

# The interaction of person and number in Mi'gmaq

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## Abstract

This paper presents puzzles concerning the representation of features in the agreement system of the Eastern Algonquian language, Mi'gmaq. A growing body of research converges on the idea that  $\phi$ -agreement should be separated into distinct person ( $\pi^0$ ), number ( $\#^0$ ), and sometimes gender ( $\gamma^0$ ) probes (e.g. Anagnostopoulou 2003, Béjar 2003, Béjar and Rezac 2003, Laka 1993, Shlonsky 1989, Sigurðsson 1996, Sigurðsson and Holmberg 2008, Preminger 2012). While these proposals account well for agreement and partial agreement patterns in a number of languages, we show that in order to account for the agreement system of Mi'gmaq,  $\pi^0$  and  $\#^0$  must probe together, which we argue to be the result of *fusion* of two distinct probes. We discuss the implications of Mi'gmaq agreement for “prominence hierarchies” and feature geometries in the grammar.

## 1. Introduction<sup>1</sup>

An increasing range of work shows that  $\phi$ -agreement—and the  $\phi$ -features that trigger it—is not an all-or-nothing affair. In Nahuatl, for example, subjects and objects of monotransitives agree fully for both *person* ( $\pi$ ) and *number* ( $\#$ ), shown in (1a).<sup>2</sup> In ditransitives like (1b), however, subjects and indirect objects show full person and number agreement (boldface), while direct objects agree only in *number* (boxed) (Baker 2011, citing Launey 1981). Baker (2011) documents this phenomenon in a number of languages, calling this pattern “two-and-a-half” agreement, to reflect that fact that two arguments show full  $\phi$ -feature agreement, while others agree only partially.

- (1) a. ***Xi-nēch-palēhui.***  
2SG.SUBJ.IMP-1SG.OBJ-help  
'(You) help me.'
- b. ***Xi-nēch*** *-im* *-maca* *huēhuèxōlō.*  
2SG.SUBJ.IMP-1SG.OBJ-PL-give turkeys  
'(You) give me some turkeys.'
- (Nahuatl, Baker 2011:883)

A related body of work has argued that different licensing mechanisms are required for different  $\phi$ -features. Béjar and Rezac (2003) derive PCC effects through the requirement that  $\pi$ -features—but not  $\#$ -features—require a special licensing mechanism. This additional licensing mechanism captures the fact that if any  $\phi$ -feature is going to “fail”, it is going to be *person*—agreement for person appears to be the most *fragile* (Baker 2011). Nevins (2011) proposes that this is particular to  $\pi$ , and notes that there is no evidence for a *Number Case Constraint*. The separation of  $\pi$ ,  $\#$ , and  $\gamma$  (gender) probes has led to a wide range of empirical converge, in everything from Mayan Agent Focus constructions to Basque unergatives (Preminger 2014). For more on the separation of  $\pi$  and  $\#$  into distinct syntactic probes, see for example Shlonsky 1989, Laka 1993, Taraldsen 1995, Anagnostopoulou 2003, Béjar 2003, Béjar and Rezac 2003, Preminger 2014.

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<sup>2</sup>Examples in glosses are as follows: 1, 2, 3 – 1st, 2nd, 3rd person; DIR – direct; EVID – evidential; IMP – imperative; INV – inverse; NEG – negation; OBJ – object; OBV – obviative; PART – participant (i.e. 1st and 2nd person); PL – plural; SG – singular; SUBJ – subject.

In light of the successes of the above accounts, the Mi'gmaq (Eastern Algonquian) data we present in this paper initially come as a surprise. Mi'gmaq's  $\phi$ -indexing system demonstrates that probes for *person* and *number* cannot be completely distinct, as 1st and 2nd person plural arguments are privileged over all other arguments in competition for a specific slot. Although the searches for person and number features must be separate, the results of the search are conjoined together when determining both agreement relations and syntactic movement. Our discussion of agreement in Mi'gmaq also demonstrates that while traditional prominence hierarchies (e.g.  $2 \gg 1 \gg 3$ ) may provide useful descriptive tools, they do not have a formal place in the grammar as such (see Bruening 2005, Brown et al. 2003, Harbour 2006, Coon and Preminger 2012, Oxford 2014, Preminger 2014).

The remainder of this paper is organized as follows. Section 2 presents background on Algonquian verb stems and the traditional inverse system, seen in languages across the family. In section 3 we provide an overview of Mi'gmaq and introduce two puzzles involving the interaction of  $\pi$  and #—each puzzle corresponding to one of the  $\phi$ -feature slots on the Mi'gmaq transitive verb stem. Section 4 examines the nature of the suffix *-ugsi*, which corresponds in some ways to a typical *inverse* morpheme, but differs in crucial respects. In section 5 we turn to the second puzzle: competition for the second slot and the importance of 1st and 2nd person plural arguments. We discuss two possibilities for formalizing the interaction of person and number, and then offer a proposal involving the fusion of two probes. Section 6 concludes.

## 2. Algonquian inverse

Mi'gmaq is an Eastern Algonquian language spoken in the Canadian Maritimes and the Gaspé region of Quebec. The data in this paper come from the Listuguj variety of Mi'gmaq, and we adopt the Listuguj orthography throughout. Though Mi'gmaq shows important differences from some of the more well-studied Algonquian agreement systems, background on Algonquian and inverse systems will prove to be a useful starting point for understanding the Mi'gmaq data. Plains Cree, shown in (2), provides a prototypical example of an Algonquian agreement system with inverse marking.

- (2) a. *ni-wāpam-ā-w*  
1-see-DIRECT-3  
'I see her.'
- b. *ni-wāpam-ikw-w*  
1-see-INVERSE-3  
'She sees me.'
- (Zúñiga 2006:24, citing Wolfart 1973, Wolfart and Carroll 1981)

The Plains Cree inverse system is characterized by two logically separable features: (i) competition for slots and (ii) direction marking (see Zúñiga 2006 for detailed discussion of inverse systems). The first characteristic is illustrated by the prefixal person markers in (2). We see that this  $\phi$ -indexing "slot" is filled not with features of a particular grammatical role (i.e. "subject agreement"), but rather by the *highest ranking argument* along some specific hierarchy.

Algonquian languages distinguish grammatical animate from grammatically inanimate nouns. Third person animate nouns participate in a system of obviation: in a span with multiple third person arguments, the more discourse-prominent argument will be proximate while other third person animate nouns will be obviative. With these distinctions in mind, the typical Algonquian prominence hierarchy is shown in (3). In the example in (2) above, we observe that the first person prefix *ni-* co-indexes the higher-ranked first person argument, regardless of whether it is the Agent or Patient ( $1 \gg 3$ ).<sup>3</sup>

- (3)  $2 \gg 1 \gg \text{proximate} \gg \text{obviative} \gg \text{inanimate}$

<sup>3</sup>Following e.g. Comrie 1978, we use the cover terms "Agent" (A) and "Patient" (P) to refer to subjects and objects of transitive predicates respectively, regardless of specific theta-roles.

The second possible component of an inverse system is a *direction marker*—commonly called a *theme sign* in Algonquianist literature. This morpheme specifies whether the higher-ranking argument is the subject (**A**) or the object (**P**), as in (4) and (5).



In Algonquian these theme signs mark not *just* direction, but also encode information about features of subject and object, as shown in the Ojibwe examples in (6) and (7). The theme signs in (6) reflect not only the relative ranking of subject and object arguments—direct in (6a) and inverse in (6b)—but also the fact that a 3rd person argument is involved; the theme signs in (7) are reserved for combinations of “local” (1st and 2nd person) arguments. We will see how this becomes relevant in our discussion of the Mi’gmaq morpheme *-ugsi* below.

- |   |   |
|---|---|
| <p>(6) NON-LOCAL</p> <p>a. <i>n-waabm-aa</i><br/>1-see-DIR(NL)<br/>‘I see him/her.’</p> <p>b. <i>n-waabm-ig</i><br/>1-see-INV(NL)<br/>‘He/she sees me.’</p> | <p>(7) LOCAL</p> <p>a. <i>g-waabam-i</i><br/>2-see-DIR(L)<br/>‘You see me.’</p> <p>b. <i>g-waabam-in</i><br/>2-see-INV(L)<br/>‘I see you.’</p> <p style="text-align: right;">(Valentine 2001:270)</p> |
|---|---|

While Mi’gmaq presents some characteristics of an inverse system, we show that the agreement facts cannot be handled by a traditional “prominence hierarchy”, of the type in (3), or the more generalized one in (8), which makes reference only to  $\pi$ -features.

- (8) PROMINENCE HIERARCHY  
 1/2 person pronouns ≫ 3rd person pronoun ≫ [+human] ≫ [+animate] ≫ [−animate]

Instead, we find that person and number features must be examined together in order to understand the agreement system.

### 3. Mi’gmaq person and number

Mi’gmaq matrix clauses do not look like those from Plains Cree: There are no person prefixes, and there are no immediately obvious reflexes of the direct and inverse markers.<sup>4</sup> Instead, Mi’gmaq transitive matrix verbs with two (grammatically) animate arguments follow the pattern in (9); see Hewson and Francis 1990 for more on the Mi’gmaq verb stem.

- (9) MI’GMAQ TRANSITIVE TEMPLATE  
 Stem-**Slot1**-(Neg)-**Slot2**-(Past/Evid)-(3PL/OBV)

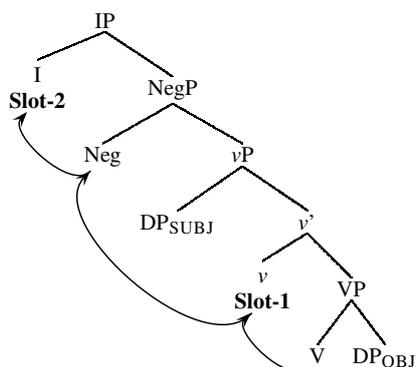
Slot 1 corresponds to what Oxford (2014; to appear) identifies as the Proto-Algonquian “theme sign” or direction marker (i.e. direct or inverse). When verbs appear under the scope of negation (marked by pre-verbal *mu*), a negative morpheme, *-u/-w*, intervenes between the two slots when present. Negative

<sup>4</sup>Historically, the Mi’gmaq “independent indicative” (matrix declaratives) derives from the Proto-Algonquian “conjunct order” (roughly, non-finite embedded clauses; see Hewson 1980).

forms prevent some of the phonological operations and irregularities from occurring between the two slots, making the pattern easier to see; we use negated forms throughout, leaving an analysis of the affirmative paradigm for future work. A third person plural marker appears stem-finally, marking plurality of either subject or object animate 3rd persons (“omnivorous number” in the terms of Nevins (2011)); obviative marking also appears in this stem-final position when present.

We will argue that Slot 1 is a morphological reflex of  $v^0$  agreement, and Slot 2 represents Infl<sup>0</sup> agreement (roughly similar to the analysis of Proto-Algonquian agreement in Oxford 2014; to appear), each discussed in more detail below. Assuming that the stem is formed via head-movement of the verb root up through higher functional projections, morpheme order is in accordance with the Mirror Principle (Baker 1985).<sup>5</sup>

(10)



(11)

V	-v	-Neg	-Infl
Stem	-Slot 1	-Neg	-Slot 2

Using the negated forms, we can break down the forms in Slots 1 and 2 as in (12) and (13). As (13) shows, Mi'gmaq makes a distinction between 1st person plural *inclusive* (speaker, inclusive of addressee, and possibly others) and *exclusive* (speaker and others, exclusive of addressee).<sup>6</sup>

(12)

SLOT 1	
1	-i'li
2	-u'l(n)
3	-a
3>PART-PL	-ugsi

(13)

SLOT 2	
1	(-an)
2	-n
3	-t/-g
1INCL	-gw
1EXCL	-eg
2PL	-oq

Across most of the paradigm, Slot 1 can be straightforwardly characterized as object agreement for person features. Examples with singular and plural objects are shown in (14) and (15), respectively. Both 1st person singular and 1st person plural exclusive objects (1EXCL) trigger the 1st person agreement suffix -i'li, as in (14a) and (15a), while 2nd person singular and 2nd person plural objects (2PL) trigger the 2nd person agreement suffix -u'ln, illustrated in (14b) and (15b). The 3rd person agreement suffix is -a in forms in (14c) and (15c); plurality of a 3rd person argument is indicated with the addition of the -ig suffix.

<sup>5</sup>What we list as the “stem” in (9) can actually be quite complex, involving the typical Algonquian array of preverbs, initials, medials, and finals. For a recent discussion of stem formation in Mi'gmaq, see McCulloch 2013 and references cited therein. This complexity is ignored in the structure in (10) and below.

<sup>6</sup>Note that it has been proposed for some Algonquian languages that the inclusive is actually a *second person inclusive* (Déchaine 1999). There appears to be evidence for this in Mi'gmaq as well—for example, the inclusive possessive form includes a second person prefix plus a plural suffix. We continue to gloss these forms as 1INCL below, though this choice does not affect the analysis.

- |  |   |
|--|---|
| <p>(14) SINGULAR OBJECTS</p> <p>a. <i>Mu nem-i'li-w-g.</i><br/>NEG see-1OBJ-NEG-3<br/>'She doesn't see <b>me.</b>'</p> <p>b. <i>Mu nem-u'ln-u-eg.</i><br/>NEG see-2OBJ-NEG-1EXCL<br/>'We<sub>EXCL</sub> don't see <b>you.</b>'</p> <p>c. <i>Mu nemi-a-w-gw.</i><br/>NEG see-3OBJ-NEG-1INCL<br/>'We<sub>INCL</sub> don't see <b>her.</b>'</p> | <p>(15) PLURAL OBJECTS</p> <p>a. <i>Mu nem-i'li-w-eg.</i><br/>NEG see-1OBJ-NEG-1EXCL<br/>'You don't see <b>us</b><sub>EXCL</sub>.'</p> <p>b. <i>Mu nem-u'ln-u-oq.</i><br/>NEG see-2OBJ-NEG-2PL<br/>'I don't see <b>you</b><sub>PL</sub>.'</p> <p>c. <i>Mu nemi-a-w-gw-ig.</i><br/>NEG see-3OBJ-NEG-1INCL-3PL<br/>'We<sub>INCL</sub> don't see <b>them.</b>'</p> |
|--|---|

If we focus on the forms with 1st and 2nd person *singular* objects in (14a) and (14b), and forms with 3rd person objects regardless of number, (14c) and (15c), then Slot 2 can be characterized as simply subject agreement. Take, for example, (14b): in this form, Slot 1 shows agreement for the 2nd person object with the suffix *-u'ln*; in Slot 2 we find agreement with the 1st person exclusive subject with the suffix *-eg*. Things become more complicated, however, in examples involving *Speech Act Participant Plural* (PART-PL) objects, such as (15a) and (15b). The three Mi'gmaq PART-PL pronoun possibilities are summarized in (16).

- (16) SPEECH ACT PARTICIPANT PLURAL (PART-PL):
- a. 1INCL = speaker, addressee, and possibly others
  - b. 1EXCL = speaker and others, exclusive of the addressee
  - c. 2PL = addressee and others

Clauses with PART-PL objects divide further into two morphological types: (i) those with third person subjects; and (ii) those with 1st and 2nd person PART subjects.

In the first type—clauses with non-PART (3rd person) subjects and PART-PL objects, schematized in (17)—the morpheme *-ugsi* appears in Slot 1, and Slot 2 indexes features of the *object*. As we will see below, person features of the *subject* are not directly indexed on the stem.

	SUBJECT		OBJECT	ENGLISH GLOSS
	<i>non</i> -PART		PART-PL	
(17)	○ 3	>	1INCL	<i>He saw us</i> <sub>INCL</sub>
	○ 3	>	2PL	<i>She saw you</i> <sub>PL</sub>
	○ 3PL	>	1EXCL	<i>They saw us</i> <sub>EXCL</sub>
	○ ...			...

In clauses with PART-PL objects and PART subjects, as in (18), Slot 1 indexes features of the object, and the realization of Slot 2 is calculated as follows: Slot 2 indexes a 1EXCL argument if one is present (regardless of whether it is subject or object); if not, Slot 2 indexes a 2PL argument if one is present (again, regardless of grammatical function). This is represented in (19) below.

	SUBJECT		OBJECT	ENGLISH GLOSS
	PART		PART-PL	
(18)	○ 2	>	1EXCL	<i>You saw us</i> <sub>EXCL</sub>
	○ 1EXCL	>	2PL	<i>We</i> <sub>EXCL</sub> <i>saw you</i> <sub>PL</sub>
	○ 2PL	>	1EXCL	<i>You</i> <sub>PL</sub> <i>saw us</i> <sub>EXCL</sub>
	○ 1	>	2PL	<i>I saw you</i> <sub>PL</sub>
	○ ...			...

- (19) SLOT 2 HIERARCHY  
 1EXCL  $\gg$  2PL  $\gg$  { 1SG, 2SG, OR 3 SUBJECT }

One wonders about the behavior of 1INCL arguments with respect to the scale in (19). Note that combinations of arguments with *overlapping features* are ruled out in Mi'gmaq (see also Lochbihler 2012 on Ojibwe, and Lasnik 1981). Sentences like those exemplified in (20) are impossible. It is not just that these examples sound awkward, as the English equivalents might out of context—rather, there simply is no Mi'gmaq verb form corresponding to these meanings.

	[PART]		[PART-PL]	
(20)	* 2PL	>	1INCL	<i>You saw us</i> <sub>INCL</sub>
	* 1	>	1EXCL	<i>I saw us</i> <sub>EXCL</sub>
	* 2	>	1INCL	<i>You saw us</i> <sub>INCL</sub>

What this means for the discussion at hand is that whenever there is a 1INCL object, we will have an *-ugsi* form, as in (17). 1INCL objects are impossible with both 1st person and 2nd person subjects, confirming that they combine both [SPEAKER] and [ADDRESSEE] features. Since 1INCL objects are only possible in combination with 3rd person subjects, and *-ugsi* is present in all 3>PART-PL environments, we do not know how 1INCL ranks along the hierarchy in (18), and, as noted above, we do not know whether it would trigger 1st or 2nd person agreement in Slot 1 (cf. 1EXCL objects trigger 1 agreement, 2PL objects trigger 2 agreement). We come back to this issue in section 5 below, turning first in section 4 to the Slot 1 morpheme *-ugsi*.

#### 4. Puzzle 1: inverse and *-ugsi*

The sentences in (21) have PART-PL objects, and non-PART (3rd person) subjects. In exactly these 3>PART-PL environments, the morpheme *-ugsi* appears in Slot 1. Recall from (14) and (15) above that when objects are singular or 3rd person, Slot 2 is simply subject agreement. In these *-ugsi* forms, however, Slot 2 is *object agreement*. There is no marker on the verb stem which can be identified as “subject agreement”, though the subject is known to be 3rd person because of the presence of *-ugsi* in Slot 1. The suffix *-ugsi* can thus be considered a portmanteau form, indexing features of both the subject and the object.

- (21) **A** = NON-PART; **P** = PART-PL
- Mu nem-ugsi-w-gw.*  
 NEG see-3>PART.PL-NEG-1INCL  
 ‘He doesn’t see us<sub>INCL</sub>
  - Mu nem-ugsi-w-eg.*  
 NEG see-3>PART.PL-NEG-1EXCL  
 ‘He doesn’t see us<sub>EXCL</sub>
  - Mu nem-ugsi-w-oq.*  
 NEG see-3>PART.PL-NEG-2PL  
 ‘He doesn’t see you<sub>PL</sub>

Note that following a traditional person hierarchy (1/2  $\gg$  3, or see (3) above), the suffix *-ugsi* is limited to “inverse” contexts, since it only appears when the lower-ranked 3rd person subject is acting on a 1st or 2nd person object. Indeed, *-ugsi* bears some resemblance to the Proto-Algonquian inverse *-ekw* (Oxford to appear).<sup>7</sup> However, unlike more robust inverse systems, this is the only morpheme in the paradigm which

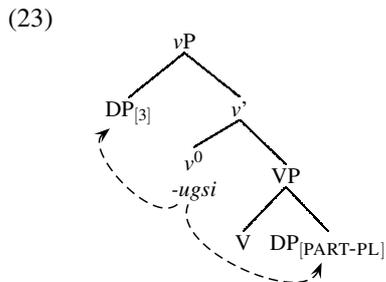
<sup>7</sup>The [si] in *-ugsi* is reminiscent of the reflexive suffix of the same form, which would also appear in this slot. Thanks to Conor Quinn for pointing this out. In a previous version of this paper, we analyzed *-ugsi* as the requirement that  $v^0$  license  $\pi$ -features of the object twice, due to its plural nature. The form *-ugsi* would then be decomposed into an *inverse* (i.e. a morpheme which indicates  $\pi$ -agreement with a low argument) and the *reflexive* (a morpheme which indicates that a single argument is agreed with twice). We

makes direct reference to the relative ranking or features of both subject and object arguments.<sup>8</sup> Moreover, *-ugsi* does not occur in all environments in which third person subjects act on PART objects. Compare the 3>1SG form in (14a) above with the 3>1INCL form in (21a), repeated together in (22).

- (22) a. *Mu nem-i'li-w-g.*  
 NEG see-1OBJ-NEG-3  
 'She doesn't see **me**.' = (14a)
- b. *Mu nem-ugsi-w-gw.*  
 NEG see-3>PART-neg-1INCL  
 'She doesn't see **usINCL**.' = (21a)

Though both forms in (22) involve a 3rd person subject acting on a 1st person object, the *-ugsi* pattern only appears when the object is plural. In the singular object form we find the simple object–subject agreement pattern. Note that Slot 2 is subject subject agreement in (22a), but object agreement in (22b).

Locating *-ugsi* in  $v^0$  is consistent with the Mirror Principle order proposed above, and also provides an account of how a single head could make reference to features of both the subject and the object. Even in familiar languages like English,  $v^0$  is credited with the dual duty of licensing the object and introducing the subject in its specifier (Chomsky 1995, Kratzer 1996).



See also Lochbihler 2012, who draws on Béjar and Rezac 2003, for one means of formalizing the spell-out of  $v^0$  in terms of features of both the object and the subject. We set this aside here, focusing on the relation between *-ugsi* and Slot 2 below.

## 5. Puzzle 2: Competition for Slot 2

To this point, we have focussed on the morphological realization of Slot 1, which we argued to be  $v^0$  realizing either object agreement for  $\pi$ -features, or in the case of 3>PART-PL, the portmanteau suffix *-ugsi*. We now turn to the realization of Slot 2.

- (24)
- |       |                  |                 |                  |
|-------|------------------|-----------------|------------------|
| $V^0$ | $-v^0$           | $-\text{Neg}^0$ | $-\text{Infl}^0$ |
| Stem  | $-\text{Slot 1}$ | $-\text{Neg}$   | $-\text{Slot 2}$ |

### 5.1. The facts

Plural Speech Act Participant arguments are also important for the content of Slot 2. As seen above, if the object is *not* PART-PL, Slot 2 is simply subject agreement, repeated in (25).

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leave this as a possibility for future work.

<sup>8</sup>A possible exception is found in forms in which an obviative 3rd person acts on a proximate 3rd person (4 > 3), not discussed here. See Hamilton 2013 for more on these forms.

- (25) a. *Mu nem-i'li-w-g.*  
 NEG see-1OBJ-NEG-3  
 'She doesn't see me.'
- b. *Mu nem-u'ln-u-eg.*  
 NEG see-2OBJ-NEG-1EXCL  
 'We<sub>EXCL</sub> don't see you.'
- c. *Mu nemi-a-w-gw.*  
 NEG see-3OBJ-NEG-1INCL  
 'We<sub>INCL</sub> don't see her.' = (14)

When the object is PART-PL, and the subject is 3rd person (-*ugsi* environments), Slot 2 agrees with the object, repeated in (26) (§4).

- (26) **A** = NON-PART; **P** = PART-PL
- a. *Mu nem-ugsi-w-gw.*  
 NEG see-3>PART.PL-NEG-1INCL  
 'He doesn't see **us**<sub>INCL</sub>
- b. *Mu nem-ugsi-w-eg.*  
 NEG see-3>PART.PL-NEG-1EXCL  
 'He doesn't see **us**<sub>EXCL</sub>
- c. *Mu nem-ugsi-w-oq.*  
 NEG see-3>PART.PL-NEG-2PL  
 'He doesn't see **you**<sub>PL</sub> = (21)

In environments in which PART subjects act on PART-PL objects (PART>PART-PL), then *descriptively* Slot 2 is determined by the hierarchy in (27).

- (27) SLOT 2 HIERARCHY  
 1EXCL ≫ 2PL ≫ { 1SG, 2SG, OR 3 SUBJECT }

In the forms in (28), Slot 1 agrees with the person features of the object, as above. Slot 2 agrees with either the subject or the object, depending on which is highest ranked according to the hierarchy in (27).

- (28) **A** = PART; **P** = PART-PL
- a. *Mu nem-i'li-w-eg.*  
 NEG see-1OBJ-NEG-1EXCL  
 'You don't see **us**<sub>EXCL</sub>.' *object agreement*
- b. *Mu nem-u'ln-u-oq.*  
 NEG see-2OBJ-NEG-2PL  
 'I don't see **you**<sub>PL</sub>.' *object agreement*
- c. *Mu nem-u'ln-u-eg.*  
 NEG see-2OBJ-NEG-1EXCL  
 'We<sub>EXCL</sub> don't see you<sub>SG/PL</sub>.' *subject agreement*

In (28a) and (28b), Slot 2 agrees *again* with the object: there is no reflex of the subject's features on the stem.<sup>9</sup> In (28c), Slot 2 agrees with the higher-ranking subject; the number of the object is unspecified since

<sup>9</sup>Note that in the constructions in (28a)–(28b), even though the features of the subject are never realized on the verb stem, these forms are still (nearly) unambiguous, by process of elimination. In (28b), for example, we know that the subject must not be 3rd person, because this would result in an -*ugsi* form (§4). We also know that the subject must not be 1st person inclusive or 2nd person singular, since feature overlap is banned. Finally, a 2nd person plural subject would result in a reflexive construction, leaving us with 1st person singular as the only possible option for the un-agreed-with subject. A similar story can be told for (28a) except that the

Slot 1 indexes only  $\pi$ -features. Critically, the ranking in (27) cannot be characterized by person or number features alone: 1st person plural outranks 2nd person singular, as shown in (28a). But 2nd person plural outranks 1st person singular, as shown in (28b).

The Slot 2 agreement facts can be summarized as in (29)–(32), where the boxed argument is the one which triggers agreement. Slot 2 agrees with a PART-PL argument whenever possible, regardless of whether it is the subject or object:

(29)  $\boxed{\text{SUBJECT}}$  > OBJECT  
 PART-PL { 1, 2, 3, 3PL}

(30) SUBJECT >  $\boxed{\text{OBJECT}}$   
 { 1, 2, 3, 3PL} PART-PL

When both subject and object are PART-PL, 1st person exclusive beats out 2nd person plural for realization of Slot 2, as illustrated in (31) and (32).

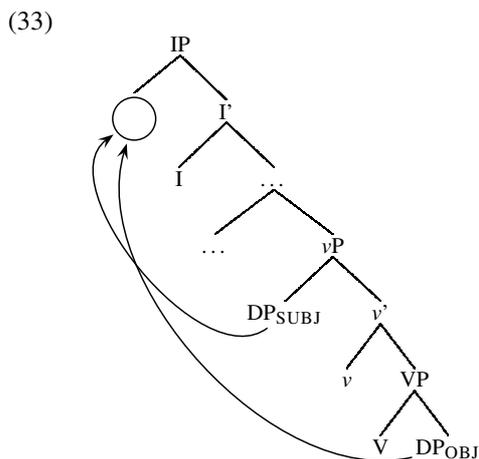
(31) SUBJECT >  $\boxed{\text{OBJECT}}$   
 2PL 1EXCL

(32)  $\boxed{\text{SUBJECT}}$  > OBJECT  
 1EXCL 2PL

Recall that there is no evidence for the relative ranking of 1st person *inclusive* because features of subject and object cannot overlap (§3); since a first person inclusive pronoun contains both [SPEAKER] and [ADDRESSEE] features, it cannot co-occur with either a 1st person exclusive or 2nd person plural argument.

5.2. Towards a formalization

Following Bruening’s 2005 analysis of the closely related Algonquian language Passamaquoddy, we assume that a single DP, either the subject or the object, raises to Spec,IP, as in (33).



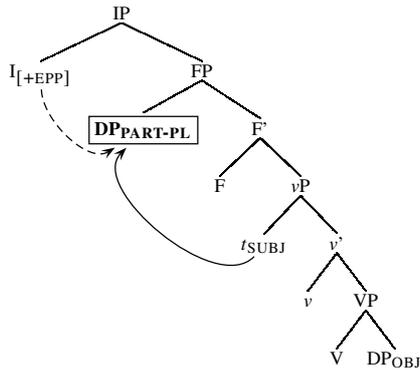
In Mi’gmaq, this raised DP triggers Slot 2 agreement. The question now becomes which DP moves to Spec,IP. Recall that the desiderata for which DP moves are as follows: (i) the highest-ranked PART-PL DP must move to Spec,IP (1EXCL  $\gg$  2PL); (ii) if there is no PART-PL DP, the subject must move to Spec,IP.

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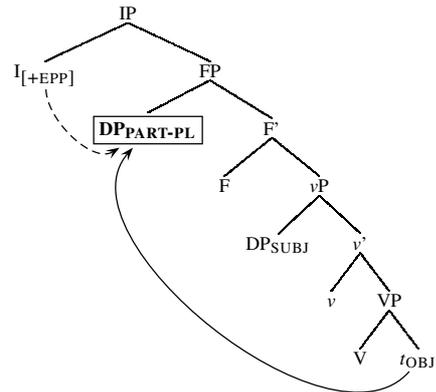
subject may be interpreted as either singular or plural.

Note that since either the subject or object may raise (depending on their relative ranking), this must not be Case-driven movement. Rather, we assume that  $\text{Infl}^0$  has a [+EPP] feature which attracts the closest DP to its specifier position. In order to capture the fact that the subject is targeted if no PART-PL argument is present, we propose an intermediate functional projection, F(unctional)P, which attracts the highest ranking PART-PL DP to its specifier, as in (34) (where the highest-ranked PART-PL is the subject), or (35) (where the highest-ranked PART-PL is the object).

(34)

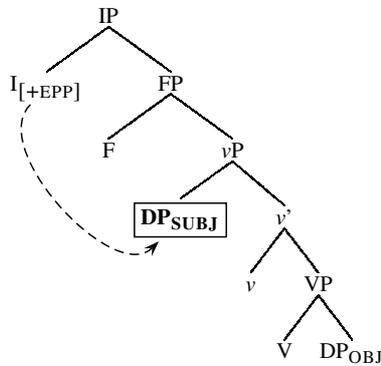


(35)



FP is located above the projection introducing the subject, ensuring that if there is a raised PART-PL argument, it will be targeted by the [+EPP] feature on  $\text{Infl}^0$  (as above), and the subject will be targeted otherwise (as in (36)).<sup>10</sup> This analysis rests on the proposal that a head with unvalued features must attempt to find a goal, but if it fails there is no “crash” in the syntax (Preminger 2014).

(36)



The question we must now address is *how* the probe  $F^0$  targets PART-PL arguments (but not PART-SG arguments), and in cases where two PART-PL DPs appear in the same clause, how it determines which to select. This problem is not trivial. Take for instance, a clause with a 1st person singular subject and a 2nd person plural object, as in (37a). Here,  $F^0$  must skip over the subject to target the PART-PL object. However, in a configuration with a 2nd person plural subject and a 1st person exclusive object, shown (37b),  $F^0$  must know to skip over the PART-PL subject in search of the higher-ranking PART-PL object.

<sup>10</sup>Note that our analysis predicts different c-command relationships between the subject and object depending on their relative ranking. Unfortunately, because the objects are proposed to move above the subject only when they are PART-PL, it is difficult to use binding or *wh*-movement diagnostics to detect this movement. An anonymous reviewer asks whether a proposal based solely on *Agree* (with no movement) would also work. Note that for us, it is crucial that the PART-PL object raise above the subject in order to be targeted by the probe on  $\text{Infl}^0$ . Whether movement to  $\text{Infl}^0$  takes place is open for question. A question for future work is how this system interacts with the calculation of which argument is available for Long Distance Agreement, discussed by Fry and Hamilton (to appear).

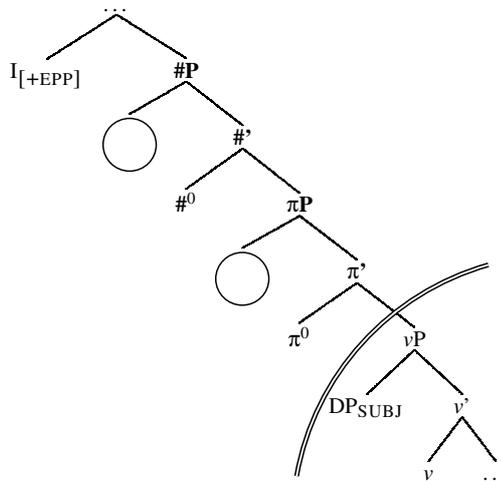
- (37) a. *Mu nem-u'ln-u-oq.*  
 NEG see-2OBJ-NEG-2PL  
 'I don't see you<sub>PL</sub>.'
- b. *Mu nem-i'li-w-eg.*  
 NEG see-1OBJ-NEG-1EXCL  
 'You<sub>SG/PL</sub> don't see us<sub>EXCL</sub>.'

We entertain and ultimately reject two possibilities for the nature of  $F^0$  (§5.2.1–5.2.2) before moving on to a new account in §5.3.1.

5.2.1. *Separating  $\pi^0$  and  $\#^0$*

As a first attempt, we explore the possibility that “FP” actually consists of two separate  $\pi$  and  $\#$  probes, ordered as in (38) (see Preminger 2012 for a discussion of this ordering of probes). In this tree, the  $\pi^0$  head would probe first, locating any pronoun with  $\pi$ -features and raising it above the subject. Next, the higher probe on  $\#^0$  searches and would have access to *only* a DP which has already raised to Spec, $\pi$ P (perhaps due to a  $v$ P phase); this would ensure that only pronouns specified for both  $\pi$  and  $\#$  would raise all the way to Spec, $\#$ P. We could perhaps break  $\pi$ P further into [SPEAKER] and [ADDRESSEE] probes, in order to account for the ranking of 1EXCL $\gg$ 2PL.

(38)



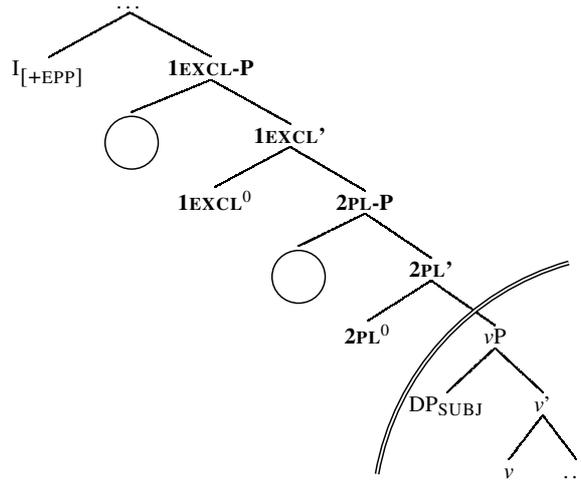
This account would successfully raise PART-PL arguments above the subject, ensuring that when a PART-PL argument is present in the derivation, it would be targeted by the [+EPP] feature on  $Infl^0$ . However, this account faces a serious problem: there is no way to prevent PART *singular* arguments from raising above the subject to Spec, $\pi$ P and thus also being targeted by the [+EPP] feature on  $Infl^0$ . Take, for example, the sentence in (39), repeated from (14a) above. The tree in (38) would predict that the 1st person object would trigger Slot 2 agreement, contra to fact.

- (39) *Mu nem-i'li-w-g.*  
 NEG see-1OBJ-NEG-3  
 'She doesn't see me.'

## 5.2.2. Exploding the clausal spine

In order to capture the fact that only PART-PL arguments raise above the subject, we could simply replicate the Slot 2 hierarchy from (27) above in the spine of the tree, as in (45). 1st person inclusive could be ordered anywhere above the subject, since we cannot determine its relative ranking with the other PART-PL arguments.

(40)



Technically, this account works: PART-PL arguments would raise above the subject and be targeted by the [+EPP] feature on  $\text{Infl}^0$ ; in the case of two PART-PL arguments, 2nd person plural would raise above 1st person exclusive. Finally, in the absence of PART-PL, the subject raises to Spec,IP triggering Slot 2 agreement.

This type of account is also not without precedent. Merchant (2006), for example, provides an analysis of person-based split ergativity in which Silverstein's prominence hierarchy is replicated in the spine of the tree. Note, however, that this ranking could not be universal: Merchant deals with languages in which  $1/2 \gg 3$ , regardless of number (as in the majority of hierarchy systems). For Mi'gmaq, as we have seen above,  $\pi$  and # must interact.<sup>11</sup> In the section that follows, we build on feature geometric accounts of pronouns in order to capture the fact that the most highly specified pronouns—PART-PLS—are privileged for agreement.

<sup>11</sup>Since PART-PL pronouns in Mi'gmaq involve different combinations of  $\pi$  features, it is tempting to try to capture the Slot 2 hierarchy in terms of  $\pi$  alone. In Maxakali and Kwakiutl, for example, there is no number distinction in 2nd and 3rd person pronoun forms, but there is nonetheless a three-way contrast in 1st persons: 1st person singular, 1st person inclusive, and 1st person exclusive. Harley and Ritter (2002) propose that these languages do not make a true number contrast, but that this distinction rather represents a distinction in person features alone:

“It is true of 1st person plural forms in general that they denote a mixed group consisting of the speaker and other individuals. This is in marked contrast to 2nd and 3rd person plural forms, which may denote a group of addressees or a group of other individuals, respectively. In natural language, there is no genuine 1st person plural—we never speak in choruses” (Harley and Ritter 2002:503).

In Mi'gmaq, however, we find a distinction not only among 1st persons, but also between 2nd person singular and 2nd person plural, ruling out the possibility that the contrast is only about  $\pi$ . Thanks to Betsy Ritter for discussion of this possibility.

5.3. Proposal

5.3.1. Fused Probes

As demonstrated in section 5.2.1, it is not possible to account for the Mi'gmaq agreement pattern if there is a split between the probes for number and person features. What is needed in order to account for the data is for the probes to be fused into a single head, thus searching for person and number simultaneously. For example, let's suppose that the  $F^0$  head is comprised of a probe that is a combination of a #-probe that searches for [PLURAL] and  $\pi$ -probe that searches for [PARTICIPANT, SPEAKER] where there is a feature-geometric dependency between [PARTICIPANT] and [SPEAKER] such that [SPEAKER]  $\rightarrow$  [PARTICIPANT] (see e.g. Harley and Ritter 2002 for more on feature geometries generally, and Béjar and Rezac 2009 and Lochbihler 2012 for implementations in Algonquian). This fused probe permits searches for number and person to be separate (each having their own matching criteria) but for the conditions of a successful match to be fused together such that failure in one search results in failure for the entire probe.

Evidence from Mi'gmaq's *intransitive animate* paradigm ("VAI" in Algonquianist terminology), supports the existence of a dedicated #-probe below negation and above the subject which has fused with a  $\pi$ -ful  $F^0$ . The paradigm for VAIs is shown in (41).<sup>12</sup> Interestingly, Mi'gmaq makes a three-way number distinction *only* in intransitives; there is no grammatical dual/plural contrast in the transitive paradigm examined to this point. A three-way contrast with the intransitive verb stem *amalga-* 'dance', is shown in (42); the glosses will be explained below.

(41)

	SINGULAR	DUAL	PLURAL
1INCL	-i	-igw	-a't-igw
1EXCL		-ieg	-a't-i'eg
2	-n	-ioq	-a't-ioq
3	-t	-j-ig	-a't-ij-ig

(42)

- a. *amalga-n*  
dance-2  
'You dance.'
- b. *amalga-ioq*  
dance-2[#>1]  
'You<sub>DU</sub> dance.'
- c. *amalga-a't-ioq*  
dance-[#>2]-2[#>1]  
'You<sub>PL</sub> dance.'

A couple of points are in order. First, note that the final person suffixes in the VAI are identical to the Slot 2 suffixes from the transitive paradigm in (13) above.<sup>13</sup> We assume that the realization of this suffix is the result of the intransitive subject raising to Spec IP, on par with the realization of Slot 2 in the transitive paradigm. When negation occurs, it appears between the # suffix *-a't* and before the final (Slot 2) agreement morpheme. We thus assume that the # head hosting *-a't* is located between  $\text{Infl}^0$  and the subject.<sup>14</sup>

Finally, note that there is no dedicated "dual" morpheme. In the transitive paradigm, an *-oq* ending indicates 2nd person plural, whereas in the intransitive, this same sequence is interpreted as dual. Instead, it is the addition of the suffix *-a't* in the intransitive paradigm which introduces a three-way contrast. This is consistent with Cowper's (2005) analysis of how number distinctions should be represented in a feature geometry, illustrated in (43) and (44).

<sup>12</sup>This is what Pacifique (1939) (translated as Hewson and Francis (1990)) calls the "2nd conjugation" of the three conjugations for VAI. The main difference between the three is in the initial vowel (cf. "theme vowels"), as well as the form of the additional morpheme in the plural column; the final agreement endings relevant to the discussion here are identical.

<sup>13</sup>The third person plural involves the addition of the omnivorous plural *-ig* for human third persons; the change of *t* to *j* preceding *i* in the bottom row of (41) is a regular phonological process in the language (orthographic *j* = IPA [dʒ]).

<sup>14</sup>Whereas the intermediate projection "FP" was required in transitives to ensure that high-ranking PART-PL DPs raise above the subject, we have no evidence for or against the presence FP in the VAI paradigm, since only a single argument (the intransitive subject) is available for the [+EPP] feature on  $\text{Infl}^0$ .

PERSON AND NUMBER IN MI'GMAQ

(43) THREE-WAY NUMBER SYSTEM

singular	dual	plural
[#]	[#]	[#]
	[>1]	[>1]
		[>2]

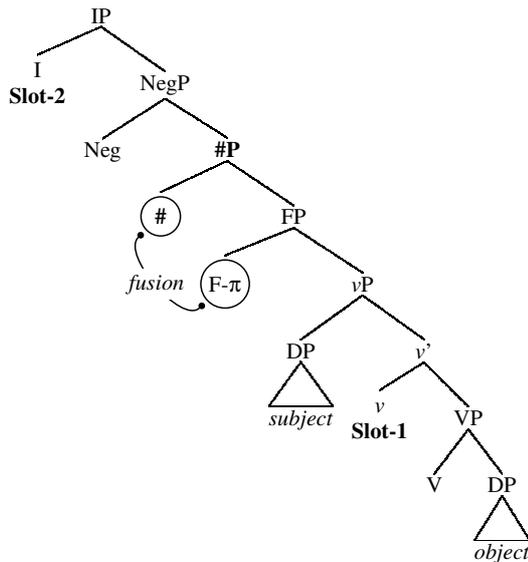
(44) TWO-WAY NUMBER SYSTEM

singular	plural
[#]	[#]
	[>1]

As Cowper notes, this system explicitly encodes the observation that what it means to be “plural” varies depending on the number of other contrasts present in the grammar (Corbett 2000, Bale to appear). In Mi’gmaq, the 2nd person plural morpheme *-oq* can be glossed as “more than 1”; in the transitive paradigm the result is plural. In the intransitive paradigm, with the addition of the more highly-specified *-a’t* “more than 2” suffix, the *-oq* alone is interpreted as dual.

We assume that this same #P is present in the transitive clause, but that it has *fused* to FP, resulting in a complex FP probe which searches simultaneously for both person and number. The assumption that FP contains  $\pi$  features is needed to capture the more straightforward hierarchy effects (e.g. 2 $\gg$ 1 $\gg$ 3 $\gg$ 4) in other Algonquian languages. The proposal that these two probes have fused in Mi’gmaq allows us to capture both (i) the fact that a [DUAL] distinction is no longer possible in the transitive verbal paradigm; and (ii) the inseparability of  $\pi$  and # in the Mi’gmaq hierarchy.

(45)



5.3.2. *Best match*

The preceding section motivated the existence of a fused  $\pi$  and # probe below  $\text{Infl}^0$  and above the subject. We now turn to a formalization of how this probe attracts the correct argument. As described in section 2 above, in Algonquian languages certain types of agreement operations target the highest ranked argument along some kind of hierarchy (see Macaulay 2005 on nuances in the hierarchy). Critically, if there are no arguments of the highest rank, the probes do not fail. Rather, they target the closest argument that has the features of the next highest rank.

A formal account of this type of feature hierarchy can be implemented in several ways. For the sake of simplicity, we will encode this idea of ranking directly in the search. In other words, with respect to a syntactic domain, the probe will assign a rank from 0 to 1 inclusive, where 1 is a perfect match with the

features in the probe and 0 is a complete lack of a match. Numbers in between will mark partial matches. This idea is defined more carefully in (46), where the value of  $n$  is determined by the number of features that the probe and potential goal have in common divided by the total number of features in the probe.

- (46) **Match of Rank  $n$ :** A syntactic object  $\sigma$  with the features  $[f_1 \dots f_i]$  constitutes a *match* of rank  $n$  for a probe  $\rho$  with features  $[g_1 \dots g_j]$ , where  $n = |\{f_1 \dots f_i\} \cap \{g_1 \dots g_j\}| / |\{f_1 \dots f_i\}|$ .

Note that any language with a person hierarchy effect will arguably have to implement some kind of formal mechanism that searches multiple arguments and selects the one that is the best match for the probe. For example, many Algonquian languages have agreement systems that prefer second person arguments over first person, but in turn prefer first person over third person (see §2). In such languages, if there is a first person subject, the probe would be required to evaluate the person features on the object before determining which argument to agree with (i.e., if the object is second person, then agreement is with the object, but if the object is third person then agreement is with the subject). Assigning a *rank* is a simple way of marking how many features in a particular syntactic object match the features in the probe. See Oxford 2014 for a discussion of this issue.

With respect to the Mi'gmaq hierarchy, one can hypothesize that the  $\pi$ -probe has the features [SPEAKER, PARTICIPANT]. DPs that are first person (whether inclusive or exclusive) will perfectly match the probe since by definition they contain the feature [SPEAKER], and since [SPEAKER]  $\rightarrow$  [PARTICIPANT] they will also contain the feature [PARTICIPANT] (i.e.,  $|\{SPEAKER, PARTICIPANT\} \cap \{SPEAKER, PARTICIPANT, etc.\}| / |\{SPEAKER, PARTICIPANT\}| = 2/2 = 1$ ).

In contrast, second person DPs (whether singular or plural) will only partially match the  $\pi$ -probe. Such DPs will contain the features [ADDRESSEE] and [PARTICIPANT]. Thus, the overlap between the probe and the potential goal contains only one feature, and hence the resulting ranking will be .5 ( $|\{PARTICIPANT\}| / |\{SPEAKER, PARTICIPANT\}| = 1/2 = .5$ ). Once the ranking is established within a syntactic domain, the EPP feature on  $F^0$  would attract the closest highest ranked match to the specifier position of the FP.

- (47) **EPP Best Match:** A probe  $\rho$  with an EPP feature and a search domain  $D$  moves the closest syntactic object in  $D$  with a match of the highest rank  $n$ .

The interesting aspect of Mi'gmaq is not the person hierarchy itself, but rather the fact that this person hierarchy only surfaces with plural arguments. To explain this pattern, we hypothesize that the probes for number and person features are fused together and that the ranking of the potential goals are based on a combination of the rankings of the separate fused probes. More specifically, the fused  $F^0$  head contains not only the  $\pi$ -probe that searches for the features [SPEAKER, PARTICIPANT] but also a #-probe that searches for [PLURAL]. Since the number probe searches for only one feature, every potential goal will be ranked as 1 or 0, 1 if the DP has the plural feature and 0 if it does not. However, the ranking of the potential goals is not determined by either the #-probe or  $\pi$ -probe alone. Rather, the ranking is determined by a combination of two probes. This can be done by multiplying the ranks of the two probes, as outlined in (48).

- (48) **Conjoined Match of Rank  $n$ :** A syntactic object  $\sigma$  is a *match* of rank  $n$  for a *fused* probe  $\rho$  composed of  $\alpha$  and  $\beta$ , where  $i \times j = n$  and where  $i$  is  $\sigma$ 's rank with respect to  $\alpha$  and  $j$  is  $\sigma$ 's rank with respect to  $\beta$ .

If either probe ranks the potential goal as 0, then the rank of the potential goal will be 0 (for any number  $n$ ,  $0 \times n = n \times 0 = 0$ ). Thus, failure with respect to one probe results in failure with respect to the fused probe and hence the person hierarchy effects as determined by the  $\pi$ -probe will only surface when the DP argument is a match for the #-probe.

As pointed out by an anonymous reviewer, there is a well-known homomorphism between propositional conjunction and multiplication. For example, if 1 represents true and 0 false, then the results of multiplication mirror the results of conjunction (i.e.,  $(1 \times 1) = 1 = (1 \& 1)$ ,  $(1 \times 0) = 0 = (1 \& 0)$ ,  $(0 \times 1) = 0 = (0 \& 1)$ ,  $(0 \times 0) = 0 = (0 \& 0)$ ). This homomorphism can be extended to multivalued logic, where propo-

sitions are assigned values between 0 and 1, as equivalent to syntactic objects being assigned a match of rank  $n$ . Thus, the mechanics that underly a fused probe are identical to treating person and number features as predicates that apply to arguments (yielding a value between 0 and 1), and then conjoining the resulting propositional values.

## 6. Summary and conclusions

In this paper we presented a description and analysis of Mi'gmaq's agreement system, with a focus on the interaction between person and number features. Specifically, we showed that a typical prominence hierarchy in which participant arguments outrank non-participants is unable to fully account for the Mi'gmaq facts. Rather, in Mi'gmaq, hierarchy effects depend on both person and number: the "Slot 2" agreement morpheme agrees with PART-PL arguments when present, and with the subject otherwise. To capture this we proposed a fused probe, which searches for both [PARTICIPANT] and [PLURAL] features. Independent evidence for the existence of this probe was found in the intransitive paradigm, in which an intermediate number probe is present.

An important part of our analysis is that though they may be useful descriptive tools, person hierarchies are not part of the formal grammar. Rather, they arise as an epiphenomenon of a person probe that attracts the best matching argument to its specifier position. Nominals with more highly-specified features will naturally emerge as "higher ranked". This explains the fact that the person hierarchy is not fixed cross-linguistically. Different hierarchies will emerge depending on whether the probe searches for the features [SPEAKER, PARTICIPANT] or [ADDRESSEE, PARTICIPANT] ( $1P \gg 2P$  vs.  $2P \gg 1P$ ). Additional variation may be possible when distinct probes fuse, as was shown for Mi'gmaq. Though this analysis permits us to capture a wide range of hierarchy facts, it still makes clear predictions. Since the features for third person arguments are a subset of the features for participant arguments, it is not possible to have a probe that would produce the hierarchy  $3P \gg 1P/2P$ , for example.

Another consequence of our analysis is that person and number probes are not always completely separate. Rather, they are sometimes fused together. However, note that the fusion of the two probes is not equivalent to having a probe that searches for both person and number features. Such a probe could not account for the Mi'gmaq data. It is critical that the fused probes search and rank syntactic objects independently. The probes are only fused in the sense that failure to match in one probe entails failure for the complex probe. It is also important to note that fusion of the probes is context dependent. There is evidence that person and number probes remain separate in the intransitive paradigm even though they become fused in the transitive paradigm. Given the more widespread evidence for separating the two probes, a reasonable conjecture would be that the probes are *always* separate, and that the appearance of a single probe with both  $\pi$  and # features must always be the result of fusion, of the type we outline above.

One of the issues left open in the current paper is the status of *-ugsi*. As discussed, *-ugsi* marks a specific type of relationship between subject and object arguments, one that is similar to inverse marking in other Algonquian languages. In future work, we hope to address how the Mi'gmaq facts fit in to the larger Algonquian family, and whether number marking plays a role in these languages as well.

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