A Cyclic and Multiple Agree account: Person/number marking in Cheyenne*

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Abstract

In this paper we propose that probe-goal relations are subject to greater variation than expected, such that both Cyclic Agree and Multiple Agree are possible not only typologically, but also within a single language and a single probe. Cheyenne (Algonquian) has two ways of marking 1st and 2nd person plurality and their conditioning differs between transitives and ditransitives. We propose a hybrid account of AGREE in order to account for this person/number marking which includes elements of both Cyclic Agree (potentially two probing cycles) and Multiple Agree (multiple simultaneous goals in the first cycle). Evidence against a pure Cyclic Agree account comes from the absence of bleeding effects in transitive forms, which indicates that probing is not always successive cyclic. Evidence against a pure Multiple Agree account comes from the presence of bleeding effects in ditransitive forms, which indicates that all arguments are not always simultaneously probed. Support comes from the properties of other probes in Algonquian and similarities with agreement patterns in other languages, such as Hungarian and Southern Tiwa.

1 Introduction

In the literature on the operation AGREE, there are two main accounts about how a probe searches its domain to find a suitable goal: Cyclic Agree and Multiple Agree. Multiple Agree is a syntactic operation in which the probe simultaneously searches and engages the features of all goals in its domain. This approach to agreement has been argued for by a number of authors (e.g., Hiraiwa 2001, 2005, Nevins 2007, 2011, Zeijlstra 2004, etc.) and has been used to analyze many empirical phenomena, from Person Case Constraint (PCC; Bonet 1994) effects and omnivorous agreement (Nevins 2007, 2011) to negative concord (Zeijlstra 2004). For example, Nevins (2011) argues that

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Multiple Agree is particularly well-suited to explain the case of omnivorous number markers: the existence of verbal markers of plurality that appear when either the subject or the object is plural.

In a Cyclic Agree model (e.g., Béjar & Rezac 2009), on the other hand, the probe searches its domain one argument at a time beginning with the most local goal and, under certain circumstances, the probe may look at the next most local goal if it is not fully satisfied by the features on first argument searched. If the first instance of searching satisfies the probe, however, it bleeds searching of all additional goals in its domain. For example, in languages like Nishnaabemwin, a 1st person object is complementary with a 3rd person subject, which is explained in this approach by assuming that 1st person features are more specific than 3rd person features, given the feature-geometric hierarchy of Harley & Ritter (2002), according to which 1st person features asymmetrically entail 3rd person features. Thus, the features of the probe in question are all exhausted by agreement with the 1st person object, which bleeds a second agreement cycle with the subject. But if the object is 3rd person, then the features on the probe are not completely valued, and a second cycle is triggered. It has been shown that this model can also successfully capture a variety of phenomena, including PCC effects. Unlike in the Multiple Agree approach, however, the probe in the Cyclic Agree model never engages with the features of more than one goal at the same time; rather, it always strictly interacts with one goal at a time, but these interactions can occur more than once in a derivation, in a cyclic fashion (with different goals).

Both of these approaches to searching are typically contrasted against each other under the assumption that one could account for all instances of searching and, thus, is the correct characterization of how a probe searches. However, it is possible that there is variation in probes, such that there are different ways in which searching can occur. Moreover, it is prima facie conceptually possible that there could be a probe with a mixture of these properties: a probe which would enter multiple cyclic agreement steps, but which would interact with more than one argument simultaneously in (at least) one of these steps. This is exactly what we believe the probe on T in Cheyenne (Algonquian) is like. It is specified to find 1st person plural features and its search domain includes the two structurally closest arguments — this is the Multiple Agree part of our proposal, since the probe simultaneously engages with two arguments. But if the probe does not find what it searches for (i.e., 1st person plural) among the first two arguments it probes, and there are more arguments to be probed, then it searches further and enters the second agreement cycle. This is the Cyclic Agree part of our proposal — which can only be seen in ditransitives, since this is the only context in which it is possible to search more than two arguments.

Our approach is, empirically speaking, based on a contrast between transitive and ditransitive constructions in Cheyenne. There are two forms for marking the plurality of 1st and 2nd person arguments (as discussed in Section 2). The form of the plural marker for 1st and 2nd person arguments in transitives is always conditioned by the presence of a 3rd person, but in ditransitives, a 3rd person direct object conditions only 2nd person plural arguments — indexing of 1st person plural arguments is insensitive to the presence of a 3rd person direct object. However, in passive and reflexive ditransitive constructions in which there is a shared identity between the subject and indirect object, such that they are both 1st person plural, the 3rd person direct object can condition the form of the 1st person plural marker, just like in transitives. We believe that this requires an approach to Agree which combines properties of both Cyclic Agree and Multiple Agree.

Although it is conceptually possible to postulate a probe which would combine properties of Cyclic and Multiple Agree models, this does not seem particularly theoretically attractive, at least from the perspective of parsimony. It must be shown that that neither of these two models can

account for all the facts on its own. In the rest of the paper we will argue that the Cheyenne facts actually necessitate this hybrid approach to agreement. There are two specific points that need to be defended: (i) we need to show that the Multiple Agree part of our analysis cannot be recast in terms of Cyclic Agree without any loss of empirical coverage, and conversely, (ii) that the Cyclic Agree component cannot be restated in terms of Multiple Agree.

The paper is organized as follows: in section 2 we present four generalizations which capture the distribution of the person/number making verbal affix (the inner suffix) in Cheyenne. In section 3 we present our hybrid account of these generalizations and show that a pure Cyclic Agree or Multiple Agree account does not provide adequate empirical coverage. In section 4 we provide independent support for several aspects important of our account: (i) the arbitrariness of probe-based person preferences (as opposed to a system of feature entailment), (ii) simultaneous probing of the two structurally highest arguments in the first cycle, and (iii) attestation of similar agreement morphemes cross-linguistically and in Cheyenne. We conclude in section 5.

2   Person/number marking in Cheyenne

Similar to other Algonquian languages, the transitive verb in Cheyenne is internally complex and includes multiple person (or φ) feature indexing affixes, e.g., person prefix, theme sign, and inner suffix. Table 1 shows a morpheme by morpheme break down of a typical transitive Cheyenne verb, although it is not an exhaustive list of all possible prefixes and suffixes; 3rd person plural agreement would occur in the outer suffix slot (see Table 9).[1] All Cheyenne data and translations come from verb paradigms in Leman (2011), but the morphological analysis and glossing are that of the authors.

Table 1: CHEYENNE TRANSITIVE VERB (*adapted from Leman 2011:78*)

prefixes		verb	suffixes				
person	negation	root	verb final	**theme sign**	negation	**inner suffix**	mode
Né-	*sâa-*	*vóo*	*-m*	*-è*	*-he*	*-me*	*-he*
2	not	see	TA	**LOC.DIR**	NEG	**2PL**	INT
'Didn't you(PL) see me?'							

In Table 1, the person prefix and inner suffix display agreement with the 2nd person plural subject. Depending on the analysis, the theme sign either displays agreement only with the 1st

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[1]Orthography: V̇ voiceless vowel, V̂ raised high pitch vowel, V́ high pitch vowel, V̄ mid pitch vowel, and V̀ low pitch vowel. All final vowels are voiceless (not marked, by convention), but their underlying pitch can affect the pitch of other vowels (see Leman 2011 for more details). Abbreviations: 1 = 1st person, 2 = second person, 3 = 3rd person proximate (topical), A = Set A inner suffix, AI = intransitive verb with animate subject, AN = animate, APPL = applicative, AUX = auxiliary, B = Set B inner suffix, DIR = direct, EXC = exclusive, F.OBV = further obviative (non-topical), IN = inanimate, INC = inclusive, INT = interrogative, INV = inverse, LOC = local (forms with only 1st and 2nd persons), NEG = negation, OBJ = object, OBV = obviative (non-topical), PASS = passive, PL = plural, PRT = participle, REFL = reflexive, REM.OBV = removed obviative, SAP = speech act participant, SG = singular, SUBJ = subject, TA = transitive verb with animate subject and animate object, TI = transitive verb with inanimate object.

person object, or with both the subject and object. While it is *prima facie* possible that these affixes could be conspiring to index all of the relevant features of both arguments, each has their own differing preferences. The person prefix has preferences independent of grammatical role, and indexes 2nd person arguments if present, otherwise 1st person arguments (see 4.1 for further discussion). The inner suffix indexes 1st person plural if present, otherwise 2nd person plural, followed by other preferences independent of grammatical role (discussed in detail below). The theme sign has preferences based on grammatical role and either exclusively indexes the object or both the subject and object (see 4.2 for further discussion).[2] Under the assumption that these φ-indexing affixes operate independently of each other, we focus on the pattern of the inner suffix in this paper.[3]

In Cheyenne, the inner suffix, which corresponds to Slot 5 in Bloomfield (1962), only indexes Speech Act Participant (SAP, e.g., Macaulay 2009) plural arguments, i.e., 2nd person plural or 1st person plural. Typical of other Algonquian languages, Cheyenne has a distinction in 1st person plural between inclusive, which includes both the speaker and addressee (1INC), and exclusive, for the speaker and 3 person(s) excluding the addressee (1EXC). Cheyenne inner suffixes have two different variants, which we refer to throughout as Set A and Set B. Set A represents an inner suffix that only indexes the SAP plural argument itself, while Set B represents a portmanteau inner suffix that indexes SAP plural and a 3rd person argument. These are shown in Table 2.[4]

Table 2: CHEYENNE INNER SUFFIXES

	Set A	Set B
1INC	*-ma*	*-ne*
1EXC	*-mé/-méno*	*-né*
2PL	*-mé*	*-vó*

Note that 1st person plural exclusive and 2nd person plural pattern together in Set A forms to the exclusion of 1st person plural inclusive (see Despić & Murray to appear). In Set B forms all three are indexed differently. The 1st person plural suffixes are differentiated by pitch, which is contrastive in Cheyenne, as exclusive has high pitch (*-né*) and inclusive does not (*-ne*). In addition, the 1st person exclusive Set A form has two allomorphs: *-mé*, which appears when it is the only argument, e.g., in intransitive forms, and *-méno*, which appears in transitives when another argument is 2nd person.[5]

Our analysis aligns with the analysis of Proto-Algonquian in Goddard (2000), in which the underlying difference between inner suffixes is divided between absolute forms (m-suffixes) that index a single argument (i.e., our Set A), and objective forms (w- and n-suffixes) that index a single

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[2]For an alternate view of theme signs as denoting a change in grammatical function of the subject and object see Rhodes (1994) for Ojibwe.

[3]Since each of the person prefix, theme sign, and inner suffix have different and not clearly complementary preferences, we assume that a simpler analysis is one which does not assume that these affixes conspire to index arguments in a certain manner, such as in Anderson (1992).

[4]Note that Set B affixes can appear with an additional *-no(t)* suffix. See footnote 6 for further discussion.

[5]In the Cheyenne dictionary (Fisher et al. 2006), *-no* is listed as a separate 1st person plural exclusive suffix. We discuss the distinction between *-mé* and *-méno* in more detail in section 3.1.2.

argument in addition to a 3rd person argument (i.e., our Set B).[6]

Examples of Set A are shown with the intransitive verb 'see' in (1); pitch can affect preceding vowels and final vowels are voiceless (see footnote 1). Inner suffixes only appear with SAP plural arguments in the first column (1a)-(1c). SAP singular (1d)-(1e) and 3rd person (1f) forms do not appear with an inner suffix; the 3rd person plural agreement in (1f) is an outer suffix (see Table 9).

(1)   a.   Né-vôo-sane-**ma**   d.   Ná-vóó-sáne
           2-see-AI-**1INC.A**   1-see-AI
           '**We(INC)** see'   'I see'
      b.   Ná-vôo-sanē-**me**   e.   Né-vóó-sáne
           1-see-AI-**1EXC.A**   2-see-AI
           '**We(EXC)** see'   'You see'
      c.   Né-vôo-sanē-**me**   f.   É-vôo-sane-oʔo
           2-see-AI-**2PL.A**   3-see-AI-3PL
           '**You(PL)** see'   'They see'

                                                                    (Leman 2011: 27)

Table 3 summarizes the appearance of inner suffixes in intransitive forms (see also Despić & Murray to appear). The argument indexed as the inner suffix appears in bold.

Table 3: INNER SUFFIX: INTRANSITIVES

Set	Intransitive (S)	form
A	1INC	*ma*
	1EXC	*mé*
	2PL	

Transitive forms can appear with either Set A or Set B forms. The examples in (2) show Set A inner suffixes in transitive forms. There are two important generalizations related to these forms, which also hold for most Algonquian languages, that suggest that the inner suffix preferentially indexes certain arguments. First, if a 1st person plural (exclusive) and 2nd person plural argument

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[6]Although Goddard (2000) posits two sets of objective forms, one based on transitive 3rd person direct objects (w-suffixes) and another on ditransitive 3rd person direct objects (n-suffixes), this distinction is somewhat less clear in Cheyenne. Leman (2011) includes two possibilities for some ditransitive forms, e.g., *-ne* vs. *-none* with the same meaning in (i). In transitive forms, the distribution is much less clear with several factors playing some role, e.g., clause type (declarative vs. interrogative), mood (indicative vs. dubitative), and obviaiton (proximate vs. obviative). Thus, we refer to the common portion across both, e.g., *-ne*, and leave the analysis of the exact distribution and the role of *-no(t)* (and its allomorphs, see Fisher et al. (2006) entry *-'tov*) for further research.

(i)   Ná-mêt-am-ó-**ne**   /   Ná-mêt-am-ó-**nóne**
      1-give-REM.OBV-DIR-**1EXC.B** / 1-give-REM.OBV-DIR-**1EXC.B**
      '**We(EXC)** gave her/him/them(REM.OBV) to her/him/them(OBV)'   (Leman 2011: 106-7)

are present in the same form, only 1st person plural exclusive is indexed, as shown in (2).[7] Note that with transitive forms, the Set A 1st person plural form is always *-méno*, whereas Set A intransitive form is *-mé*.

(2) a. Né-vôo-m-atse-**meno**
         2-see-TA-LOC.INV-**1EXC.A**
         '**We(EXC)** saw you(SG/PL)'

    b. Né-vôo-m-e-**meno**
         2-see-TA-LOC.DIR-**1EXC.A**
         'You(SG/PL) saw **us(EXC)**'
         (Leman 2011:55)

Second, grammatical role is irrelevant to the conditioning of the inner suffix, since there is no contrast between the pairs in (2) above and (3) below, in which grammatical roles are reversed in the (a) and (b) examples in both.[8]

(3) a. Né-vôo-m-ē-**me**
         2-see-TA-LOC.DIR-**2PL.A**
         '**You(PL)** saw me'

    b. Né-vôo-m-atsē-**me**
         2-see-TA-LOC.INV-**2PL.A**
         'I saw **you(PL)**'
         (Leman 2011:55)

There is one additional generalization relating to the patterning of Set A and Set B inner suffixes. Set B suffixes appear in transitive forms when the other argument is 3rd person. This is shown in (4) and (5) with the contrast between the use of Set A suffixes in the (a) examples, which only include arguments that are speech act participants (SAP; i.e., 1st and 2nd persons), and the Set B suffixes in the (b) examples, which include a 3rd person argument.[9]

(4) a. Né-vôo-m-atse-**meno**
         2-see-TA-LOC.INV-**1EXC.A**
         '**We(EXC)** saw you(SG/PL)'

    b. Ná-vôo-m-ó-**ne**
         1-see-TA-DIR-**1EXC.B**
         '**We(EXC)** saw <u>her/him</u>'
         (Leman 2011:55)

(5) a. Né-vôo-m-ē-**me**
         2-see-TA-LOC.DIR-**2PL.A**
         '**You(PL)** saw me'

    b. Né-vôo-m-ó-**vo**
         2-see-TA-DIR-**2PL.B**
         '**You(PL)** saw <u>her/him</u>'
         (Leman 2011:55)

Grammatical role in Set B forms, similarly to Set A forms, is not relevant to indexing. This is shown in (6)-(8), since the inner suffix does not change between the (a) and (b) examples although

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[7]The person prefix shows a different pattern since it indexes 2nd person if both 1st and 2nd person are present. See 4.1 for discussion. Goddard (1967) and Macaulay (2009) also note the 2>1 pattern for prefixes and 1>2 pattern for inner suffixes in Cheyenne.

[8]Note that the only thing that changes between the (a) and (b) examples in (2) and (3) are the theme signs, e.g., *-atse* and *-e*. See 4.2 for further discussion.

[9]Note that transitive forms with a 1st person plural inclusive argument and another SAP argument do not appear in the grammar (Leman 2011), and so the Set A-B contrast cannot be shown for transitive forms with 1st person plural inclusive arguments. We are uncertain whether the missing transitive forms with 1st person plural inclusive and another SAP argument are a true gap in verbal paradigms or not. They do appear to be a gap in other Algonquian languages (see Valentine 2001; Lochbihler 2012). However, these forms are not crucial for our analysis; if they are possible, we predict Set A allomorphs to appear.

the grammatical roles are switched.[10] This is pattern is consistent across all SAP plural arguments in Set B, as in Set A.

(6) a. Né-vôo-m-ò-**ne**
         2-see-TA-DIR-**1INC.B**
         '**We(INC)** saw her/him'

       b. Né-vôo-m-ae-**ne** (Leman 2011:55)
          2-see-TA-INV-**1INC.B**
          'S/he saw **us(INC)**'

(7) a. Ná-vôo-m-ó-**ne**
         1-see-TA-DIR-**1EXC.B**
         '**We(EXC)** saw her/him'

       b. Ná-vôo-m-aē-**ne** (Leman 2011:55)
          1-see-TA-INV-**1EXC.B**
          'S/he saw **us(EXC)**'

(8) a. Né-vôo-m-ó-**vo**
         2-see-TA-DIR-**2PL.B**
         '**You(PL)** saw her/him'

       b. Né-vôo-m-aē-**vo** (Leman 2011:55)
          2-see-TA-INV-**2PL.B**
          'S/he saw **you(PL)**'

Table 4 summarizes Set A-B patterning in transitive forms. Parentheses are used as shorthand to represent both the singular and plural forms (e.g., 1EXC>2(PL) represents 1EXC>2 and 1EXC>2PL).[11]

Table 4: INNER SUFFIX: TRANSITIVES

Set	Transitive (S>DO)	*form*
A	**1EXC>2(PL)** **2(PL)>1EXC**	*méno*
	2PL>1 **1>2PL**	*mé*
B	**1EXC>3(PL)** **3(PL)>1EXC**	*né*
	2PL>3(PL) **3(PL)>2PL**	*vó*

As in other Algonquian languages, ditransitive forms are also possible in Cheyenne, but these forms are limited because the direct object can only be 3rd person (proximate or obviative), i.e., a

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[10]The same pattern is present with transitive verbs with an animate and inanimate argument. This is shown by the lack of contrast in the inner suffix between (ia) and (ib). Here the inanimate 3rd person argument also triggers the Set B inner suffix.

(i) a. Né-hoʔëhó-htá-nó**vo**
         2-come-TI-**2PL.B**
         '**You(PL)** came to it(IN)'
         (Leman 2011:89)

       b. Né-hoʔëhó-ʔt-ae-nó**vo**
          2-come-TA-INV-**2PL.B**
          'It(IN) came to **you(PL)**'
          (Leman 2011:101)

[11]1st person plural inclusive arguments are not included in this because, as noted above in footnote 9, they do not appear with other SAP arguments in the grammar (Leman 2011).

strong Person Case Constraint (PCC) effect (Bonet 1994). Table 5 shows a comparison of possible forms across transitives and ditransitives. Note that OBV refers to obviative 3rd persons, which are relatively less topical than proximate 3rd persons. Cheyenne is a typical Algonquian language in only allowing one proximate 3rd person in a single clause.[12]

Table 5: TRANSITIVES VS. DITRANSITIVES

Transitive	Ditransitive	
(S>DO)	(S>IO>DO)	(S>IO>DO)
SAP>SAP	SAP>SAP>3	*SAP>SAP>SAP
SAP>3	SAP>3>3OBV	*SAP>3>SAP
3>SAP	3>SAP>3OBV	*3>SAP>SAP
3>3OBV	3>3OBV>3OBV	*3>3OBV>SAP
3OBV>3	3OBV>3>3OBV	*3OBV>3>SAP

As shown in the third column of Table 5, ditransitive forms with SAP direct objects are not possible, e.g., *1<3<2 and *2<3<1. As such, the possible set of ditransitive forms mirrors the possible set of transitive forms, e.g., SAP>SAP>3, SAP>3>3OBV, or 3>SAP>3OBV. However, when multiple 3rd persons are present in a ditransitive, the subject and indirect object can be proximate, e.g., 3>3OBV>3OBV and 3OBV>3>3OBV respectively, but the direct object cannot, e.g., *3OBV>3OBV>3, or *3OBV>3OBV>3.

The main difference between transitive and ditransitive forms is that in ditransitive forms there is an unexpected asymmetry in the appearance of Set A and Set B affixes across SAP plural arguments. The generalization is that a Set B suffix always appears when a 3rd person direct object is present in ditransitives with 2nd person plural forms, but not with 1st person plural forms. This is shown for 2nd person plural in (9). A Set A inner suffix appears in transitives without a 3rd person argument, such as in (9a), but a Set B inner suffix appears in ditransitives with a 3rd person direct object, such as in (9b).

(9) a. Né-mêá?tov-ē-**me**
         2-give.away-LOC.DIR-**2PL.A**
         '**You(PL)** gave me away'
         (Leman 2011:67)

     b. Né-méts-é-nó**vo**
         2-give-LOC.DIR-**2PL.B**
         '**You(PL)** gave her/him to me'
         (Leman 2011:106)

Otherwise, inner suffixes in ditransitives pattern exactly the same as their transitive counterparts. A similar contrast in the inner suffix for 1st person plural exclusive is not present, as shown in (10). Set A inner suffixes appears regardless of whether there is a 3rd person direct object, such as in (10b), or not, such as in (10a).

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[12]Note that when there are three 3rd persons, there is the possibility for a further obviative form. Although obviative and further obviative are not morphologically distinct in Cheyenne, they are in some Algonquian languages, e.g., Nishnaabemwin Valentine (2001).

(10) a. Né-mêa?tov-atse-**meno**
      2-give.away-LOC.INV-**1EXC.A**
      '**We(EXC)** gave you away'
      (Leman 2011:67)

   b. Né-mêt-atse-**meno**
      2-give-LOC.INV-**1EXC.A**
      '**We(EXC)** gave <u>her/him</u> to you'
      (Leman 2011:106)

Table 6 summarizes Set A-B patterning in ditransitive forms.

Table 6: INNER SUFFIX SUMMARY: DITRANSITIVES

Set	Ditransitive (S>IO>DO)	*form*
A	**1EXC**>2(PL)>3(PL) 2(PL)>**1EXC**>3(PL)	*méno*
B	**1EXC**>3(PL)>3OBV(PL) 3(PL)>**1EXC**>3OBV(PL)	*né*
	2PL>1>3(PL) 1>**2PL**>3(PL) **2PL**>3(PL)>3OBV(PL) 3(PL)>**2PL**>3OBV(PL)	*vó*

Table 7 highlights the Set A-B asymmetry in patterning across transitives, and ditransitives. The 2nd person plural forms that surprisingly pattern differently are highlighted.

Table 7: INNER SUFFIX SUMMARY: TRANSITIVES VS. DITRANSITIVES

Set	Transitive (S>DO)	Ditransitive (S>IO>DO)
A	**1EXC**>2(PL) 2(PL)>**1EXC**	**1EXC**>2(PL)>3(PL) 2(PL)>**1EXC**>3(PL)
	2PL>1 1>**2PL**	
B		**2PL**>1>3(PL) 1>**2PL**>3(PL)
	1EXC>3(PL) 3(PL)>**1EXC**	**1EXC**>3(PL)>3OBV(PL) 3(PL)>**1EXC**>3OBV(PL)
	2PL>3(PL) 3(PL)>**2PL**	**2PL**>3(PL)>3OBV(PL) 3(PL)>**2PL**>3OBV(PL)

Although up to this point we have not seen ditransitive forms in which a 3rd person direct object can condition a 1st person plural Set B inner suffix, in fact it is possible, but only when these forms are reflexive or passive. Compare the transitive (a) examples with the ditransitive (b) examples with reflexives in (11) and passives in (12). In the transitive (a) examples, only SAP

arguments are present and the Set A form appears. However, notice that when a 3rd person direct object is included, as in the ditransitive (b) examples, the Set B form appears. This is unexpected given the appearance of a Set A suffix in ditransitives with a 3rd person direct object that we saw in (10b) above.

(11) a. Ná-mêaʔtov-ȧhtsē-**me**
          1-give.away-REFL-**1EXC.A**
          '**We(EXC)** gave ourselves away'
          (Leman 2011:67)

    b. Ná-mét-ȧhtsé-nó**ne**
          1-give-REFL-**1EXC.B**
          '**We(EXC)** gave <u>her/him</u> to ourselves'
          (Leman 2011:106)

(12) a. Ná-méáʔt-óné-**me**
          1-give.away-PASS-**1EXC.A**
          '**We(EXC)** were given away'
          (Leman 2011:67)

    b. Ná-mêt-ané-nó**ne**
          1-give-PASS-**1EXC.B**
          '<u>S/he</u> was given to **us(EXC)**'
          (Leman 2011:106)

Thus far we have set aside 1st person plural inclusive forms for the sake of simplicity. This is because it appears that 1st person plural inclusive cannot co-occur with other SAP arguments in transitives. Thus, they typically appear with 3rd person arguments and Set B suffixes. This is shown with transitives in (13a) and ditransitives in (13b).

(13) a. Né-mêan-o-**ne**
          2-give.away-DIR-**1INC.B**
          '**We(INC)** gave <u>her/him</u> away'
          (Leman 2011:67)

    b. Né-mêt-o-no**ne**
          2-give-DIR-**1INC.B**
          '**We(INC)** gave her/him to <u>her/him(OBV)</u>'
          (Leman 2011:106)

Despite the gap in transitive SAP forms, 1st person plural inclusive forms follow the reflexive and passive pattern shown with 1st person plural exclusive arguments. The transitive reflexive and passive forms in the (a) examples in (14) and (15), respectively, appear with the Set A suffix, while the corresponding ditransitives in the (b) examples appear with the Set B suffix. This supports the Set A-B allomorph generalizations shown for 1st person plural exclusive forms.

(14) a. Né-mêaʔtov-ȧhtse-**ma**
          2-give.away-REFL-**1INC.A**
          '**We(INC)** gave ourselves away'
          (Leman 2011:67)

    b. Né-mét-ȧhtsê-no**ne**
          2-give-REFL-**1INC.B**
          '**We(INC)** gave <u>her/him</u> to ourselves'
          (Leman 2011:106)

(15) a. Né-mêaʔt-one-**ma**
          2-give.away-PASS-**1INC.A**
          '**We(INC)** were given away'
          (Leman 2011:67)

    b. Né-mêt-ané-no**ne**
          2-give-PASS-**1INC.B**
          '<u>S/he</u> was given to **us(INC)**'
          (Leman 2011:106)

In sum, there are four generalizations regarding the inner suffix in Cheyenne that any account needs to derive. These are summarized in (16).

(16)   PLURAL SAP INDEXING INNER SUFFIXES IN CHEYENNE: 4 GENERALIZATIONS
     1.   1st person plural is always indexed when present (even if 2nd person plural is present)
     2.   Grammatical role is irrelevant in transitives
     3.   Set B forms only appear when a 3rd person argument is present in transitives (intransitives and transitives with only SAP arguments always appear with Set A suffixes)
     4.   In ditransitives, Set B affixes appear when a 3rd person direct object is present in all 2nd person plural forms, but only for 1st person plural (inclusive and exclusive) forms in reflexives and passives

In the next section we present a syntactic analysis of inner suffixes which derives all four generalizations.

3   Proposal

In this section we present our account of the four generalizations from the Cheyenne data presented in the previous section. Our account has three important elements: (1) a fused person-feature (π-feature) and number-feature (#-feature) probe on T which is only maximally satisfied by a 1st person plural argument, (2) the two structurally closest arguments are searched simultaneously, and (3) the probe can enter into a second agreement cycle if it is not fully satisfied in the first searching cycle. Essentially, our account is a hybrid of Cyclic Agree (the potential for a two-cycle probing system) and Multiple Agree (simultaneous probing in the first cycle) accounts. We introduce the three elements of our Hybrid Agree proposal in 3.1, and discuss why the data necessitates a hybrid account and not either a pure Cyclic Agree or pure Multiple Agree account in 3.2.

3.1   Hybrid Agree

### 3.1.1   Satisfaction by 1st person plural

In Table 8 we propose the mapping of the typical Cheyenne verb (from Table 1, Leman 2011: 78) to functional heads. Following recent analyses of Proto-Algonquian (Oxford 2014) and Mi'gmaq (Coon & Bale 2014), we locate the inner suffix in T.[13]

Table 8: MAPPING THE VERB TEMPLATE TO FUNCTIONAL PROJECTIONS

prefixes		verb	suffixes				
person	negation	root $\sqrt{}$	verb final *v*	theme sign Voice	negation Neg	**inner suffix T**	mode C
Né- 2	*sâa-* not	*vóo* see	*-m* TA	*-è* LOC.DIR	*-he* NEG	***-me*** **2PL**	*-he* Q
'Didn't you(PL) see me?'							

We propose that the inner suffix is indexed by a ɸ-probe on T which specifically searches for a DP with ɸ-features. We assume a probe-goal account of AGREE (Chomsky 2000, 2001), in which a probe with unvalued features searches its local (e.g., via c-command) domain for a goal with valued features. In intransitives, the probe on T finds a goal with ɸ-features, e.g., the subject in Spec-VoiceP in (17), and is valued accordingly.

(17)
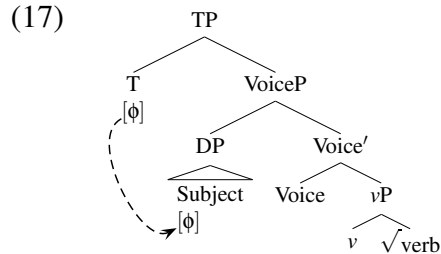
More specifically, the probe only indexes SAPs that are plural. This is shown in the intransitive paradigm in Table 9. Only 1st person plural (inclusive and exclusive), and 2nd person plural are indexed.

Table 9: INNER SUFFIX: INTRANSITIVE PARADIGM ('sees', Leman 2011:27)

form	prefix	verb	**inner suffix**	outer suffix
1INC	Né-	vôosane	-**ma**	
1EXC	Ná-	vôosanē	-**me**	
2PL	Né-	vôosanē	-**me**	
3PL	É-	vôosane		-oʔo
3OBV	É-	vôosan		-óho
1	Ná-	vóósáne		
2	Né-	vóósáne		
3	É-	vóósáne		

The 3rd person plural (-*oʔo*) and 3rd person obviative (-*óho*) suffixes occupy a different position, often referred to as the outer suffix (Oxford 2014).[14] We can see this in forms with both an inner and outer suffix, such as in the ditransitive forms in (18) (see below for a discussion of ditransitives).

(18)   a.   Né-mêt-atse-**meno**-oʔo
          2-give-LOC.INV-**1EXC.A**-3PL
          '**We(EXC)**   gave   them   to
          you(SG/PL)'

         b.   Né-mêts-e-nó**vo**-oʔo
          2-give-LOC.DIR-**2PL.B**-3PL
          '**You(PL)** gave them to me'
                        (Leman 2011:107)

---

[14]This corresponds to Slot 9 in Bloomfield (1962). We follow Oxford (2014) in assuming that the outer suffix is a 3rd person clitic. Since the distribution of the outer suffix does not impact the distribution of the inner suffix, we leave this topic for further research.

In order to derive the fact that the inner suffix only indexes arguments that are both SAP and plural, the ϕ-probe on T must have at least two characteristics: (1) both unvalued person (π) and number (#) features, and (2) these are fused such that they are only valued when an argument has both person and number valued (Coon & Bale 2014). This shown in our representation of the probe in (19).

(19)   FUSED ϕ-PROBE ON T

      T
      |
      ϕ
    ⌒
  π #
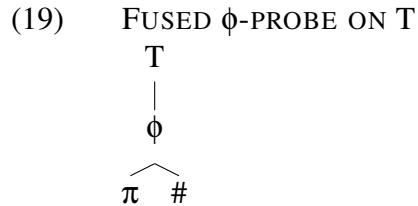
Additionally, the intransitive data shows that the probe has certain preferences, since only SAP plural arguments are indexed. There is also a preference for 1st person over 2nd person arguments (Generalization #1), as shown with *-meno* in (20).

(20)   a.   Né-vôo-m-atse-**meno**   b.   Né-vôo-m-e-**meno**
          2-see-TA-LOC.INV-**1EXC.A**   2-see-TA-LOC.DIR-**1EXC.A**
          '**We(EXC)** saw you(SG/PL)'   'You(SG/PL) saw **us(EXC)**'
                                                             (Leman 2011:55)

This indicates to us that the probe in T only stops searching when it finds a 1st person plural argument — it is fully satisfied only if it finds an argument with both 1st person π-features and a plural #-feature. Following Deal (2015), we make a two-way distinction between interacting and satisfying features. Interacting features are those which can condition allomorphy at Vocabulary Insertion (VI). Under the assumption that the probe copies all the features of DPs that it searches, all features copied to the probe can condition allomorphy, thus are potentially interacting features. Satisfying features are those that cause the probe to halt further searching and value the probe. Thus, if a 1st person plural argument is present, it will value the probe, and will be indexed as either *-mé* (Set A), if no other argument is present, *-méno* (Set A) if a 2nd person argument present, or *-né* (Set B) if a 3rd person argument is present. Both 2nd person and 3rd person can be interacting features for 1st person plural. If a 2nd person plural argument is present (but not 1st person plural), *-mé* (Set A) will appear unless there is a 3rd person present to trigger the insertion of *-vó* (Set B). Only 3rd person can be an interacting feature for 2nd person plural.

We propose that the 1st person plural is a preference of the probe in the syntax, such that it will determine the argument to be indexed in VI insertion. The only thing determined post-syntactically is the exact VI to be inserted, which is dependent on the presence of an interacting feature. We do not assume that it is either: (i) the feature system itself determines that 1st person plural is preferred, i.e., because it is the most specified person (see 4.1), or (ii) the ordering between VIs post-syntactically that determines the 1st person plural preference. It is important that this preference occurs in the syntax, thus influences probing in such a way effects probing of the direct object in ditransitives (see 3.2).

As such, the first important part of our proposal is that only a single ϕ-feature bundle set with both 1st person and plural features will fully satisfy the probe and halt further search. This assumption explains why the probe agrees with the 1st person plural argument, even if the other

argument is 2nd person plural: even though the probe can spellout as 2nd person plural, 2nd person plural is not a satisfying feature. As we discuss below, 3rd person is the crucial interacting feature that triggers Set B allomorphy.

3.1.2 Simultaneous probing

What (20) also shows us is that grammatical role is not relevant (Generalization #2), since regardless of whether it is the subject or object, 1st person plural is indexed and with the same allomorph. However, the form of the morpheme that marks the 1st or 2nd plural argument is conditioned by the presence of a 3rd person argument (Generalization #3). For instance, a 2nd person plural argument is marked with the Set B morpheme *-vo* only when it combines with a 3rd person argument in transitives, e.g., in (21c). This also occurs regardless of the grammatical function. In an intransitive construction such as (21a), where it is the sole argument, or in a transitive construction such as (21b), in which it combines with another SAP argument (e.g.,1st person singular), the 2nd person plural argument is marked with the Set A morpheme *-me* (this is also true for 2nd person plural passives and reflexives of transitive predicates).

(21) a. Né-vôo-sanē-**me**
          2-see-AI-**2PL.A**
          '**You(PL)** see'
          (Leman 2011:27)
      b. Né-vôo-m-ē-**me**
          2-see-TA-LOC.DIR-**2PL.A**
          '**You(PL)** saw me'
          (Leman 2011:55)

      c. Né-vôo-m-ó-**vo**
          2-see-TA-DIR-**2PL.B**
          '**You(PL)** saw <u>her/him</u>'
          (Leman 2011:55)

The same is true for the morpheme that marks a 1st person plural exclusive argument — it takes the Set B form *-ne*, only when the 1st person plural argument combines with the 3rd person argument, as in (22c). Otherwise, it takes the Set A form *-méno*, as in (22a) and (22b).

(22) a. Ná-vôo-sanē-**me**
          1-see-AI-**1EXC.A**
          '**We(EXC)** see'
          (Leman 2011:27)
      b. Né-vôo-m-atse-**meno**
          2-see-TA-LOC.INV-**1EXC.A**
          '**We(EXC)** saw you(SG/PL)'
          (Leman 2011:55)

      c. Ná-vôo-m-ó-**ne**
          1-see-TA-DIR-**1EXC.B**
          '**We(EXC)** saw her/him'
          (Leman 2011:55)

Thus, T must be able to probe (at least) two arguments – (i) the 1st or 2nd person plural argument, with which it agrees, and (ii) the other argument, in order to determine whether it is a 3rd person argument, which conditions the Set B morpheme, or not. Thus, the second important part of our proposal is that the probe in question simultaneously probes the two structurally

closest arguments in its domain.[15] The issue of the number of arguments that T simultaneously probes does not arise with intransitives, of course, since the SAP plural argument, which triggers agreement, is the only argument present — consequently, intransitives are limited to Set A forms. With transitive forms, however, T will simultaneously probe both arguments, and if it finds a 1st or 2nd person plural argument, it will agree with it. But whether or not this argument is marked with the Set A or Set B morpheme will be determined by the π-features of the other argument: if the other argument is 3rd person, the Set B morpheme will be inserted, otherwise the Set A morpheme will appear. Consider first the structure in (23), in which T probes both arguments.

(23) a.

  b. 1PL>3 ⇔ *-né* (Set B)
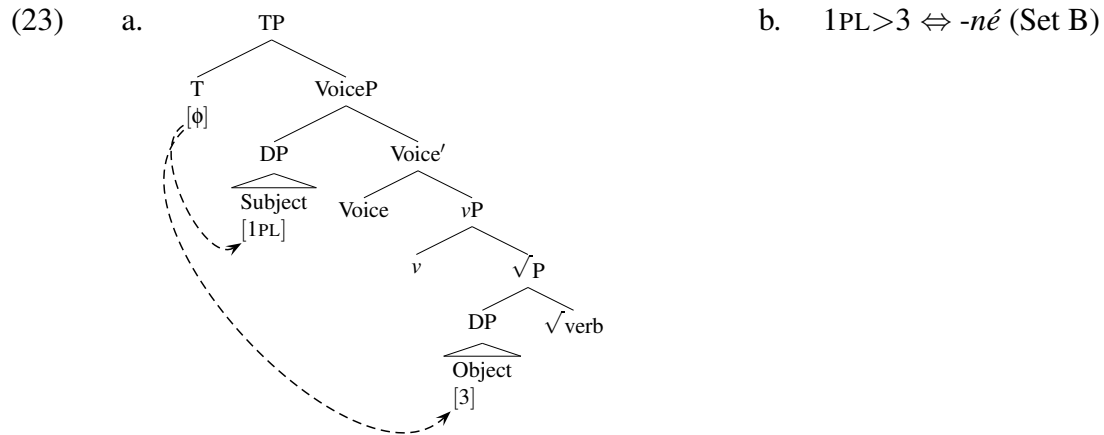
Here the probe finds a 1st person plural argument in the subject position, with which it agrees, and a 3rd person argument in the object position, which conditions the appearance of the Set B allomorph. We propose that this is governed in the post-syntactic component by the vocabulary insertion rules, such as in (24).[16]

(24) SET A VS. SET B
  a. Set B ⇔ [[+*participant*][*plural*]]/__[−*participant*]
  b. Set A ⇔ [[+*participant*][*plural*]]

Formal statements of vocabulary insertion like (24) are guided by the two general principles in (25), e.g., Bobaljik to appear, but see also Kiparsky 1972, Halle 1997, Halle & Marantz 1993.

(25) a. RULES APPLY
      A rule applies wherever its structural description is met.

---

[15]The necessity of simultaneous probing is based on the assumption that when a probe is fully satisfied it will cease to probe further. See the argument against a pure Cyclic Agree (Béjar & Rezac 2009) account of transitives in 3.2 for further discussion.

[16]First, note that we are using [±*participant*] features in (24) and throughout for ease of exposition. However, nothing in our account crucially hinges on this, as we believe that other feature systems could in principle express the same distinction. Second, note that we do not distinguish between subject and object φ-feature bundles, but only between the indexing and conditioning ones, similar to Deal (2015) for Nez Perce. This seems to be a property of specific probes, as the order of the φ-feature bundles (subject and object) is relevant for the probe on Voice which is responsible for theme signs (see 4.2).

b. ELSEWHERE CONDITION
Where more than one mutually exclusive rule may apply, (only) the most highly specified rule applies.

After T probes both arguments in (23), it is specified for the sets of features shown in (26) in the post-syntactic component. We represent this feature set such that the features of the indexed (e.g., satisfying) argument are ordered first and the features of other (e.g., interacting) arguments are ordered after. Thus, both 1PL>3 and 3>1PL are represented identically, as in (26).

(26)   T $\{[[+participant, +speaker], [plural]], [[-participant]]\}$

Application of the rule in (24a) results in a Set B vocabulary item being inserted to mark a plural SAP argument in the context of a 3rd person argument. The rule in (24b), on the other hand, inserts the Set A vocabulary item in all other contexts (it is an elsewhere item); i.e., in the absence of a 3rd person. This also means that (24b) correctly derives intransitives as well as transitive forms without a 3rd person argument. Also, the set of features in (26) is in principle compatible with both (24a) and (24b); there are no features in any of the statements in (24) which are not included in (26). However, since (24a) is more specific, the Set B morpheme must be inserted given (25b).

Now, note that (24) makes a general distinction between Set A and Set B forms, that is, elements that are conditioned by the presence of a $[-participant]$ argument and elements that are not. This kind of division into two natural classes is strongly supported by the diachronic Algonquian evidence; in particular, the Set A suffixes have developed from the so-called 'M-suffixes' of the Proto-Algonquian (see Goddard 2007 and the references cite therein). Also, in terms of morphophonological properties all Set A forms start with *m-* and a vowel and in certain cases this CV sequence can be extended by an *n-* and a vowel. As we already saw, 1st person exclusive is extended by *-no* in the context of 2nd person (i.e., *-méno*), while in dubitative constructions 1st and 2nd person take the forms in (27).

(27)   DUBITATIVE INNER SUFFIX (Goddard 2007:226)
a.   1EXC *-mane*
b.   1INC *-mane*
c.   2PL *-me*

This means that the Set A suffixes can be further specified in the following way in (28) (we focus here on the exclusive forms).

(28)   SET A
a.   *-méno* $\Leftrightarrow [[+participant], [+speaker], [plural]] / \_\_ [+hearer]$
b.   *-mé* $\Leftrightarrow [[+participant], [plural]]$

Thus, there is further division within forms that are not conditioned by the presence of a $[-participant]$ argument (Set A). (28a) is more specific since it includes reference to the feature $[+speaker]$ (i.e., 1st person) and a conditioning factor, namely, the presence of a $[+hearer]$ argument (an interacting feature). The form in (28b), on the other hand, is less specific and is in principle compatible with any input that includes features $[+participant]$ and $[plural]$. Its

distribution, however, is limited by (25b), which is a version of the well-known Subset Principle (e.g., Kiparsky 1972, Halle 1997, ...etc.). This immediately captures the elsewhere nature of (28b) and accounts for why *-mé* shows up in 1st and 2nd person plural intransitives, and 2nd person plural transitives where the other argument is not 3rd person. That is, *-mé* marks all plural SAP arguments in intransitives, but only 2nd person plural arguments in transitives (provided the other argument is not [−*participant*], which would trigger the Set B form). Consider first intransitives: if the sole argument of an intransitive verb is 1st person plural, the syntactic input will be $\{[+participant], [+speaker], [plural]\}$, with which *-mé* is compatible since it is specified for a subset of those features (i.e., [+*participant*] and [*plural*]). The more specific form in (28a) cannot be inserted here, because the syntactic input does not include the conditioning 2nd person argument – intransitives do not have the second argument. For this reason *-mé* must be inserted in this case. The same goes for 2nd person plural intransitives: (28a) is an incompatible match, since the input does not include [+*speaker*]. However, the situation with transitives is different because they include a second argument. If a 1st person plural argument is combined with a 2nd person argument, the form in (28a) must be inserted, since it is more specific than (28b). But if a 2nd person PL argument is combined with a 1st person argument, the element *-méno* in (28a) cannot be inserted, because there is a feature mismatch with the syntactic input: the plural argument of the input does not include [+*speaker*] (and the conditioning argument is not [+*hearer*]). Consequently, the less specific/elsewhere element *-mé* in (28b) is inserted. Thus, the system developed here is able to capture two things. First, the division in (24) formalizes the distinction between Set A and Set B forms, for which there is strong, independent diachronic evidence. Second, the Set A-internal division in (28) correctly accounts for the elsewhere-like nature of *-mé*.

The Set B forms can also be further specified as in (29).

(29)   SET B

    a.   *-né* ⇔ $[[+participant], [+speaker], [plural]]/\underline{\quad}[-participant]$
    b.   *-vó* ⇔ $[[+participant], [plural]]/\underline{\quad}[-participant]$

The element *-né* in (29a) makes reference to the feature [+*speaker*], this marking 1st person plual arguments, in the presence of a 3rd person argument. The specification for *-vó* in (29b) lacks [+*speaker*] and as a result is used for 2nd person plural arguments (in the presence of a 3rd person argument).

One might wonder at this point if it is perhaps more appropriate to treat a morpheme like *-né* as an element simultaneously agreeing with both the 1st person plural argument and the 3rd person argument, instead of a special form of a 1st person plural agreement morpheme conditioned by the presence of the 3rd person argument, as in our system. The main reason why we choose this approach is that the features of the two arguments are clearly not equally important for the spellout of this morpheme. That is, in order for this morpheme to appear it must agree with an SAP plural argument. In other words, the features [+*participant*] and [*plural*] on a single argument are the precondition for this morpheme to show up, while the feature [−*participant*] is of secondary importance. The system proposed here captures this fact directly by assuming the rules in (28)-(29), where all the morphemes are specified to express [+*participant*] and [*plural*]. Features like [−*participant*] and [+*hearer*], on the other hand, are simply additional factors that condition special forms of the SAP plural agreement morpheme. It is therefore expected on our approach that there should not be any agreement morpheme in this agreement slot (i.e., T), if an

SAP plural argument (i.e., [+*participant*][*plural*]) is not present in the structure, which is exactly the case. For instance, there is no morpheme in this slot in structures like 1>3 or 2>3, even though these structures include the [−*participant*] feature. An approach on which -*né* is treated as an element simultaneously agreeing with both the 1st person plural argument and the 3rd person argument, [−*participant*] feature of the 3rd person argument is not expected to have this secondary importance. That is, we would expect to see some sort of agreement morpheme in this slot even in cases like 1>3 or 2>3. The same goes for -*méno* in (28a): it appears in structures like 1pl>2, or 2>1pl, but the relevant agreement slot is empty in structures like 1>2, or 2>1, even though they contain the feature [+*hearer*]. If [−*participant*] or [+*hearer*] are indeed agreement triggering features, we would expect to see them trigger some agreement when SAP plural arguments are absent – but this is exactly the case where no agreement morphemes are present. This fact falls out directly from our approach, while the alternative approach would need to make some additional assumptions. This in principle might be feasible, but we leave exploring this possibility to future work.

In sum, the second important part of our proposal is that the two structurally highest arguments are necessarily probed by T in order to derive the ability for the interacting argument to condition allomorphy of the indexed argument, which either fully (i.e., 1PL) or partially (i.e., 2PL) satisfies the pre-specification of the probe.
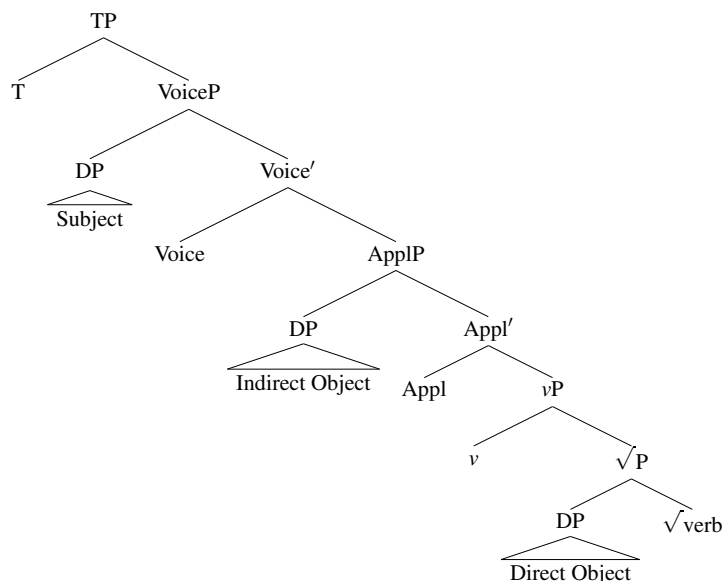
3.1.3   2nd probing cycle

The assumption that the two structurally highest arguments are probed also forms the basis for our account of the asymmetry between 1st and 2nd person plural arguments in ditransitives. We assume that in ditransitives in Cheyenne, the indirect object asymmetrically c-commands the direct object, as argued in other Algonquian languages, e.g., Bruening 2001 and Lochbihler 2012.[17] The indirect object is introduced in the specifier of an Applicative phrase (ApplP) and the direct object in the specifier of $\sqrt{}$P (as in transitives). This is shown in (30). It is important to note that Cheyenne also appears to pattern with other Algonquian languages in only having 3rd person direct objects in ditransitives (a strong PCC effect; Lochbihler 2012).[18]

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[17]The data in Leman (2011) does not contradict the Algonquian literature which uniformly assumes that goals are structurally higher than themes. The investigation of underlying structure of ditransitives in Cheyenne is a topic for further research.

[18]We cannot address PCC effects here in any serious detail, but we need to point out that our proposal is perfectly compatible with many major accounts of PCC. If agreement is the source of PCC effects, then we think that lower heads in the verbal domain, e.g., Voice and/or *v*, are more relevant to the licensing of the direct object, thus should be investigated for argument licensing (see Béjar & Rezac 2003, Preminger 2014 and references therein).

(30)

TP
├─ T
└─ VoiceP
   ├─ DP (Subject)
   └─ Voice′
      ├─ Voice
      └─ ApplP
         ├─ DP (Indirect Object)
         └─ Appl′
            ├─ Appl
            └─ *v*P
               ├─ *v*
               └─ √P
                  ├─ DP (Direct Object)
                  └─ √verb

In order to show the asymmetry in allomorphy, let's take a ditransitive form with a 1st person subject, 2nd person indirect object, and 3rd person direct object (1>2>3) as our example. If the 1st person subject is plural (e.g., **1PL**>2>3), the probe in T always agrees with it and the Set A allomorph appears. But when only the 2nd person indirect object is plural (e.g., 1>**2PL**>3), the probe in T will agree with it and the Set B allomorph always appears. In other words, in these ditransitives forms, a 1st person plural marker is never sensitive to the presence of the 3rd person direct object, while the 2nd person plural marker always is (Generalization #4).

Consider now how the two assumptions we made here account for this. We proposed that the probe in question: (i) is specified to look for a 1st person plural argument, and (ii) simultaneously searches the two structurally closest arguments. In transitives, it searches both arguments, and regardless of whether it ends up agreeing with the 1st person plural or 2nd person plural argument, it will also be able to see whether the other argument is 3rd person, which would then determine which type of allomorph is inserted (Set A or Set B). This follows from the assumption that the search domain of this probe includes two arguments. But if its search domain is limited to two arguments, then it cannot probe all arguments of a ditransitive verb (only the two structurally closest: the subject and indirect object), because ditransitives include an extra argument (the direct object).

This brings us then to the final main ingredient of our proposal: we propose that the probe in T will enter a second searching cycle if it does not find satisfying features (i.e., a 1st person plural feature set) in its initial search domain. That is, if the probe does not find a 1st person plural argument among the two structurally closest arguments it initially searches (i.e., the subject and indirect object), search will enter the second agreement cycle and search the next closest argument (i.e., the direct object). Thus, the 3rd person direct object of a ditransitive will be 'visible' to T only if the second searching cycle is initiated, which never happens if the subject or the indirect object is 1st person plural. For this reason, a 1st person plural argument in ditransitives (i.e., **1PL**>2SG/PL>3SG/PL; or 2SG/PL>**1PL**>3SG/PL) is always marked with the Set A morpheme. If, on the other hand, the only plural argument among the subject and the indirect object is 2nd person (i.e., **2PL**>1>3SG/PL; or 1>**2PL**>3SG/PL), the second cycle will be initiated, which will then make a 3rd person direct object visible for Set A-B vocabulary insertion rules in (24).

Consequently, this is the reason why a Set B morpheme will be obligatory in such contexts. This is the gist of our analysis of ditransitives, which we lay out in more details in the next section.

In sum, in this section we propose that a φ-probe on T is responsible for the inner suffix and has three important characteristics. First, the probe is fused for π- and #-features, which causes it to only be valued by SAP plural arguments, and satisfied by 1st person plural. This causes it to index 1st person plural when a 2nd person plural argument is also present (Generalization #1). Second, the probe on T searches the two closest arguments simultaneously, which derives both: (a) the irrelevance of grammatical role in transitives (Generalizations #2), and (b) the ability for the non-indexed argument to condition the Set A-B allomorph, i.e., the absence (Set A) or presence (Set B) of a 3rd person argument (Generalization #3). Third, if neither of the first two probed arguments satisfies the probe (i.e., a 1st person plural argument is not present), then the probe can engage in a second agreement cycle if another argument is present (i.e., in ditransitives). This derives the ability for a 3rd person direct object to condition a 2nd person plural Set B allomorph in ditransitives when a 1st person plural argument is not present (Generalization #4). We take a step back and contrast pure Cyclic Agree and Multiple Agree accounts with our hybrid approach in the next section.

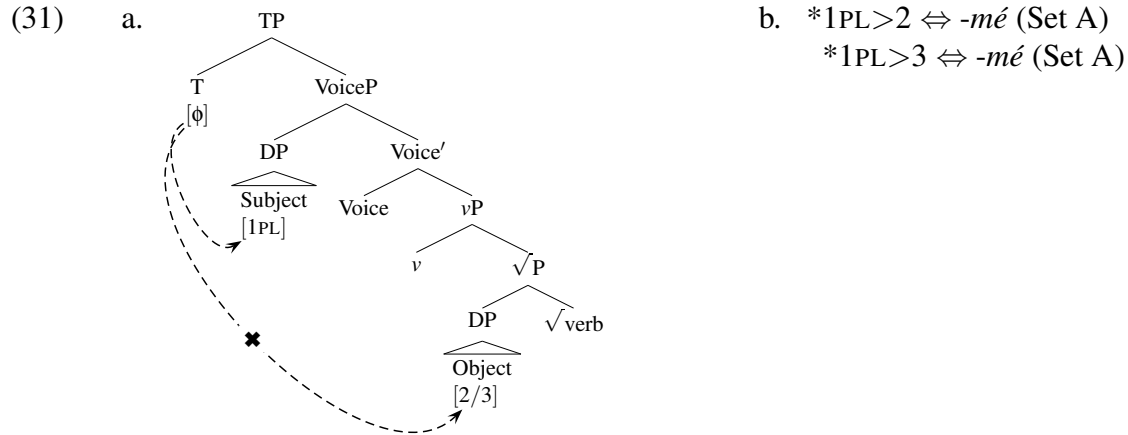## 3.2   Cyclic and Multiple Agree

Overall, our analysis combines two types of approaches to the operation AGREE, which are often contrasted against each other: Multiple Agree (e.g., Hiraiwa 2001, 2005, Nevins 2007, 2011, Zeijlstra 2004, etc.) and Cyclic Agree (e.g., Béjar & Rezac 2009). As discussed in Section 1, under a Multiple Agree account, the probe simultaneously engages the features of all goals in its domain. While under a Cyclic Agree account, the probe strictly interacts with one goal in its domain at a time (beginning with the most local), but these interactions can occur more than once in a derivation, in a cyclic fashion with different goals.

We have presented an account of a probe that can enter multiple cyclic agreement steps, but which would interact with more than one argument simultaneously in (at least) one of these steps. The probe on T in Cheyenne is specified to find 1st person plural features and its search domain includes two structurally closest arguments — this is the Multiple Agree part of our proposal, since the probe simultaneously engages with two arguments. But if the probe does not find what it looks for (i.e., 1st person plural) among the two arguments it probes, and there are more arguments to be probed, then it probes further and enters the second agreement cycle. This is the Cyclic Agree part of our proposal — which can be seen only in ditransitives, since these are the only contexts in which it is possible to probe more than two arguments.

However, from the perspective of parsimony, an account of the Cheyenne data using only one of these accounts is preferred over our hybrid account. Thus we need to show that the Multiple Agree part of our analysis cannot be recast in terms of Cyclic Agree without any loss of empirical coverage, and conversely, that the Cyclic Agree component cannot be recast in terms of Multiple Agree.

Thus, we first need to show that the probe in question does engage simultaneously with the features of two closest arguments; i.e., that this is not the result of Cyclic Agree, whereby T probes one argument in one cycle, and then the other in another cycle. If this were the case, then we would expect to see bleeding of the type discussed in Béjar & Rezac (2009), between the argument in the first cycle and the argument in the (potential) second cycle. That is, agreement with the structurally

closest argument should, depending on the feature specifications of the probe, prevent agreement with the next closest argument. For example, since the subject is the structurally closest argument to T, we would expect that it would be searched first, and if it were 1st person plural, it would fully satisfy the probe, such that it would bleed the searching of the object, as shown in (31).

(31) a.

```
                    TP
                  /    \
                 T      VoiceP
                [φ]    /      \
                    DP         Voice′
                   /  \       /      \
              Subject  Voice   vP
               [1PL]        /     \
                           v      √P
                                 /   \
                               DP    √verb
                              /  \
                          Object
                           [2/3]
```

b. *1PL>2 ⇔ -mé (Set A)
    *1PL>3 ⇔ -mé (Set A)

This would predict that we should always find the same inner suffix (e.g., *-mé* Set A) when the subject is 1st person plural, since the object is not probed, thus, cannot condition the inner suffix allomorph. But nothing like this ever happens in transitives — inner suffix agreement does not care about grammatical role (the structural position of the argument it agrees with) and it is always sensitive to the presence of the 3rd person argument, as shown by the Set A-B allomorphs irrespective of the grammatical function.[19]

Thus, assuming that the satisfaction of the probe (the valuing of all of its features) results in no further searching (or deactivation of the probe), it must be the case that both the subject and direct object are probed simultaneously in transitives. This is the only way to explain how the direct object in (31) can be probed and condition the inner suffix allomorph if a 1st person plural argument is the subject. This is the Multiple Agree part of our proposal, as in (23) and shown again below in (32)

(32) a.

```
                    TP
                  /    \
                 T      VoiceP
                [φ]    /      \
                    DP         Voice′
                   /  \       /      \
              Subject  Voice   vP
               [1PL]        /     \
                           v      √P
                                 /   \
                               DP    √verb
                              /  \
                          Object
                           [2/3]
```

b. 1PL>2 ⇔ -méno (Set A)
    1PL>3 ⇔ -né (Set B)

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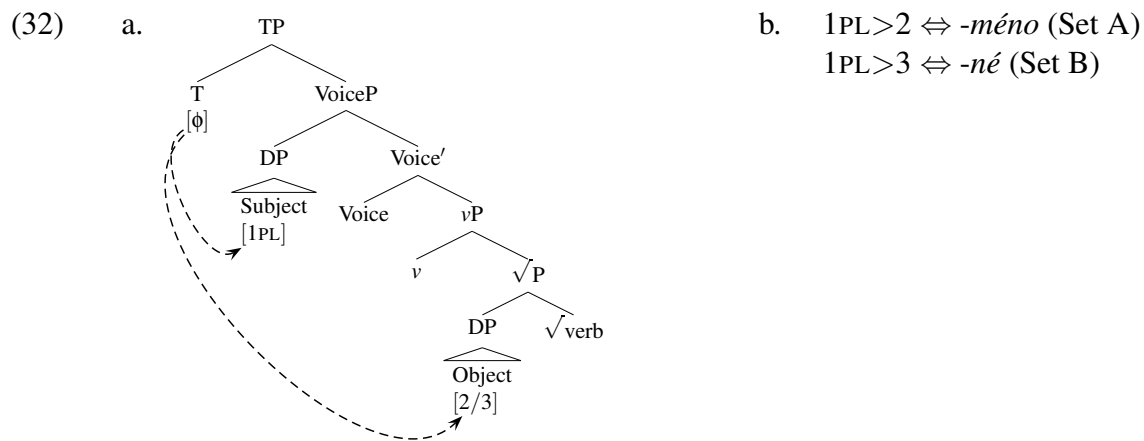
[19]Note that nothing crucial hinges on the subject being probed first. If the object is probed first, this account would predict the same bleeding effect, but for the subject instead, which is equally problematic for the conditioning of the Set A-B allomorphs.

In fact, there are other probes in Cheyenne (and other Algonquian languages) that probe two arguments simultaneously — namely, theme signs. We discuss them in more detail in Section 4.2, where we show that there is no evidence of bleeding of the type argued to occur with person prefixes in Nishnaabemwin (Béjar & Rezac 2009). Thus, a pure Cyclic Agree account does not seem to be able to capture the full range of data without additional stipulations.

But evidence for the existence of a type of bleeding effect, and therefore the second agreement cycle, comes from the asymmetry in SAP plural marking we observe between transitives and ditransitives. 1st person plural exclusive arguments are sensitive to the presence of the 3rd person direct object only in transitives, but never in ditransitives. Recall the lack of contrast in the inner suffix between the transitive (10a) and the ditransitive (10b), shown again below as (33a) and (33b), respectively. The presence of the 3rd person direct object in (33b) does not trigger the Set B allomorph as it did when present in transitives in (33c).

(33)   a.   Né-mêaʔtov-atse-**meno**
            2-give.away-LOC.INV-**1EXC.A**
            '**We(EXC)** gave you away'
            (Leman 2011:67)

       b.   Né-mét-atse-**meno**
            2-give-LOC.INV-**1EXC.A**
            '**We(EXC)** gave her/him to you'
            (Leman 2011:106)

       c.   Ná-mê-á-nó**ne**
            2-give.away-DIR-**1EXC.B**
            '**We(EXC)** gave her/him away'
            (Leman 2011:67)

The reason why the direct object is not probed in ditransitives is because the feature preferences of the probe on T (1st person plural) are fully valued in the first cycle in ditransitives, and thus the second cycle which would make the 3rd person object visible for the rule of insertion never starts. This is shown with the representation of (33a) in (34).

(34)   a.   b.   1PL>2 ⇔ -*méno* (Set A)
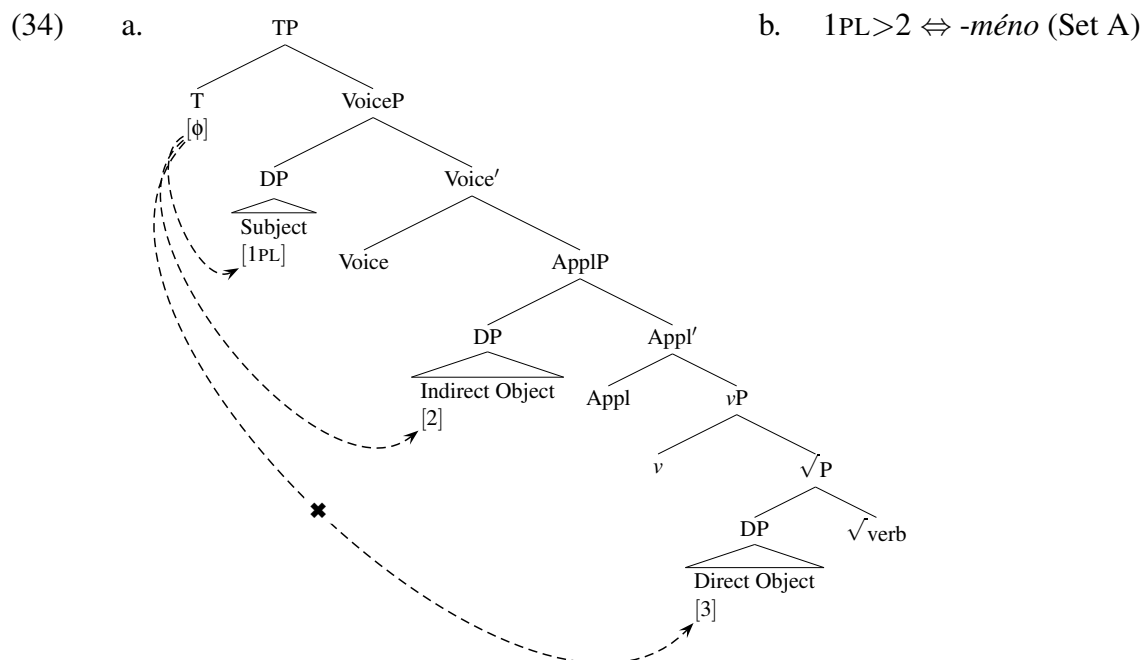

But if neither the subject nor the indirect object is 1st person plural, the second cycle must start and it makes the 3rd person direct object always visible for agreement with a 2nd person plural

argument — thus, a 2nd person plural argument will trigger the Set B morpheme in the context of the 3rd person direct object both in transitives and ditransitives. Recall the contrast between the Set A allomorph in the transitive (9a) and the Set B allomorph in the ditransitive (9b), shown again below as (35a) and (35c), respectively. The presence of the 3rd person direct object in (35c) triggers Set the B allomorph, as it did when present as the direct object in a transitive, such as in (35b).

(35)   a.   Né-mêáʔtov-ē-**me**
             2-give.away-LOC.DIR-**2PL.A**
             '**You(PL)** gave me away'
             (Leman 2011:67)

       b.   Né-mé-á-nó**vo**
             2-give.away-DIR-**2PL.B**
             '**You(PL)** gave <u>her/him</u> away'
             (Leman 2011:67)

       c.   Né-méts-é-nó**vo**
             2-give-LOC.DIR-**2PL.B**
             '**You(PL)** gave <u>her/him</u> to me'
             (Leman 2011:106)

The reason why the direct object is probed in ditransitives is because the features preferences of the probe on T (1st person plural) are not fully valued in the first cycle in ditransitive in (35c). Thus, the second cycle is triggered and the 3rd person direct object is probed and conditions the Set B allomorph as it did in transitives. This is shown in (36).

(36)   a.   b.   2PL>1>3 ⇔ -*vó* (Set B)
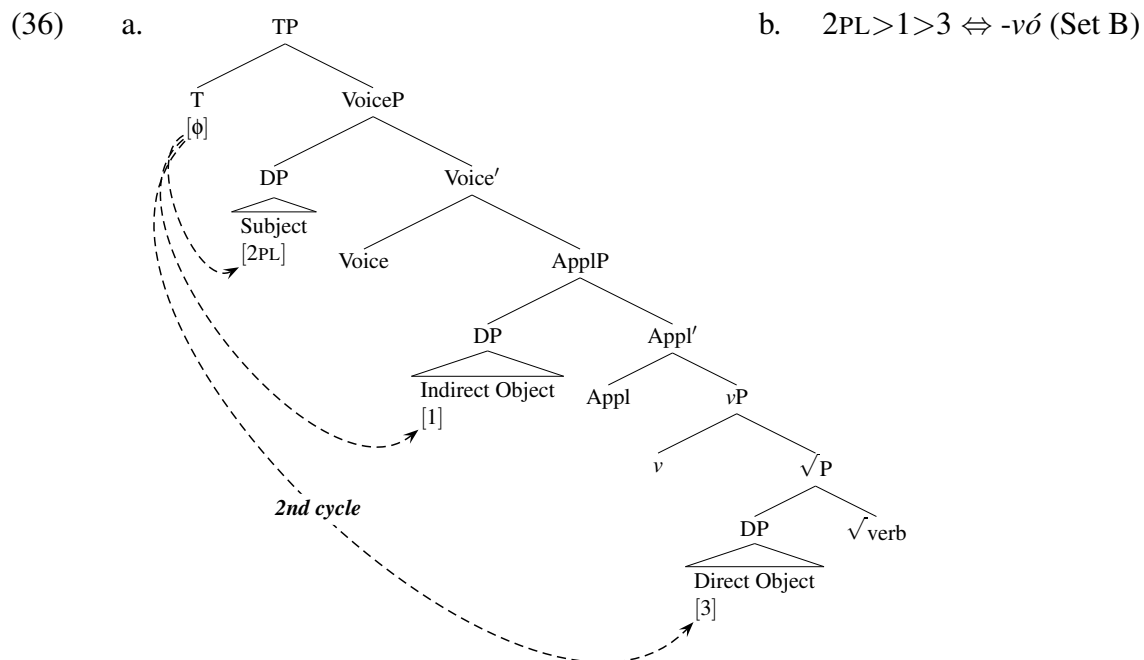
This is the Cyclic Agree part of our proposal, which we believe cannot be successfully captured

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within a pure Multiple Agree approach.[20] On the pure Multiple Agree approach, the 3rd person direct object should be visible for 1st person plural agreement equally well in transitive and ditransitives, just like in the case of 2nd person plural agreement. This is because a Multiple Agree approach would predict that all three arguments are searched simultaneously, regardless of their ϕ-feature content.[21] This account would incorrectly predict the insertion of the Set B allomorph, as shown in (37) for (33b).

(37) a.

b. *1PL>2>3 ⇔ -*né* (Set B)
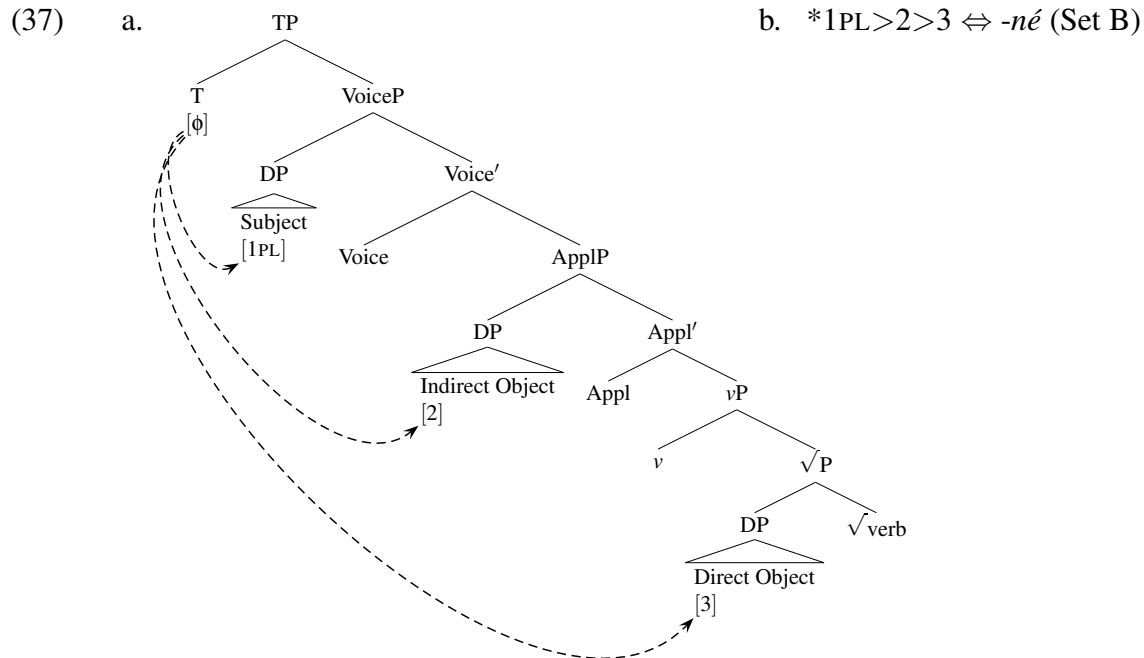
Thus, under a Multiple Agree approach it is unclear how to derive the asymmetry between 1st and 2nd plural arguments with respect to the ability for the direct object to condition the allomorph (therefore, be probed) in ditransitives.

In addition, it is also puzzling on this approach why 1st person plural marking becomes sensitive to the presence of the 3rd person direct object exactly in reflexives and passives. Recall the contrast in the 1st person plural exclusive allomorph between Set A in a reflexive based on a transitive predicate in (38a) and the Set B in a reflexive based on a ditransitive predicate in (38b). The same contrast occurs in passives, since a Set A allomorph appears when based on a transitive

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[20]We are aware, and multiple reviewers have pointed out, that a Multiple Agree approach which places the descriptive burden on the insertion of post-syntactic Vocabulary Items is a viable option. In particular, under this approach the ϕ-features of all arguments would be simultaneously probed in a single Multiple Agree operation and VIs that spellout these features would be underspecified in such a way to describe the distribution. Although, this has the advantage of limiting the typology of probes, this benefit is outweighed by the post-syntactic stipulations necessary to make it work. Specifically, this type of approach is not appealing to us since it (i) requires inherent rankings between VIs based on the Person Hierarchy (which we argue against in 4.1), (ii) still misses generalizations in the data itself (e.g., historically motivated 'm-class' suffixes, see Goddard 2007), and (iii) appears to be able to re-describe any given data set without revealing any deeper principles about the grammar (i.e., this type of theory would necessarily have to be constrained in some principled way). Ultimately, we leave this alternative account for future investigation.

[21]Note that under the Contiguous Agree approach to Multiple Agree proposed by Nevins (2011), the ϕ-feature content of arguments does impact the probing of arguments. We do not adopt this aspect of his proposal.

predicate in (39a) and Set B from a ditransitive predicate in (39b).[22]

(38) a. Ná-mêaʔtov-ȧhtsē-**me**
     1-give.away-REFL-**1EXC.A**
     'We(EXC) gave ourselves away'
     (Leman 2011:67)

(38) b. Ná-mét-ȧhtsé-nó**ne**
     1-give-REFL-**1EXC.B**
     'We(EXC) gave <u>her/him</u> to ourselves'
     (Leman 2011:106)

(39) a. Ná-méáʔt-óné-**me**
     1-give.away-PASS-**1EXC.A**
     'We(EXC) were given away'
     (Leman 2011:67)

(39) b. Ná-mêt-ané-nó**ne**
     1-give-PASS-**1EXC.B**
     '<u>S/he</u> was given to us(EXC)'
     (Leman 2011:106)

Regardless of the φ-feature content of the arguments, the Multiple Agree approach predicts that all arguments should be searched in (38b) and (39b), as shown in (40), in a similar manner as they are all predicted to be searched in transitives, such as (33a).

(40) a.   b.   1PL>1PL>3 ⇔ *-né* (Set B)
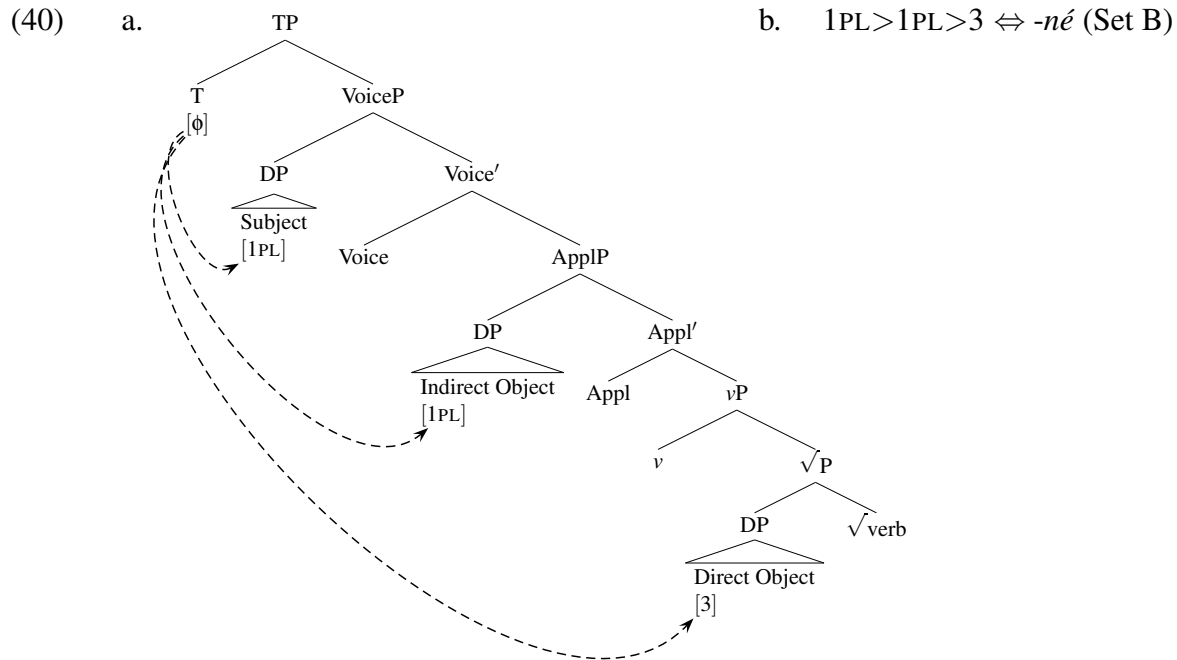
Under a pure Multiple Agree approach, there is no principled way to explain why the 3rd person direct object can condition allomorphy in the reflexive in (38b) and the passive in (39b), but not in the ditransitive form in (33b).

For us, the data in (38b) and (39b) indicate that the probe on T must be sensitive to the φ-feature properties of goals, such that the direct object can be searched in the first cycle, i.e., simultaneously with the subject/indirect object. For example, if we assume that the subject and indirect object are copies of the same DP in passives and reflexives (e.g., Hornstein 1999, Kayne 2002, Zwart 2002, etc.), the probe must recognize the shared identity between these arguments,

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[22]Note that reflexives and passives do not have the theme signs that we typically see in actives. Instead, there are special passive and reflexive suffixes (e.g., *-ȧhtse* for reflexives) that appear in the same slot and do not change based on the φ-feature content of the arguments.

and continues first-cycle searching. Given this shared identity, the subject and the indirect object in passives and reflexives 'count' as a single argument for the purposes of probing.[23] That is, there is just one argument with a single set of φ-features but with two copies. Since the probe in T searches 2 arguments in the first cycle, in reflexive and passive ditransitives the first cycle is extended to include the direct object as the second argument. This must occur in the syntax proper since it involves a first cycle search of the direct object, which is otherwise not possible in ditransitives. Otherwise, if the first cycle only included the identical subject and indirect object, a Set A allomorph should appear since the probe is maximally satisfied by the subject/indirect object, as it is in (38a) and (39a).

The failure of either a pure Cyclic Agree or a pure Multiple Agree approach to account for all of the inner suffix data in Cheyenne leads us to a hybrid approach, which provides maximal empirical coverage. In Section 4.2 we address the properties of theme signs in Cheyenne and show how they also raise serious questions for the pure Multiple Agree approach; we show that the theme signs always encode properties of the two structurally highest arguments, never more than two, even in ditransitives. That is, one might be led to conclude from the behavior of the theme signs in transitive constructions that they encode properties of all arguments through some version of unbounded Multiple Agree. But, ditransitives show that this operation is limited to the properties of the two highest arguments (the subject and the indirect object: i.e., there are no theme signs which index the subject, the indirect object, and the direct object).

To summarize, our account involves a hybrid approach to the probe in T, since we adopt: (a) a two-cycle Cyclic Agree approach, the second cycle which is only visible in ditransitives, and (b) simultaneous Multiple Agree probing of the two structurally closest arguments in the first cycle. We argue against a pure Cyclic Agree account due to the lack of bleeding effects in transitives and ditransitives with a 1st person plural exclusive subject. It is crucial that the two structurally closest arguments are probed in order to account for Set A-B contextual allomorphy. We argue against a pure Multiple Agree account since there are bleeding effects in ditransitives, such that the presence of a 1st person plural exclusive argument in the first cycle bleeds second cycle probing of the direct object. Bleeding of direct object probing is crucial in order to account for the asymmetry between 1st person plural exclusive and 2nd person plural Set B allomorphs in ditransitives.

In the next section we provide additional support for our proposal from other agreement morphemes in Cheyenne and other Algonquian languages, and discuss the cross-linguistic data to show why the inner suffix marking pattern appears in Algonquian languages although relatively rare, but attested, cross-linguistically.

4   Independent support

In this section we present independent evidence to support each crucial element of the analysis sketched in the previous section. First, we present the flexibility in ordering between 1st and 2nd persons across Algonquian languages as support for an articulated probe account, rather than variation in feature system between languages. Second, we support our hybrid approach to agreement from similarities between the inner suffix and theme signs in Cheyenne. Third, we

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[23]Note that other analyses in which the subject and the indirect object are (a) DPs with the same index (i.e., on the same chain), or (b) separate DPs with identical φ-feature sets (e.g., Reuland & Müller 2005; Reuland 2011), would also lead to the same result.

motivate the rarity of the inner suffix pattern and show why it is somewhat unsurprising that it appears in Algonquian languages.

4.1 Arbitrariness of ϕ-preference

We have proposed that the preference for 1st person over 2nd person is located in the probe itself. We have not made the additional assumption that this provides evidence for the existence of a universal, articulated π-feature system. For instance, a popular version of π-feature articulation is that 1st person ([*speaker*]) entails 2nd person ([*hearer*]), but the reverse does not. This would allow for either to value π, but only 1st person to maximally satisfy it. We have not made this assumption because it seems to us that the 1st person preference on T is arbitrary, thus, does not reveal anything deeper about the direction of entailment of π-features on the probe. The evidence that this is arbitrary comes from: (i) variance in the person preference of the inner suffix across Algonquian languages, which does not necessarily align with the preference of the person prefix, and (ii) the ability for 1st person plural inclusive ('you and me') forms to trigger either 1st or 2nd person agreement.

Although there is a preference for 1st person plural over 2nd person plural in the inner suffix, e.g., *-méno* in (41), the opposite preference is exhibited for the person prefix, which has a preference for 2nd person over 1st, e.g., *né-* in (41).

(41)   a.   **Né**-vôo-m-e-meno
           2-see-TA-LOC.DIR-1EXC.A
           'You(SG/PL) saw us(EXC)'

     b.   **Né**-vôo-m-atse-meno
           2-see-TA-LOC.INV-1EXC.A
           'We(EXC) saw you(SG/PL)'

                        (Leman 2011:55)

In fact, the Cheyenne pattern of a person prefix preference for 2nd person and an inner suffix preference for 1st person plural is the most common across Algonquian languages, and is shared in Menominee, Mi'gmaq, Blackfoot, Plains Cree, Atikamekw, East Cree, Betsiamites, and Moisie (MacKenzie 1980; Macaulay 2009). The less common, but also attested, pattern is for a 2nd person plural preference in both, which is shown in Moose Cree, Swampy Cree, and Davis Inlet Cree (MacKenzie 1980; Macaulay 2009).[24] The Moose Cree data in (42) shows the preference for 2nd person plural inner suffix (*-naawaaw*) such that the other argument is ambiguous for 1st person singular or plural. In addition, notice that: (i) the grammatical roles of the arguments are irrelevant, and (ii) Moose Cree also displays a 2nd person preference for the person prefix (*ki-*).

(42)   MOOSE CREE

     a.   Ki-waapam-i-**naawaaw**
           2-see.TA-LOC.DIR-**2PL**
           '**You(PL)** see me/us'

     b.   Ki-waapam-iti-**naawaaw**
           2-see.TA-LOC.INV-**2PL**
           'I/we see **you(PL)**'

                        (Ellis 1983:282)

Thus, it appears to be a general property of the probe that is responsible for inner suffixes across Algonquian to have a built-in preference for either 1st or 2nd person plural, which can

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[24]One exception is Arapaho which is unique amongst Algonquian languages in not having an inner suffix, but having separate subject and object markers (Macaulay 2009).

vary arbitrarily between the two possibilities. This may align with the preference for the person prefix, as in Moose Cree, Swampy Cree, and Davis Inlet Cree, but may not, as in Cheyenne and the majority of Algonquian languages, which have a 1st person preference for the inner suffix. Although it is unclear whether person prefixes are agreement affixes or clitics and whether they are derived via a probe-goal relation, such preferences are more likely to be derived via the idiosyncrasies of probes themselves rather than the feature system itself, since if it were indicative of the feature system, we should see consistent preferences across morphemes.

Algonquian languages also have a distinction in 1st person plural between inclusive and exclusive, as introduced in Section 2 for Cheyenne. Since 1st person inclusive uncontroversially includes both 1st person and 2nd person π-features, if there were an asymmetry in the featural representation between 1st and 2nd person, we should be able to see consistency in how these forms are indexed, e.g., as either 1st or 2nd person. However, if they are indexed inconsistently, then this may indicate that it is a property of the probe (or the triggering method) itself. As shown in (43), 1st person inclusive in Cheyenne satisfies the ɸ-probe preference for 1st person on T, yet triggers the 2nd person person prefix on verbs.

(43) a. Né-vôo-sane-**ma**
          2-see-AI-LOC.DIR-**1INC.A**
          'We(INC) see'
          (Leman 2011:27)

      b. Né-vôo-m-ò-**ne**
          2-see-TA-DIR-**1INC.B**
          'We(INC) saw her/him'
          (Leman 2011:55)

In other Algonquian languages, 1st person inclusive satisfies the preference of the probe, thus, it always triggers the 2nd person prefix on verbs and either the 1st or 2nd person plural inner suffix (unless there is a distinct 1st person inclusive affix).

Possessed nominals are similar to verbs, in that they appear with a prefix that indexes the ɸ-features of the possessor. Across Algonquian languages, it is also common for 1st person plural inclusive arguments to trigger a 2nd person possessor prefix. One exception to this is Mi'gmaq, since either a 1st person possessor prefix, such as in (44b), or a 2nd person possessor prefix, such as in (44e), are possible, although the 1st person prefix is more common (Fidelholtz 1968; Macaulay 2009).[25]

(44) MI'GMAQ (LISTUGUJ)

      a. **nʔt**-awgti-nen
          1-road-1EXC
          '**Our(EXC)** road'

      b. **nʔt**-awgti-nu
          1-road-1INC
          '**Our(INC)** road'

      c. əgt-awgti-wow
          2-road-2PL
          'Your(PL) road'

      d. n-ig-nen
          1-house-1EXC
          'Our(EXC) house'

      e. **g**-ig-nu
          2-house-1INC
          '**Our(INC)** house'

      f. **g**-ig-uow
          2-house-2PL
          '**Your(PL)** house'

      (Fidelholtz 1968:323-4; Macaulay 2009:375)

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[25]Note that in the Listuguj-dialect, possessive prefixes are uniformly 2nd person for 1st person inclusive possessors (McClay 2012).

It is important to note that the preference on verbs for the person prefix and inner suffix are independent from possessive prefix indexing, since they are the same as in Cheyenne, thus, consistently 2nd and 1st person, respectively. This is more proof that the preference between SAP arguments is arbitrary and dependent on the property of the probe (or triggering method) rather than a revealing variation in feature specification itself. What this data does show is that there is a clear preference for SAP over 3rd person arguments across these inflectional affixes.

Thus, our account of probe-based preferences for inner suffixes in Cheyenne empirically covers the data for inner suffixes in other Algonquian languages, as well as other inflectional affixes which show arbitrary preferences for 1st or 2nd person arguments. We have shown that a probe-based account for these preferences is preferred to an account which places the onus on the organization of the feature system itself to derive these, often conflicting, preferences. In this respect we share with Deal (2015) the intuition that the constraints on feature entailments we argue against in this section need to be relaxed. This also follows the intuition of Macaulay (2009), amongst others, that there is no universal hierarchy and no entailment relationship between 1st and 2nd persons.

4.2   2 is the magic number

At the heart of our hybrid account is the proposal that the first cycle of searching involves two, and only two, arguments (although in limited contexts an additional cycle can be triggered in which an additional argument is searched). In this section we show that the importance of probing two arguments is a deeper property of the grammar of Cheyenne since it is not limited to the inner suffix, but is also a property of the theme sign in transitive verbs with animate arguments (TA).[26] The theme sign supports our hybrid approach, in that a pure Multiple Agree or Cyclic Agree account cannot derive the data.

Following (Goddard 2000), Table 10 shows four TA theme signs in Cheyenne. As shown in Table 8, we propose that that these are the instantiation of transitive Voice (e.g., Lochbihler 2012, Coon & Bale 2014, Oxford 2014, Hamilton 2015).

Table 10: CHEYENNE TA THEME SIGNS *adapted from (Goddard 2000: 102-14)*

theme sign	gloss	environments
-*e*	local direct (LOC.DIR)	2>1
-*atse*	local inverse (LOC.INV)	1>2
-*ó*	direct (DIR)	SAP>3, 3>3OBV
-*ae*	inverse (INV)	3>SAP, 3OBV>3

First, note that these can be subdivided into a set of local theme signs, which involve only SAPs, and another set which involve at least one 3rd person. Also note that the direct and inverse glosses reflect a descriptive tradition in Algonquian linguistics which assumes a person hierarchy (e.g., 2>1>3>3OBV) on which the relative alignment of the subject and object is either: (i) direct,

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[26]Note that in transitive forms with an animate subject and inanimate object (TI), there is some discussion of a different theme sign appearing, but it is not entirely clear if this is a separate morpheme or part of the TI verb final.

with the subject outranking the object, or (ii) inverse, with the object outranking the subject. We use these terms for consistency with the literature, since we reject the notion of a person hierarchy as a primitive in the grammar.

One commonality between theme signs and inner suffixes is that the distribution can be characterized as indexing one argument with the allomorph determined by the non-indexed argument. If we follow some previous analyses that conceptualize theme signs as object marking (e.g., McGinnis 1999, Brittain 1999), supported by the fact that they only appear in transitives only when the object is animate, we can characterize the difference between local theme and non-local theme signs by the absence or presence of a 3rd person argument.[27] As shown in Table 11, the presence of a 3rd person subject levels the paradigm; i.e., whenever the object is SAP and the subject is 3rd person, the theme sign is -*ae*.[28] Theme signs are different for different SAP objects, only when the subject is also another SAP argument (i.e., -*e* and -*atse*). In a parallel manner, the direct theme sign (-*o*) could similarly be seen as a 3rd person object marker when the subject is SAP, and the inverse theme sign (-*ae*) as appearing when the subject is 3rd person (specifically obviative).[29]

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[27]The object making proposal is supported by 3>SAP forms in Mi'gmaq and in embedded clause (or conjunct) forms in other Algonquian languages, 1st and 2nd person markers appear. In the Mi'gmaq examples in (i), the same theme sign indexes a 1st person object (-*i*) and 2nd person object (-*ul*) regardless of whether the subject is SAP (ia) and (ic), or 3rd person (ib) and (id), respectively. Note that the negated form is used in (id) since the theme sign and inner suffix are fused in the affirmative form.

(i)   MI'GMAQ (LISTUGUJ)

     a.   ges-al-**i**-n
            love-TA-**1OBJ**-SAP
            'You(SG) love **me**'

     b.   ges-al-**i**-t
            love-TA-**1OBJ**-SAP
            'S/he loves **me**'

     c.   ges-al-**ul**
            love-TA-**2OBJ**
            'I love **you(SG)**'

     d.   ges-al-**ul**-nug
            love-TA-**2OBJ**-NEG.3
            'S/he does not love **you(SG)**'

[28]Note that -*ae* is realized as -*a* word-finally, as in (45c) and (46c).

[29]It appears that the object marking characterization breaks down somewhat with obviatives, since whenever the object is 3rd person obviative only one theme sign appears (-*ó*). However, when the subject is SAP, an additional suffix (-*am*) appears before the direct suffix. This differentiates these forms from those with a 3rd person subject. Although it is unclear whether the resulting -*amo* can be considered as a separate theme sign, -*am* is characterized by Goddard (2000) as being "thematic." This provides general support for the claim that the π-features of both the subject and direct object (in transitives) are important to derive the distribution of theme signs in Cheyenne.

Table 11: CHEYENNE TA THEME SIGNS BY SUBJECT

↓O/S→	SAP subject	3rd person subject
1OBJ	*-e* 2>1	*-ae* 3>1
2OBJ	*-atse* 1>2	*-ae* 3>2
3OBJ	*-ó* SAP>3	*-ae* 3OBV>3
4OBJ	*-ó* SAP>3OBV	*-ó* 3>3OBV

Following this characterization, it is clear that in transitives, the π-feature content of both the subject and direct object are important.[30] The transitive forms in the (a) and (c) examples in (45) and (46) show the contrast in theme signs when forms have an SAP subject (the (a) examples) and a 3rd person subject (the (c) examples). Following the inner suffix data, we might expect that the addition of a 3rd person direct object in ditransitives might trigger a change in the theme sign in the (a) examples to the 3rd person conditioned theme sign in the (c) examples. However, the corresponding ditransitive forms in the (b) and (d) examples show that this is not the case, since the addition of a 3rd person direct object (underlined in each) does not impact the theme sign. The ditransitive forms in the (b) and (d) examples have the same theme sign as the transitive (a) and (c) examples to which they correspond.

(45) a. Né-mêaʔtov-**e**
          2-give.away-**LOC.DIR**
          'You gave me away'
          (Leman 2011:67)

      b. Né-mêts-**e**-nȯtse
          2-give-**LOC.DIR**-3
          'You gave her/him to me'
          (Leman 2011:106)

      c. Ná-mêaʔtov-**a**
          1-give.away-**INV**
          'S/he gave me away'
          (Leman 2011:67)

      d. Ná-mêt-**ae**-noto
          1-give-**INV**-OBV
          'S/he gave her/him(OBV) to me'
          (Leman 2011:106)

(46) a. Né-mêaʔtov-**ȧtse**
          2-give.away-**LOC.INV**
          'I gave you away'
          (Leman 2011:67)

      b. Né-mêt-**atse**-nȯtse
          2-give-**LOC.INV**-3
          'I gave her/him to you'
          (Leman 2011:106)

      c. Né-mêaʔtov-**a**
          2-give.away-**INV**
          'S/he gave you away'
          (Leman 2011:67)

      d. Né-mêt-**ae**-noto
          2-give-**INV**-3PL
          'S/he gave her/him(OBV) to you'
          (Leman 2011:106)

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[30]Note that #-features do not factor into the distribution of theme signs in Cheyenne, although they do in some languages, such as Mi'gmaq, where there is a separate theme sign to mark 3>SAPpl (*-ugsi*).

It is also important to note that changing the direct object in transitives with a 3rd person argument also changes the theme sign, but does not in ditransitives. For example, (47a) has a local inverse theme sign when both arguments are SAP, but this changes to a direct theme sign in (47c), when the direct object is 3rd person. However, if we compare a transitive form with only SAP arguments, such as in (47a), with a ditransitive form with an SAP subject and indirect object an a 3rd person direct object, such as (47b), there is no change in the theme sign.

(47) a. Né-vôo-m-**àtse**
          2-see-TA-**LOC.INV**
          'I saw you'
          (Leman 2011:55)

      b. Né-mêt-**atse**-nòtse
          2-give-**LOC.INV**-3
          'I gave her/him to you'
          (Leman 2011:106)

      c. Ná-vóó-m-**o**
          1-see-TA-**DIR**-3
          'I saw her/him'
          (Leman 2011:55)

This shows us that in ditransitives, only the two structurally highest arguments (the subject and indirect object) are probed, since these are the only two arguments relevant for the conditioning of the theme sign. This is similar to the importance of searching two arguments in the first cycle of the inner suffix (although there is no apparent second cycle in the probe on Voice). This presents clear evidence against a Multiple Agree account, since it is not the case that all arguments are searched in the conditioning of theme signs. If the direct object were also searched, there is the possibility that it would trigger a different theme sign. This is because, if the direct object in ditransitives is local enough to be searched by T, it should also be local enough to be searched by Voice.

The distribution of theme signs is also difficult to account for by using Cyclic Agree without revising assumptions about probe preferences. There is no evidence that there is any kind of bleeding relationship between arguments. Regardless of which argument is searched first, it is clear that the other argument also needs to be searched in order to derive the distribution of the inverse theme sign and the object marking variants, similar to Set A and Set B allomorphs of inner suffixes. While the inner suffix and theme sign are similar in that they both index a single argument and can be conditioned by another argument, the inner suffix has a ϕ-feature preference (1st person plural) which the theme sign lacks. If we assume that the object is probed first, there is no ϕ-feature specification which would cause the probe on Voice to stop searching. It is unclear what predictions the Cyclic Agree account makes for probes that lack a ϕ-feature preference.[31] In fact, there may be a link between the presence of a probe preference and the triggering of a second cycle, which would explain why a second cycle is not triggered with theme signs. But, simply put, a pure Cyclic Agree account is insufficient without additional assumptions.

However, our simultaneous probing account for inner suffixes can be applied to theme signs. This highlights the importance of probing two arguments, and accounts for the distribution of theme signs with the lack of ϕ-preference explaining the absence of the motivation for full satisfaction which could trigger a second cycle. The only addition we need to make is that the

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[31]We can imagine a modified Cyclic Agree account in which the π-probe on Voice has no preference, but is simply valued by the most local argument (e.g., the direct object in transitives and the indirect object in ditransitives), which is searched first. Then a second cycle always occurs, in which the next local argument (i.e., the subject) is searched and its π-features condition the allomorph.

probe on Voice needs to identify structural position in order to fulfill the preference for indexing objects (which is not done in the environment of a 3rd person subject). Since searching is done in the syntax, and limited to the two structurally closest arguments, the probe must have an ability to recognize structural height already.

Thus, we take the distribution of theme signs as support for the importance of the searching of two arguments in a first cycle in Cheyenne (even though there is no second cycle in this case). We also take the difficulty of either a pure Multiple Agree or Cyclic Agree account as support for our hybrid approach.

4.3 Why so rare? Why Algonquian?

Finally, we would like to address the question, posed by an anonymous reviewer, of why the Cheyenne pattern we outline is so rare. First, we address the fact that it must involve a combination of two factors, simultaneous searching and probe-preference, both of which are possible separately, but must occur on the same probe. Second, we point to our analysis of the person prefix in 4.1 and theme signs in 4.2 to show that the probe on T is simply a combination of probe parameters found on other probing heads in Cheyenne.

The inner suffix pattern in Cheyenne is somewhat rare in that it involves the combination of two possible probe parameters: searching for two arguments and being probe-preference. We follow Baker (2008) in assuming that there is parametric difference between whether a functional head can search for something to agree with multiple times, once or not at all. Baker (2008) proposes this based on cross-linguistic variation in probing heads, such as *v* and T. He proposes that in certain forms in Southern Tiwa, such as passives of ditransitives, a single morpheme (the instantiation of T) displays full person agreement with the goal and gender and number agreement with the theme. This morpheme is shown in bold in the dataset in (48) and indexes the 1st person goal subject in each, yet varies based on the gender; A: animate singular *khwian* 'dog' in (48a); B: animate plural *khwian* 'dogs' in (48b); C: inanimate plural *keuap* 'shoes' in (48c).

(48)   SOUTHERN TIWA (Baker 2008: 101)

    a.   Hliawrade-ba **in**-khwian-wia-che-ban
              lady-INST   **1sS/A**-dog-give-PASS-PAST
              'I was given a dog by the lady.'

    b.   **Im**-khwian-wia-che-ban
              1sS/B-dog-give-PASS-PAST
              'I was given (the) dogs.'

    c.   **Iw**-keuap-wia-che-ban
              1sS/C-shoe-give-PASS-PAST
              'I was given (the) shoes.'

T in Southern Tiwa is very similar to Cheyenne, in that they both probe for multiple arguments. In our terminology, we could say that T indexes subjects in Southern Tiwa, but the gender and number of the theme conditions the phonological form, e.g., *in-* 1st person goal subject in the context of an animate singular theme, *im-* 1st person goal subject in the context of an animate plural theme, and *iw-* 1st person goal subject in the context of an inanimate plural theme.

A similar pattern for T is also found in subjective-objective agreement markers in Hungarian.

The subjective pattern follows Set A, in which only the φ-features of one argument (the subject) are indexed. The objective pattern follows Set B, in that the φ-features of one argument (the definiteness of the object) conditions allomorphy of the indexing of the other argument (the subject). This is shown in the contrast between the subjective pattern in (49a) and the objective pattern in (49b).

(49) HUNGARIAN (Coppock & Wechsler 2012)

    a. Lät-**ok**   egy madar-at
        see-**1.SG.IN** a   bird-ACC
        '**I** see a bird'

    b. Lät-**om**   a   madar-at
        see-**1.SG.DEF** the bird-ACC
        '**I** see the bird'

Following the analysis in Coppock & Wechsler (2012), *-ok* in (49a) indexes the 1st person subject marker, while *-om* in (49b) indexes both the 1st person subject and the definiteness of the object. Using our terminology, we can say that definiteness of of the object is an interacting factor in the allomorphy of the indexing of the φ-features of the subject. The full paradigm is given in Table 12.

Table 12: HUNGARIAN: SUBJECTIVE VS. OBJECTIVE (Coppock & Wechsler 2012)

Subject	Subjective	Objective
1SG	*ok/ek/ök*	*om/em/öm*
2SG	*(a)sz/(e)sz* or *ol/el/öl*	*od/ed/öd*
3SG	*0̷*	*ja/i*
1PL	*unk/ünk*	*juk/jük*
2PL	*(o)tok/(e)tek/(ö)tök*	*játok/itek*
3PL	*(a)nak/(e)nek*	*ják/ik*

As we can see, although rare, it is possible for a probing head to agree with multiple arguments cross-linguistically. Thus, the first probe parameter necessary to account for the pattern in Cheyenne. The second is probe preference.

What we saw in both Southern Tiwa and Hungarian is a preference for T to fully agree with the subject and only partially agree with the object. While Cheyenne is similar in that T fully agrees with one argument and only partially agrees with the second (person, but not number or gender), it differs in that it is not grammatical role, but the person features themselves that determines which argument is fully agreed with. This is similar to complementizer agreement in Nez Perce (Deal 2015), in which C has a preference for 2nd person, and searches until it finds it, or all arguments in the relevant domain are searched. Deal (2015) proposes that evidence for this preference is fact that 2nd person arguments bleed probing of structurally lower arguments, as the probe on C appears to stop further searching as soon as it is finds a 2nd person argument. We can see this in (50), as when the subject is 2nd person, e.g., (50a), the probe only searches the subject, and the complementizer only shows 2nd person agreement (*-m*). However, when the object is 2nd person,

e.g., (50b) the probe searches the subject as well as the object, and the complementizer shows both 2nd person (-*m*) and 1st person (-*ex*) agreement.

(50)   NEZ PERCE (Deal 2015: 184)

     a.   ke-**m** kaa cewcew-téetum
        C-**2** then telephone-TAM
        'when **you** call me'

     b.   ke-**m**-<u>ex</u> kaa cewcew-téetu
        C-**2**-<u>1</u> then telephone-TAM
        'when <u>I</u> call **you**'

     Although Nez Perce shows evidence for a strict Cyclic Agree pattern, it is similar to Cheyenne is showing that searching occurs in the syntax and is limited by the person preferences of the probe. This is different from the pattern in Southern Tiwa and Hungarian, in which the structurally highest argument is the target of full agreement and the lower one is only partially agrees with (or conditions the appearance of the fully agreed with argument). Thus the pattern in Cheyenne necessarily involves both the ability for a probing head to have (i) a preference for certain arguments, and (ii) the ability to search multiple arguments in its domain.

     The necessity to have multiple parameters to align explains why the Cheyenne pattern is relatively rare, although the individual parameters are certainly attested. However, it is not surprising that this pattern exists in Algonquian languages. Based on our analysis of the person prefix in 4.1, the preference for 2nd person agreement is an instance of probe preference similar to Nez Perce. Following the analysis in Lochbihler & Mathieu (to appear), if C if the probing head responsible for the person prefix, then this is an instance of complementizer agreement which is parallel to Nez Perce, except it can only index a single argument, which would make (50a) and (50b) appear the same (except for other morphemes on the verb). Thus, the ability for the probe on T in Cheyenne to have a person preference is unsurprising given the ability for the probe on C to also display a preference.

     In addition, it is unsurprising for T in Cheyenne to have the ability to probe multiple arguments since Voice also has the same ability. Based on our analysis in 4.2, the distribution of theme signs can be better understood if we assume that Voice probes the two structurally highest arguments in it domain (typically the subject and highest object). We propose that T probes multiple arguments in its domain in a parallel fashion. Thus, under our analysis, the probe on T in Cheyenne is simply a combination of the probe preference on C and multiple probing ability of Voice. Therefore, the fact that adjacent probes in Cheyenne display the characteristics that the probe on T combines into a single probe makes the unique pattern that it displays more plausible. We conclude in the next section.

5   Conclusion

In this paper we have presented a hybrid account of the inner suffix in Cheyenne. We proposed that the inner suffix is the result of a fused π- and #-feature probe on T with a preference to index 1st person plural, and failing that, 2nd person plural. Our account involves an aspect of Cyclic Agree, in that T can potentially engage in two probing cycles, and an aspect of Multiple Agree, in that the first cycle involves simultaneous probing of two arguments. We presented Set A-B contextual allomorphy as evidence that the two structurally highest arguments are probed simultaneously in

the first cycle, and proposed that a second probing cycle is possible if: (a) the probe is not fully satisfied by a 1st person plural argument in the first cycle, and (b) there is a third argument (i.e., in ditransitives). We argued for the preference of 1st person over 2nd person as an arbitrary property of the probe, rather than due to a system of feature entailment. We presented evidence from theme signs in Cheyenne and across Algonquian to support the importance of probing two arguments in the first, or only, cycle. We showed further support for the second cycle from a morphological reflex to index 3rd person plural in ditransitives when both arguments in the first cycle are SAP and singular.

We take our account to indicate that both Cyclic and Multiple Agree must be options available to probes, in addition to our hybrid approach. This is necessary to achieve descriptive adequacy, although it sacrifices parsimony. We also take the availability of the direct object to be probed from T as an indication that a maximally strict definition of locality, such as the strong PIC, may be too restrictive.

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