{author} \\ +\text{participant} \end{array} \\ \#: & \begin{array}{l} +\text{singular} \\ \upsilon\text{augmented} \end{array} \end{bmatrix}$$

In what follows, we will show how our analysis derives the aforementioned generalization that the OM only tracks the DO if the DO matches or outranks the IO on both the person and number scales. We will discuss both of the scenarios described in (76) and (77). Subsequently, we discuss the effect of the gender restriction in overriding any other scale preferences.

4.7.1 Scenario 1: One argument outranks the other on both scales

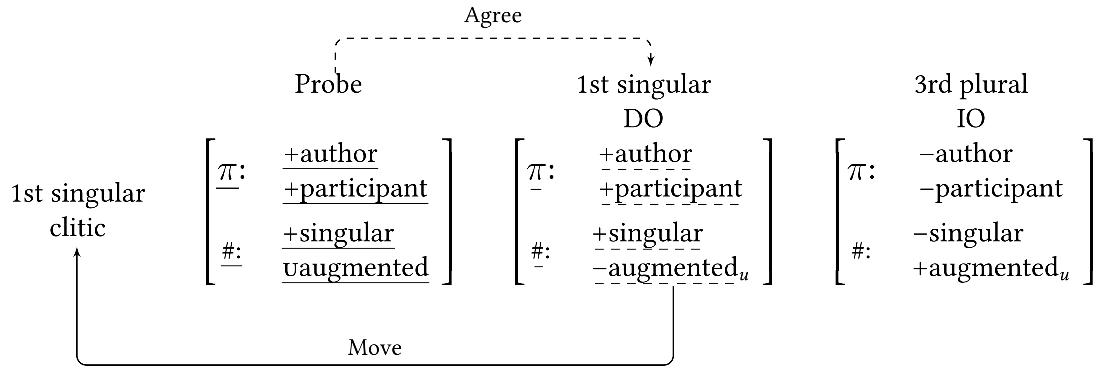
Let us first begin by illustrating cases in which both scales pick out the same argument, as in (76). Concretely, let us first consider the case of (26a), repeated below as (79), where the DO is 1SG, and the IO is 3PL. Here, the DO outranks the IO on both the person and number scales.

(79) hon-ko aiɲ ke ako ke-ko ɛm-a-iɲ-ta-n-a
children-PL 1SG EMP 3PL EMP-3PL.SM give-APPL-1SG.OM-PROG-ITR-IND
'Children are giving me to them.' 1SG DO & 3PL IO

The derivation of this example is given in (80), where we see that all of the relevant features on the composite person/number probe are matched in the first cycle of Agree. For this reason, there is no remaining feature on the probe to trigger a second cycle and, as such, we generate a single clitic referring to the DO.

[21] This differs from accounts such as Taraldsen (1995), Béjar (2003), Rezac (2003), Sigurðsson & Holmberg (2008), Preminger (2011), where they consider person and number as probes on distinct heads that probe separately.

(80) *Derivation of $IO_{3pl} \rightarrow DO_{1sg}$ (26a)*



Now, let us consider the reverse case in which the IO is 1SG and the DO is 3SG, as in (26b) repeated below as (81). Here, it is the IO that outranks the DO on both the person and number scales.

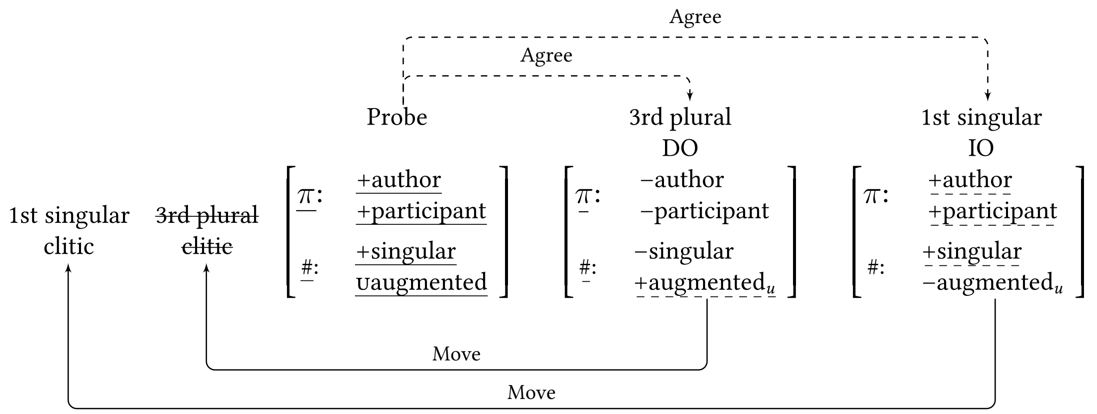
(81)

hon-ko	ako ke	aiɲ	ke-ko	ɛm-a-iɲ-ta-n-a
children-PL	3PL EMP	1SG	EMP-3PL.SM	give-APPL-1SG.OM-PROG-ITR-IND

'Children are giving them to me.' 3PL DO & 1SG IO

The relevant derivation is given in (82). In the first cycle of Agree, the probe only matches [#] and [−augmented] for number, in addition to the general person feature [π]. Since the probe is not fully satisfied in this first cycle, a second cycle of Agree with the IO is initiated and the remaining features of the probe are matched. As a consequence, a second clitic is generated, thereby triggering deletion of the inner DO clitic.

(82) *Derivation of $IO_{1sg} \rightarrow DO_{3pl}$ (26b)*



As we have seen, if a clitic from the IO is created, then the previously generated DO clitic will be deleted. Therefore, whenever there are leftover features from the first cycle that can be checked by the IO, the DO will not be indexed by the object marker. The derivations for other cases in (76) work similarly. We therefore derive the desired generalization that cross-referencing of the DO is only possible if it is not outranked by the IO on either the person or number scale.

4.7.2 Scenario 2: Each argument ranks highest on a scale

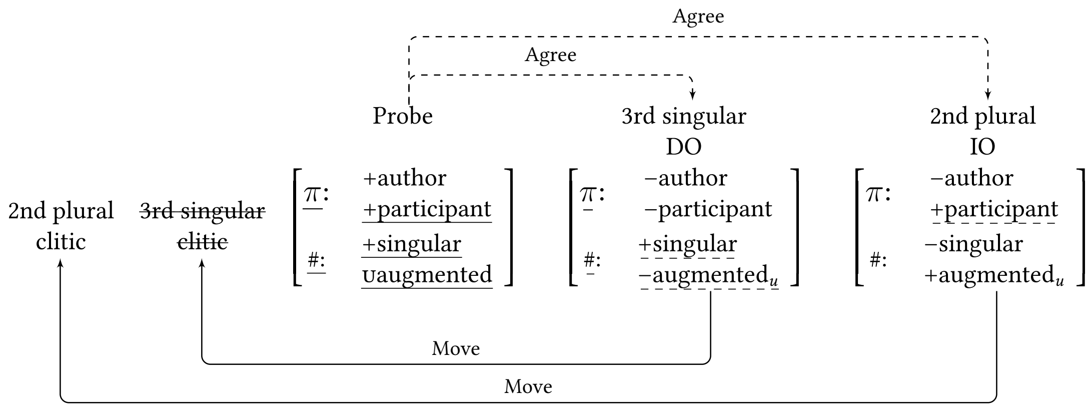
Now, let us consider the scenarios in (77) in which there is a conflict between the scales. This can be illustrated on the basis of the examples in (27), repeated below.

(83) a. hon-ko Ravi ke ape ke-ko ɛm-a-pe-ta-n-a
children-PL Ravi EMP 2PL EMP-3PL.SM give-APPL-2PL.OM-PROG-ITR-IND
'Children are giving Ravi to you(PL).' 3SG DO & 2PL IO

b. hon-ko ape ke Ravi ke-ko ɛm-a-i-ta-n-a
children-PL 2PL EMP 3SG EMP-3PL.SM give-APPL-3SG.OM-PROG-ITR-IND
'Children are giving you(PL) to Ravi.' 2PL DO & 3SG IO

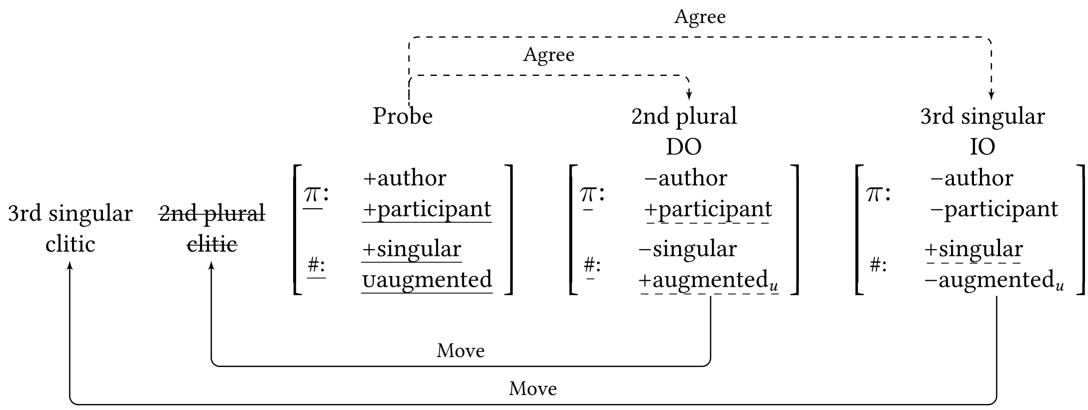
In (83a), for example, the DO is 3SG and the IO is 2PL. The person scale therefore favours the IO, while the number scale picks out the DO. The derivation of this example is given in (84). The probe does not match any specific person values other than [π] and also matches [uaugmented] for number. For this reason, the remaining [+participant] feature on the IO can be matched in a second cycle of Agree. Consequently, a second clitic is generated.

(84) *Derivation of $IO_{2pl} \rightarrow DO_{3sg}$ (83a)*



As (85) shows, if we reverse the position of the arguments as in (83b), we still end up with a clitic referencing the IO (now the 3rd singular argument), as the first cycle of Agree cannot match the [+singular] value of the probe.

(85) *Derivation of $IO_{3sg} \rightarrow DO_{2pl}$ (83b)*



The remaining scenarios in (77) run along similar lines. What they all have in common is that the IO is not outranked by the DO on both the person and number scales. For this reason, there will always be a second cycle of Agree and therefore no DO clitic.

4.7.3 Scenario 3: Gender overrides person/number

The final scenario to discuss here involves the interaction of gender with the person and number hierarchies. As previously discussed, we do not view gender as a hierarchy of its own, but rather treat animacy as a precondition for being a legitimate goal for Agree. What is relevant at this point is that gender can override other hierarchies. As shown in (86), even if the number scale would favor a particular argument, the OM will not cross-reference it if that argument is inanimate.

(86) a. aiɲ bhilai-ko ke oɽak'-iɲ ɛm-a-<u>ko</u>-ta-n-a
1SG cat-PL EMP house-1SG.SM give-APPL-<u>3PL.OM</u>-PROG-ITR-IND
'I am giving cats to the house.'

b. aiɲ oɽak bhilai-ko ke-iɲ ɛm-a-<u>ko</u>-ta-n-a
1SG house cat-PL EMP-1SG.SM give-APPL-<u>3PL.OM</u>-PROG-ITR-IND
'I am giving a house to the cats.'

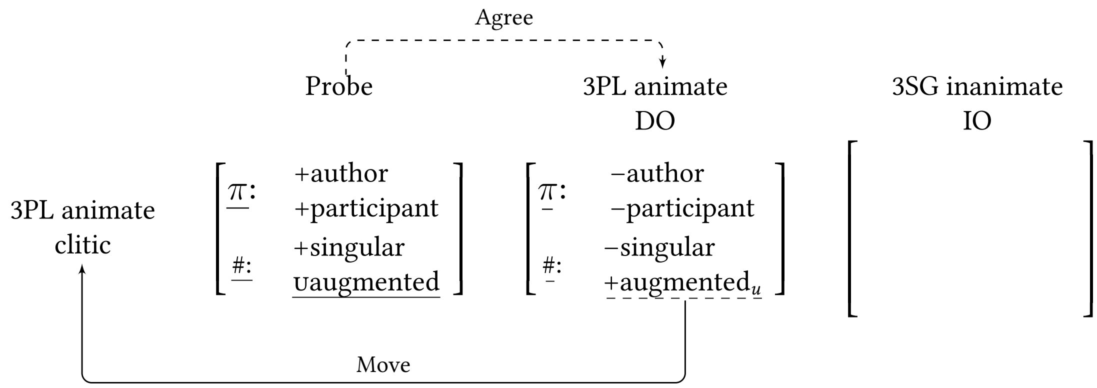
So, even if the number scale singles out the DO as in (86a), the gender restriction can overrule this outcome if the preferred argument is not animate. This summarized in (87).

(87) *Gender overrides the number scale*

	DO	IO
(86a)	<u>3PL.animate</u>	3SC.inanimate
(86b)	3SG.inanimate	<u>3SG.animate</u>

Given what we have said in section 4.6, the derivations of these examples are relatively straightforward. Recall that we assumed that, due to an animacy condition on the DP-internal agreement, the φ-features of a nominal are only present on D/DP if it is animate. Therefore, in each of the cases above in (86), there are no features on the respective inanimate that are visible to the probe. This is schematized below in (88) and (89).

(88) *Derivation of IO$_{3sg.inan}$ → DO$_{3pl.an}$ (86a)*



(89) *Derivation of $IO_{3pl.an} \rightarrow DO_{3sg.inan}$ (86b)*

Agree

$$\begin{array}{cccc} & \text{Probe} & \begin{array}{c}\text{3SG inanimate}\\\text{DO}\end{array} & \begin{array}{c}\text{3PL animate}\\\text{IO}\end{array} \\ \begin{array}{c}\text{3PL animate}\\\text{clitic}\end{array} & \begin{bmatrix} \underline{\pi}: & \begin{array}{l}+\text{author}\\+\text{participant}\end{array} \\ \underline{\#}: & \begin{array}{l}+\text{singular}\\ \underline{u\text{augmented}}\end{array}\end{bmatrix} & \begin{bmatrix} \quad & \quad \\ \quad & \quad \end{bmatrix} & \begin{bmatrix} \pi: & \begin{array}{l}-\text{author}\\-\text{participant}\end{array} \\ \#: & \begin{array}{l}-\text{singular}\\ +\text{augmented}_u\end{array}\end{bmatrix}\end{array}$$

Move

While it may seem that, descriptively at least, omnivory for gender somehow 'outranks' the preference for other scales, in our actual implementation, gender features will simply remove the applicability of the person or number scale if one of the arguments is inanimate, by virtue of the features being invisible to the probing calculus.

4.8 Division of labour between syntax and morphology

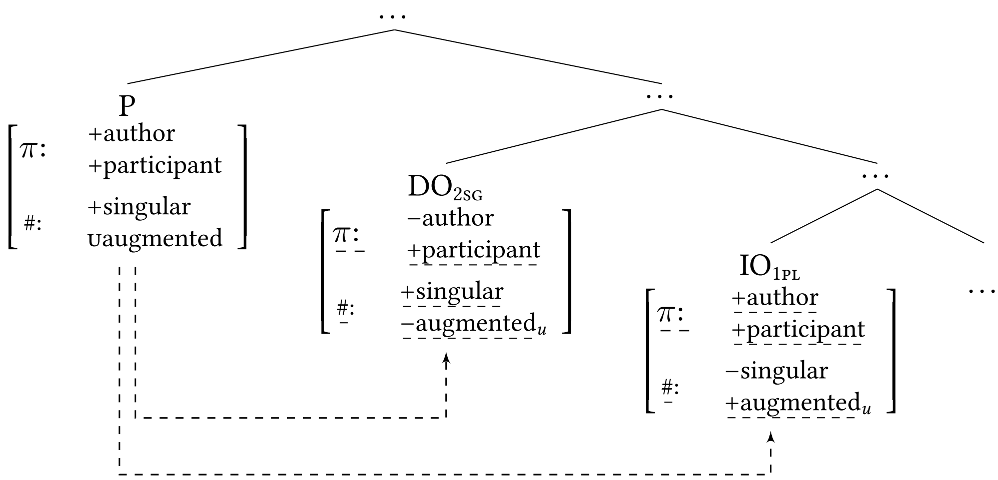
In this section, we have shown how a Cyclic Agree analysis combined with a straightforward PF deletion rule can derive the effect of interacting scales in Mundari. Recall that the key empirical generalization is that the object marker on the verb in Mundari tracks the DO only if the DO outranks the IO on both the person and number scales. In all other cases, the OM indexes the features of the IO. In our analysis, this pattern is derived by the fact that, whenever a second cycle of Agree with the IO is successful, the innermost clitic referencing the DO will be deleted by a PF Obliteration rule. This derives the 'all or nothing' nature of the scale interaction – the DO must outrank the IO on both scales to be the target of the OM, i.e. to prevent generation of an IO clitic to begin with.

Given this, our analysis has a hybrid nature in that the interaction of scales in Mundari is derived by a conspiracy of syntactic and PF mechanisms. Cyclic Agree provides a natural way of implementing a hierarchy based on the number of features matched by the probe. Only when there are leftover features after Agree with the DO will a second cycle of Agree take place. The PF deletion rule then ensures that in all cases in which there is a second cycle of Agree with the IO, it is the IO clitic that will be retained over the DO one. At this juncture, one might wonder whether such a hybrid approach is strictly speaking necessary. Would it not be more parsimonious to pursue an entirely syntactic or morphological account? In what follows, we consider two such analytical options and conclude that neither offers a better way of deriving the interplay of the person and number scales in Mundari.

First, let us consider what a purely syntactic approach could look like. It is clear that a Cyclic Agree analysis without the deletion rule we posit is not adequate. This would predict a radically different pattern in which we find a single OM on the verb referencing the DO when the DO outranks the IO on both the person and number scales, and two distinct clitics indexing the DO and IO in all other cases. As we have seen, there is only ever one object clitic on the verb in Mundari. An alternative way of achieving variable indexing of the DO and IO without multiple cycles of Agree would be to assume that the probe considers both the DO and IO as possible goals, ultimately only choosing one of them. This is what we find in accounts employing Multiple Agree (see e.g. Hiraiwa 2001, 2005, Nevins 2011*b*, Coon & Bale

2014, Oxford 2019, Despić et al. 2019). In Multiple Agree analyses, there is a single cycle of probing that may match multiple goals within a given domain. The choice of which goals are ultimately targeted for Agree will depend on which one provides the 'best match' for the probe. The concept of *Best Match* is often understood in a rather intuitive way, where the goal matching most features wins (also see van Urk & Richards 2015 for the similar principle of *Multitasking*). This still leaves open the question of what happens when goals match the same number of features of the probe. Here, the common assumption is that Agree then targets both goals simultaneously (see e.g. Oxford 2019: 970). While Best Match will derive correct results when only one scale is involved, e.g. when the arguments have the same person value but differing number values, a Multiple Agree approach with Best Match struggles to capture cases of conflicting scales in Mundari. To see this, consider a scenario in which the IO is 1PL and the DO is 2SG, as in example (28a). Here, the outcome we find is that the OM tracks the IO since the DO outranks the IO only in number, but not person. As shown in the tree in (90), however, the DO and IO match the same number of features on the probe, meaning that there is no obvious reason why the IO would be preferred to the DO.[22]

(90)



The challenge here is that we need to somehow express a 'default preference' for the IO, with Agree with the DO succeeding only in cases in which the DO matches more features of the goal. This cannot be easily achieved with Best Match alone. We would need to encode the default preference for an IO in cases of scale conflict via some additional statement in the grammar. In the Cyclic Agree alternative that we have proposed, we do not require any additional assumption for cases in which multiple scales are applicable, the preference for the IO follows automatically from there being leftover features on the probe.

A similar line of critique applies to a purely morphological analysis. In such an approach, we could imagine that the probing head always successfully agrees with both internal arguments, thereby generating two clitics for all combinations of person and number features. It would then be the job of PF to delete one of these clitics based on the features they have. In resolving illicit clitic combinations, previous work has argued that deletion rules can be sensitive to factors such as markedness or position (e.g. Bonet 1991, Grimshaw 1997, Pescarini 2010, Calabrese 2011, Arregi & Nevins 2012). As such, a purely morphological approach could take the deletion rule we posit to delete either the DO or IO depending on the markedness of the features they bear. For cases in which a single scale determines the controller of the OM, there would be an

[22]The position of the probe/arguments is not important in the Multiple Agree analysis since the probe will always match both internal arguments.

asymmetry: deletion would preserve the clitic with the more marked person features or the less marked number features. In cases of scale conflict, however, we have the same problem as before. There has to be a default preference for the IO. In other words, the deletion rule would amount to a restatement of the empirical observation: 'Delete the DO whenever the IO outranks it in either person or number'. Here, it is necessary to refer to ranking on a scale rather than just markedness itself.

In the Cyclic Agree analysis we have proposed, this generalization emerges from the interaction of two simple components: a standard Cyclic Agree analysis and a dissimilation rule against multiple clitics. It is precisely in those cases in which Cyclic Agree creates the context for the deletion rule to apply that we find the preference for the IO (in case the relevant scales pick out distinct arguments). Importantly, this hybrid approach relies on the interaction of these two processes to derive the empirical generalizations in Mundari and therefore does require that Mundari's bias toward the IO be explicitly encoded in either the Agree mechanism or the deletion rule.

4.9 Summary

To summarize this section, we have seen that a Cyclic Agree approach can readily accommodate the patterns of omnivorous object marking that we find in Mundari. As we saw, the number scale in Mundari is unexpected as it prefers less-marked number values over more marked ones. We have suggested a way of incorporating markedness preferences into relativization of the probe. In general, omnivory for person and number in Mundari reduces to the number of cycles of Agree in a given derivation. Assuming that multiple clitic clusters are not possible, whenever a second cycle of Agree is successful, the object marker will never refer to the DO. Thus, cross-referencing of the DO indicates that there was only a single cycle of Agree. Thus, the interaction of scales follows naturally because the IO outranking the DO on any of the scales entails that there are leftover features that match the probe.[23]

5 Cross-linguistic omnivorous patterns

In this section, we will situate Mundari with other omnivorous patterns of various ranking systems observed in different languages. Aside from the variation expected from binary feature systems, we will lay out the cross-linguistic implications of allowing probing for unmarked/marked features. In (91) and (92), we present the scales for person and number with each feature labeled as contextually marked/unmarked. The markedness status of each decomposed feature depends on the other person/number feature in the feature bundle and the position of this combination on the universal markedness scales. We include each combination of features on the scale, including the impossible combination which is assumed to be the most highly marked feature bundle, and is thus not attested.

Markedness status is assigned along the following lines. A subfeature value is considered marked if the opposite value in the same context forms a feature bundle that ranks lower on the markedness scale. In the same vein, a subfeature is considered unmarked if the opposite value

[23] A reviewer asks if the proposed analysis incorrectly predicts omnivorous agreement with subjects, as well. In order to see why we do not expect this, it is important to note that an omnivorous pattern arises in a configuration when there is one probe and multiple goals. In a transitive sentence like (8), there are two probes and two goals, where one probe agrees with the subject (realized as the subject marker) and the other probe agrees with the object. In addition, if the subject probe did try to additionally agree with the object, Agree/clitic doubling would have already taken place with the object probe at that point. Consequently, no further head movement or agreement is possible for the object DP for the subject agreement probe.

in the same context forms a feature bundle that ranks higher on the markedness scale. For example, the feature [−singular] is marked in the category dual because the feature [+singular] in the same context, i.e., [−augmented], forms the category singular which ranks lower on the universal number scale than dual in (91). The same rationale is applied to the person scale. The subfeature [−participant], for example, is considered unmarked in the 3rd person since [+participant] in the same context, i.e., [−author], forms 2nd person which ranks higher on the person scale in (92) than 3rd person.

(91) *Universal markedness hierarchy for number*

$$\begin{array}{ccccccc} * & > & \text{DU} & > & \text{PL} & > & \text{SG} \\ \begin{bmatrix} +\text{singular}_m \\ +\text{augmented}_m \end{bmatrix} & & \begin{bmatrix} -\text{singular}_m \\ -\text{augmented}_m \end{bmatrix} & & \begin{bmatrix} -\text{singular}_u \\ +\text{augmented}_u \end{bmatrix} & & \begin{bmatrix} +\text{singular}_u \\ -\text{augmented}_u \end{bmatrix} \end{array}$$

(92) *Universal markedness hierarchy for person*

$$\begin{array}{ccccccc} * & > & 1 & > & 2 & > & 3 \\ \begin{bmatrix} -\text{participant}_m \\ +\text{author}_m \end{bmatrix} & & \begin{bmatrix} +\text{participant}_u \\ +\text{author}_m \end{bmatrix} & & \begin{bmatrix} +\text{participant}_m \\ -\text{author}_u \end{bmatrix} & & \begin{bmatrix} -\text{participant}_u \\ -\text{author}_u \end{bmatrix} \end{array}$$

The scales in (91) and (92) will serve as helpful overviews as we go through each probing possibility in this section. Section 5.1 will be devoted to the implications for omnivorous number patterns, while section 5.2 will focus on omnivorous person patterns.

5.1 Number

Apart from Mundari, we are aware of two other language which displays a three-way number system and omnivorous agreement. As was briefly mentioned in section 4.5, the Northern Iroquoian language Onondaga instantiates another omnivorous agreement pattern we predict with our analysis of number decomposition. Barrie (2016) observes the following interactions of number marking in (93), pointing to a number hierarchy of the form PL > DU > SG. The same scale emerges from the omnivorous pattern observed for Hayu, a Sino-Tibetan language spoken in Nepal (Michailovsky 2017, Georgi 2019).

(93) *Onondaga* (Barrie 2016: 101 (4-5))

a. s-g-ni-ge-haʔ
2-1-DU-see-HAB
'I see you two.' (or)
'We two see you.' (or)
'We two see you two.'

b. s-g-wa-ge-haʔ
2-1-PL-see-HAB
'I see you all.' (or)
'We two see you all.' (or)
'We all see you (SG).'

The number agreement that emerges from languages like Onondaga and Hayu is summarized in the tables in (94). In contrast to Mundari, singular is the least favored category in Onondaga (and Hayu).

(94) *Number marking in Onondaga and Hayu*

Subj	Obj
SG	PL
PL	SG

Subj	Obj
SG	DU
DU	SG

Subj	Obj
PL	DU
DU	PL

Within a binary number system, we can derive the number scale in Onondaga/Hayu by specifying the probe for plural, as is shown in (95), so that a plural argument fully matches the probe, a dual argument constitutes a partial match, and a singular argument only matches the attribute #. As discussed in section 4.5, this probe specification derives the hierarchy PL > DU > SG in our account. Note that one of the contrasts between Onondaga/Hayu and Mundari comes about by specifiying the probe for [−singular] in Onondaga/Hayu, as opposed to [+singular] in Mundari.

(95) *Scale and probe in Onondaga, Hayu*

$$\begin{array}{ccccccc} \text{Probe} & & \text{PL} & > & \text{DU} & > & \text{SG} \\ \left[\#: \begin{array}{l} -\text{singular} \\ +\text{augmented} \end{array}\right] & & \left[\underline{\#}: \begin{array}{l} \underline{-\text{singular}} \\ \underline{+\text{augmented}} \end{array}\right] & & \left[\underline{\#}: \begin{array}{l} \underline{-\text{singular}} \\ -\text{augmented} \end{array}\right] & & \left[\underline{\#}: \begin{array}{l} +\text{singular} \\ -\text{augmented} \end{array}\right] \\ & & \text{(3 matches)} & & \text{(2 matches)} & & \text{(1 match)} \end{array}$$

Recall from (62) in section 4.5 that there are a few more three-way number hierarchies we predict to appear with omnivorous agreement within the context of a binary number system, that is DU > PL > SG, SG > DU > PL, and SG/PL > DU. This is, however, not the only dimension along which probes can vary. One often discussed point of variation comes about via the extend to which probes are elaborated (Béjar 2003, Béjar & Rezac 2009, amongst many others). Another dimension of variation we propose in this paper is markedness. In (96) and (97), we show which scales are predicted to exist if we take these two additional factors into account, where shading indicates attested omnivorous patterns. Since we propose that number probes can either target the decomposed binary values or the contextual markedness status (or both), we predict that simple probes can enter the derivation with eight different specifications, as shown in (96). The decomposed features can also be combined creating elaborate probes which either combine in terms of binary features or in their markedness specifications. Additionally, as we argued for Mundari, elaborate probes can constitute hybrids cross-cutting a markedness properties and binary features. Specifically, the Mundari scale SG > PL > DU results from a probe which targets [+singular] and [Uaugmented]. The number scale emerging from the omnivorous pattern in Onondaga and Hayu can be derived with [−singular] and [+augmented]. Interestingly, as is indicated in (97), another way to predict the Onondaga/Hayu scale is via an elaborate probe which targets [+singular] and [Uaugmented]. The current system predicts many more scales to emerge, but since there are only few three-way number systems with omnivorous agreement observed so far, it is difficult to test these predictions. Thus, we leave this open for future work in the hope that more languages with omnivorous agreement patterns will come to light.

(96) *Predicted scales with simple number probes*

a. Msingular = DU > SG/PL	e. +singular = SG > PL/DU
b. Usingular = SG/PL > DU	f. −singular = DU/PL > SG
c. Maugmented = DU > SG/PL	g. +augmented = PL > SG/DU
d. Uaugmented = SG/PL > DU	h. −augmented = SG/DU > PL

(97) *Predicated scales with elaborate number probes including hybrids*

	+augmented	−augmented	Maugmented	Uaugmented
+singular	SG/PL > DU	SG > DU > PL	SG/DU > PL	$\boxed{\text{SG > PL > DU}}$
−singular	$\boxed{\text{PL > DU > SG}}$	DU > PL > SG	DU > PL > SG	$\boxed{\text{PL > DU > SG}}$
Msingular	PL/DU > SG	DU > SG > PL	DU > SG/PL	SG/PL/DU
Usingular	PL > SG > DU	SG > DU/PL	SG/PL/DU	SG/PL > DU

Instead, let us turn to languages with the more widely attested two-way number systems and investigate our predictions concerning omnivorous agreement. First note that for a two-way number system only one bivalent feature is required to draw a distinction. Hence, there are two possible probe specification, shown in (98), which predict two types of omnivorous number agreement either following a SG > PL hierarchy or a PL > SG hierarchy. Contextual markedness does not arise in such a system, as there is only one feature which derives the two-way split.

(98) *Possible scales in two-way number systems*

Probe	PL	>	SG
[#: −singular]	[#: −singular]		[#: +singular]
	(2 matches)		(1 match)

Probe	SG	>	PL
[#: +singular]	[#: +singular]		[#: −singular]
	(2 matches)		(1 match)

Omnivorous number agreement following a PL > SG hierarchy can be observed with the agent focus construction in Kichean (Preminger 2014), shown in (99), for the combination of a 3rd person subject and a 3rd person object. In such cases, plural marking on the verb can come from either the subject (99a) or the object (99b). Georgian also exhibits a similar effect, as was shown in section 1, where plural agreement can come from either the subject or the object. Again, the omnivorous agreement pattern is guided by the PL > SG hierarchy. Finally, D'Alessandro (2017) points out that certain varieties of Abruzzese dialects spoken in Italy, in particular Ariellese, display an omnivorous number effect, where the participle agrees with whichever argument is plural. Like in Georgian, Abruzzese's omnivorous number effect is also independent of the argument's person values. All three languages require a probe specified for [−singular].

(99) *Kichean* (Preminger 2014: 20)

a. ja rje' x-e-tz'et-ö rja'
   FOC them COM-3PL-see-AF him
   'It was them who saw him.'

b. ja rja' x-e-tz'et-ö rje'
   FOC him COM-3PL-see-AF them
   'It was him who saw them.'

By now, we have discussed three languages which display omnivorous number agreement with a PL > SG scale. This raises the question of whether we also find the mirror pattern, that is a language which shows omnivorous number agreement with a SG > PL hierarchy. Indeed, recent observations concerning clitic climbing in Ketama Berber, an Afro-Asiatic language, seem to involve a probe that favors singular over plural categories (Kumaran 2023). In this language, object clitics are generally found post-verbally, but some preverbal morphology such as the future tense marker attracts clitics to the preverbal position. The choice of whether one or two clitics are moved to preverbal position is guided by a preference for singular clitics over plural clitics (100). This pattern can be derived by a probe specified for [+singular] in Ketama Berber, as is indeed also proposed by Kumaran (2023).

(100) *Ketama Berber* (Kumaran 2023)

a. š-a y=t=∅-i-k
FUT-IRR 1SG.IO=3SG.DO=DITR-3SG.M-give
'He will give it to me.'

b. š-a y=t-i-kk=ihen
FUT-IRR 1SG.IO=DITR-3SG.M-give=3PL.DO
'He will give them to me.'

In this section, we have shown how our account of omnivorous number agreement in Mundari can extend to other patterns, including two-way number systems. An overview is given in (101).

(101) *Cross-linguistic omnivorous number patterns*

a. Mundari: SG > PL > DU
b. Onondaga, Hayu: PL > DU > SG
c. Georgian, Kichean, Ariellese: SG > PL
d. Ketama Berber: PL > SG

What seems to be instrumental in deriving the variation in omnivorous number agreement is a bivalent feature system overall, as different languages specify the relevant probe either to positive or to negative values. Moreover, the Mundari pattern requires an extension that makes reference to contextual markedness. In the next section, we will explore in how far this conclusion can also be drawn for omnivorous person agreement patterns.

5.2 Person

As in the previous section, we will start with an investigation of the predictions emerging from a binary person feature system, and then extend our discussion towards the factors elaboration of the probe and markedness. Given a binary decomposition of person features, we predict the scales in (102) to occur for omnivorous person agreement cross-linguistically. If the probe is specified for [+author] and [+participant], a 1st person argument will match the probe fully, a 2nd person argument will provide a partial match, and a 3rd person argument will match the attribute. This probe specification leads to the Mundari pattern with a 1 > 2 > 3 hierarchy, as was discussed in section 4.4. Another language which has been documented with such an omnivorous pattern is Alutor, a Chukotkan language (Mel'čuk 1973). With nothing else being said, there are (at least) three more probe specifications allowed by our account which lead to the scales shown in (102). In analogy to the discussion for omnivorous number in section

4.5, a probe specified for 2nd person would result in the hierarchy 2 > 1/3, a probe specified for 3rd person would lead to the hierarchy 3 > 2 > 1, and the unnatural person combination [+auth,−part] would create a 1/3 > 2 scale. Neither of these hierarchies are attested with omnivorous person agreement. This is significant since, in contrast to three-way number systems, three-way person systems are widespread across languages and hence any of these three patterns should have likely come to light by now. A closer look at the probe specifications points to a probable source for the lack of such patterns. One conclusion one could draw from the current state of the cross-linguistic picture is that omnivorous person probes can only probe for positive values. This assumption would derive the observation that the known omnivorous patterns in Mundari and Alutor follow the 1 > 2 > 3 hierarchy, and neither of the other three hierarchies in (102). Crucially, person omnivory would differ from number omnivory in that the latter is derived by probes being able to probe for negative and positive values. We will come back to this point at the end of this section.

(102) *Possible scales given the decomposition in (52)*

$$
\begin{array}{ccccccc}
\text{Probe} & 1 & > & 2 & > & 3 \\
\left[\pi: \begin{array}{l}\text{+author}\\ \text{+participant}\end{array}\right] &
\left[\underline{\pi}: \begin{array}{l}\underline{\text{+author}}\\ \underline{\text{+participant}}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\text{−author}\\ \underline{\text{+participant}}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\text{−author}\\ \text{−participant}\end{array}\right] \\
 & \text{(3 matches)} & & \text{(2 matches)} & & \text{(1 match)} \\
\\
\text{Probe} & 2 & > & 1 & = & 3 \\
\left[\pi: \begin{array}{l}\text{−author}\\ \text{+participant}\end{array}\right] &
\left[\underline{\pi}: \begin{array}{l}\underline{\text{−author}}\\ \underline{\text{+participant}}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\text{+author}\\ \underline{\text{+participant}}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\underline{\text{−author}}\\ \text{−participant}\end{array}\right] \\
 & \text{(3 matches)} & & \text{(2 matches)} & & \text{(2 matches)} \\
\\
\text{Probe} & 3 & > & 2 & > & 1 \\
\left[\pi: \begin{array}{l}\text{−author}\\ \text{−participant}\end{array}\right] &
\left[\underline{\pi}: \begin{array}{l}\underline{\text{−author}}\\ \underline{\text{−participant}}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\underline{\text{−author}}\\ \text{+participant}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\text{+author}\\ \text{+participant}\end{array}\right] \\
 & \text{(3 matches)} & & \text{(2 matches)} & & \text{(1 match)} \\
\\
\text{Probe} & 1 & = & 3 & > & 2 \\
\left[\pi: \begin{array}{l}\text{+author}\\ \text{−participant}\end{array}\right] &
\left[\underline{\pi}: \begin{array}{l}\underline{\text{+author}}\\ \text{+participant}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\text{−author}\\ \underline{\text{−participant}}\end{array}\right] & &
\left[\underline{\pi}: \begin{array}{l}\text{−author}\\ \text{+participant}\end{array}\right] \\
 & \text{(2 matches)} & & \text{(2 matches)} & & \text{(1 match)}
\end{array}
$$

The fact that omnivorous person probes can only search for positive values does not exclude variation within omnivorous person patterns. As we showed for number in the previous section, the other dimension along which probes can vary, is elaboration of the probe. Let us then turn to the variation amongst omnivorous person agreement which is attested across languages.

The Kichean agent focus construction exhibits an omnivorous effect for person (Preminger 2014). For the combination of a 3rd person and 2nd person argument, agreement occurs only with the 2nd person argument, see (103a) and (103b). Similarly, in the combination of a 3rd person with a 1st person, agreement happens only with the 1st person argument, shown in (103c) and (103d).

(103) *Kichean* (Preminger 2014: 18-20)

a. ja rat x-<u>at</u>-ax-an ri achin
FOC you(SG) COM-<u>2SG</u>-hear-AF the man

'It was you(SG) that heard the man.'

b. ja ri achin x-at-ax-an rat
FOC the man COM-2SG-hear-AF you(SG)
'It was the man that heard you(SG).'

c. ja yïn x-in-ax-an ri achin
FOC me COM-1SG-hear-AF the man
'It was me that heard the man.'

d. ja ri achin x-in-ax-an yïn
FOC the man COM-1SG-hear-AF me
'It was the man that heard me.'

The same pattern is observed in assumed identity contexts in Eastern Armenian (Béjar & Kahnemuyipour 2017), shown in (104).

(104) *Eastern Armenian* (Béjar & Kahnemuyipour 2017: 22)

a. du Lina-n eir
you Lina-SP BE.PST.2SG
'You were Lina'

b. Lina-n du eir
Lina-SP you BE.PST.2SG
'Lina was you.'

c. Shad-n yes ei
Shadi-SP 1SG BE.PST.1SG
'Shadi was me.'

d. yes shadi-n ei
1SG shadi-SP BE.PST.1SG
'I was shadi'

As for combinations of 2nd and 3rd person as well as 1st and 3rd person, Eastern Armenian and Kichean behave like Mundari. However, when it comes to the combination between 1st and 2nd person arguments, both languages differ from Mundari. Whereas in Mundari the 1st person argument outranks the 2nd person argument, any sort of combination of 1st person and 2nd person is ungrammatical in the Kichean agent focus construction (105).In Eastern Armenian, there is no omnivorous effect between two local persons, and instead, the agreement simply tracks the subject (106).

(105) *Kichean* (Preminger 2014: 22)

a. * ja rat x-in/at/∅-ax-an yïn
FOC you(SG) COM-1SG/2SG/3SG.ABS-hear-AF me
'It was you(SG) that heard the me.'

b. * ja yïn x-in/at/∅-ax-an rat
FOC me COM-1SG/2SG/3SG.ABS-hear-AF you(sg)
'It was the me that heard you(SG).'

(106) *Eastern Armenian* (Béjar & Kahnemuyipour 2017: 24)

a. yes du em / *es
   I you be.PRES.1SG / be.PRES.2SG
   'I am you.'

b. du yes *em / es
   you I be.PRES.1SG / be.PRES.2SG
   'you are me.'

Furthermore, a few Chukotko-Kamchatkan languages exhibit omnivorous person marking (Bobaljik & Wurmbrand 2002), but their characteristics typically follow one of those languages we have seen. For instance, Chuckchi behaves exactly like Kichean (Comrie 1979), and Alutor resembles Mundari (Mel'čuk 1973) in their respective person hierarchy patterns. Bobaljik & Wurmbrand (2002) refers to Mel'čuk's (1973) generalization of Alutor, where the agreement choice between a direct and an indirect object depends on the hierarchy $1 > 2 > 3$. If direct and indirect objects are both 3rd person, the verb exhibits agreement with the direct object. The same is true for Chuckchi, except that both internal arguments cannot be a local person. At least one internal argument has to be 3rd person (Comrie 1979). Now, with these languages included, we can provide an overview of the attested patterns for the omnivorous person agreement in (107).

(107) *Cross-linguistic omnivorous person patterns*

a. Mundari, Alutor: $1 > 2 > 3$
b. Kichean, Chuckchi: $1/2 > 3$ (local person combination ineffable)
c. Eastern Armenian: $1/2 > 3$ (local person combination possible)

The difference between a $1 > 2 > 3$ scale and a $1/2 > 3$ follows from the level of probe specification. Recall that the person probe for Mundari is specified as in (53), repeated here in (108); the same can be assumed for Alutor. However, the person probe for Kichean agent focus, Chuckchi, and Eastern Armenian is less specified, see (109).

(108) *Person probe in Mundari and Alutor*

$$\begin{bmatrix} \pi: & \begin{array}{l} \text{+author} \\ \text{+participant} \end{array} \end{bmatrix}$$

(109) *Person probe for Kichean AF, Chuckchi, Eastern Armenian*

$$\begin{bmatrix} \pi: & \text{+participant} \end{bmatrix}$$

We illustrate in (110) how the person probe in (109) leads to a $1/2 > 3$ hierarchy. Since the probe searches for [+participant], a local person argument will be agreed with over a non-local person argument. The combination of two local persons, however, will lead to a tie, as both arguments provide an equally good match for the probe. Languages provide different means to resolve the tie: Whereas in Kichean and Chuckchi, a combination of local persons is simply ineffable, the agreement system in Eastern Armenian retreats to agreement with the subject.

(110) *Scale and probe in Kichean AF, Chuckchi, Eastern Armenian*

$$\begin{array}{ccccccc} \text{Probe} & 1 & = & 2 & > & 3 \\ \left[\pi\!: \;\; \text{+participant}\right] & \left[\underline{\pi}\!: \; \begin{array}{l}\text{+author} \\ \underline{\text{+participant}}\end{array}\right] & & \left[\underline{\pi}\!: \; \begin{array}{l}-\text{author} \\ \underline{\text{+participant}}\end{array}\right] & & \left[\underline{\pi}\!: \; \begin{array}{l}-\text{author} \\ -\text{participant}\end{array}\right] \\ & \text{(2 matches)} & & \text{(2 matches)} & & \text{(1 match)} \end{array}$$

The contrast between Kichean/Chuckchi and Eastern Armenian is reminiscient of the contrast we find in PCC languages between the strong and the weak PCC. Perhaps not surprisingly then, we will follow Preminger (2014) who attributes the omnivorous person paradigm in Kichean AF, specifically the ineffable local person combinations, to the Person Licensing Condition (PLC), following Béjar & Rezac (2003).[24]

(111) *Person Licensing Condition (PLC):*
An interpretable 1st/2nd person feature must be licensed by entering into an Agree relation with an appropriate functional category.

We will adopt the PLC for Kichean AF and Chuckchi, thereby deriving the ineffability of agreement with a combination of local persons. Under our account, the probe will undergo agreement with the higher local person argument and stop probing since it will be fully valued, in turn leaving the other local person argument unlicensed. Such cases trigger a violation of the PLC. For combinations of a local person and a non-local person, the PLC will not be violated, as the probe keeps on probing until it finds the local person argument and licenses it. Crucially, however, the PLC must be parametrized since it is clearly not at work in languages like Mundari, Alutor, and Easter Armenian. As for Mundari, we showed with the derivation (55) in section 4.4 that a 2nd person indirect object does not undergo Agree with the probe in the context of a 1st person direct object which is closer to the probe. A similar situation arises in Eastern Armenian with a 1st person over 2nd person configuration. Again, the hierarchically lower 2nd person object does not undergo Agree with the probe in the context of a 1st person subject. In either case, the structures are perfectly acceptable. Hence, we conclude that the PLC is not active in Mundari, Alutor and Eastern Armenian.

So far, we focused our discussion on the attested omnivorous patterns across languages. We will now turn to the overall cross-linguistic picture and show the predictions a binary person feature system makes with respect to elaboration and markedness. In (112), we present the predicted scales created with probes that search for one feature, including markedness values, while in (113) we show the scales predicted by a combination of values. As in the previous section, we indicate attested omnivorous patterns with shading. The restriction to positive values derives the patterns we find so far, that is the scales 1 > 2 > 3 and 1/2 > 3. Crucially, this restriction also excludes most of the unattested patterns. Furthermore, we highlight patterns which, although not currently observed as an omnivorous pattern, have a good chance to exist, motivated by the fact that the scales have been described for person hierarchy interactions more generally across languages. The 1 > 2/3 scale is reflected in the *Me-First* PCC pattern observed for Bulgarian (Pancheva & Zubizarreta 2018) and Romanian (Nevins 2007). One reason why we have not encountered a Me-First omnivorous pattern so far might be correlated with the fact that the Me-First PCC has also been classified as typologically rare (Deal 2024: 75). As for the 2 > 1/3 scale, this pattern expresses an addressee preference which is often discussed

[24] See also Oxford's (2022) recent discussion of the Algonquian inverse agreement patterns where he invokes the PLC to account for portmanteau marking and lack of an inverse marker in local person combinations.

in relation to the description of Algonquian languages (Harley & Ritter 2002, Béjar & Rezac 2009, Oxford 2019).

(112) *Predicted scales with simple person probes*

a. Mparticipant = $\boxed{2 > 1/3}$
b. Uparticipant = 1/3 > 2
c. Mauthor = $\boxed{1 > 2/3}$
d. Uauthor = 2/3 < 1
e. +participant = $\boxed{1/2 > 3}$
f. −participant = 3 > 1/2
g. +author = $\boxed{1 > 2/3}$
h. −author = 2/3 < 1

(113) *Predicted scales with elaborate person probes including hybrids*

	+participant	−participant	Mparticipant	Uparticipant
+author	$\boxed{1 > 2 > 3}$	1/3 > 2	$\boxed{1/2 > 3}$	1 > 3 > 2
−author	$\boxed{2 > 1/3}$	3 > 1/2	2/3 > 1	3 > 2 > 1
Mauthor	$\boxed{1 > 2 > 3}$	1/3 > 2	$\boxed{1/2 > 3}$	1 > 3 > 2
Uauthor	$\boxed{2 > 1/3}$	3 > 2 > 1	2 > 3 > 1	3 > 1/2

The attested patterns, including a potentially exisiting Me-First pattern, can be derived by person probes making reference to positive person features. Can person probes also target the marked specification of a person feature? According to the overviews in (112) and (113), this extension would at least not predict unnatural omnivorous patterns to emerge. Moreover, probing for a marked person specification would be necessary to derive a 2 > 1/3 omnivorous pattern, i.e., via (112a). In the absence of such data though, the answer to the question must remain speculative for now.

A different conclusion one could draw from the so far observed cross-linguistic picture is that person features are privative (as opposed to number features).[25] In this connection, we would like to report on recent work regarding the Algonquian varieties Blackfoot and Plains Cree by Grishin (2023), which shows that the peripheral agreement marker in the agreement pattern, often argued to realize the C head, tracks 3rd person arguments skipping over local persons if they are present and are considered more local to the probe, shown in (114) for Blackfoot. In other words, this pattern points to a 3 > 1/2 scale active in such languages.

(114) *Blackfoot* (Grishin 2023: 8-9)

a. nits-ikákomimm-ok-innaan-a
   1-love-INV-1EXC-SG
   'she loves us'

b. nits-ikákomimm-ok-innaan-i
   1-love-INV-1EXC-PL
   'they love us'

c. nits-ikákomimm-a-nnaan-a
   1-love-3OBJ-1EXC-SG
   'we love her'

[25] Interestingly, this would constitute exactly the opposite claim to Nevins's (2011*b*) conclusion, who argued for a binary person feature system and a privative number feature system.

d. nits-ikákomimm-a-nnaan-i
1-love-3OBJ-1EXC-PL
'we love them'

Under our account, this agreement paradigm can be captured, e.g., with the probe specification in (115) which specifically targets a 3rd person argument, referred to by [−participant]. Crucially, this type of person probe requires a referral to negative features.

(115) *Person probe for Blackfoot and Plains Cree*

$\left[\pi: \quad -\text{participant}\right]$

Data sets like the one in (114) lead us to refrain from the conclusion that omnivorous person agreement provides evidence for an underlying private feature system, though we leave a detailed discussion to future work. Further investigations will reveal either that paradigms as in (114) turn out to be the exception or that indeed more variation within person omnivory patterns will emerge, as is already apparent for number omnivory.

6 Conclusion

In this paper, we saw that ditransitive constructions in Mundari display an omnivorous agreement pattern for person, number, and gender. The omnivorous pattern itself is determined by different scales and their interaction, which provided a set of empirical generalizations given in (34) repeated as (116) below.

(116) a. In the ditransitive construction, the choice between IO and DO for the OM slot is determined by the following hierarchies:
   i. Person hierarchy: 1 > 2 > 3
   ii. Number hierarchy: SG > PL > DU

b. Given these scales, the DO can be cross-referenced by the OM slot if and only if the DO outranks the IO on both the person and number scales; on the other hand, if the IO outranks the DO on either the person or number scale, OM agrees with the IO instead.

c. The hierarchies and their interaction are subject to gender restriction, where only animate arguments can be cross-referenced by the OM.

To account for these empirical generalizations, we proposed an analysis based on Béjar & Rezac's (2009) cyclic Agree model, where a probe agrees with a second goal if the second goal has features sought by the probe that is not present on the first goal. By using this model of Agree, along with a bivalent feature system of person and number (Nevins 2007, Harbour 2011*b*, 2014, 2016), we saw that the generalizations in (116) can be straightforwardly accounted for if the object clitic associated with the DO signals a single cycle of Agree, whereas the OM tracking the IO is indicative of a second cycle of Agree.

In terms of features, the person hierarchy is straightforward to implement in a system such as Bejar and Rezac's, while the number hierarchy poses a serious challenge for all previous approaches. We suggested that this challenge can be overcome by taking the number hierarchy in Mundari to encode both a preference for singulars and unmarked features.

Finally, we discussed the cross-linguistic implications of the analysis. Two dimensions along which omnivorous systems can vary were discussed. These were the degree of articulation of the probe on the one hand, and the kind of features a probe may be specified for (positive/negative and marked/unmarked). We have shown that this system is well-equipped to capture the full range of variation in omnivory that has been previously identified.

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