Indirect interaction of person and number

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1. Introduction

Agreement in Ojibwe (Algonquian, North America) shows a complicated interdependence of person and number features.

- Agreement targets are selected based on their features, not only their structural position.

- In particular, in embedded clauses, Ojibwe verbs show agreement with the object exactly when it is *both* [LOCAL] and [PLURAL].[1]

- When the object doesn't show the correct feature composition, agreement targets the subject — the featural composition of the object no longer matters.

- Neither [LOCAL] person features nor [PLURAL] number features *alone* is enough to trigger the attested object agreement.

  (1)   a.   waabm -i -siiw -aang
             see   TS NEG **1p**
             "(if) you / y'all see us."
        b.   waabm -i -siiw -an
             see   TS NEG **2s**
             "(if) you see me."

- Existing models for this kind of 'preferential' agreement (e.g. Preminger (2014), Béjar & Rezac (2009)) rely on either relativized or articulated probes, but neither will capture this system directly:

  – Separate probes for person and number might take different features from different arguments — for instance, spelling out [LOCAL] from the subject but [PLURAL] from the object.

  – A single probe targeting the combination [[LOCAL] [PLURAL]] doesn't work either: We'd expect either failed agreement if no such argument exists, or possibly partial agreement with one or the other.

We will show that the pattern can be derived without stipulating any direct interaction between person and number features:

- Instead, we'll propose an indirect interaction in which movement to the specifier of a lower probe feeds agreement with the higher one.

- This feeding relationship is constrained by a locality constraint in the spirit of *Relativized Minimality*.

1.1   Outline of this talk

§2:   We will go over the data from Ojibwe embedded clauses and show that the correct generalization is: *Agree with the object exactly when it is local plural; otherwise agree with the subject.*

§3:   We will briefly discuss the challenges with extending the theoretical accounts of Béjar & Rezac (2009) and Preminger (2014) to the Ojibwe embedded clause agreement data.

§4:   We will present our analysis: *Probes interact indirectly by raising arguments higher in the structure, making them available for later probing.*

§5:   We will conclude by briefly discussing some of the typological predictions of our system.

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[1]Throughout this talk, we will be using the feature [LOCAL] to index speech act participants — i.e. 1st and 2nd persons.

2. AGREEMENT IN OJIBWE EMBEDDED CLAUSES

Ojibwe shows distinct agreement paradigms in matrix and embedded clauses. In this talk, we will be concerning ourselves only with agreement in embedded clauses. For discussion of agreement in the matrix clauses, see Béjar & Rezac (2009).

2.1 Embedded Clause Template

Inflectional material on embedded verbs is exclusively suffixing:

(2) Stem -THEME -Neg -AGREE -PROX -Mode
     waabm -I   -siiw -ANG   -IDWAA -n
     see   1   neg   1p   3p   preterit

     '(if) they hadn't seen us'

Within this template, there are three argument-tracking slots:

1. THEME SIGN — immediately follows the stem; tracks person features of the object

2. AGREEMENT PROPER — follows negation; tracks subjects or local plural objects

3. PROXIMATE CLITIC — tracks the presence of proximate 3rd person arguments

This talk will primarily focus on the second of these, here termed 'agreement proper'. However, we'll first turn our attention to the other two.

2.2 Theme Signs

In the independent order, Algonquian theme signs are famously sensitive to the properties of both subject and object and indicate 'inversion'. (Valentine 2001; Rhodes 1994; Béjar & Rezac 2009)

In the Ojibwe embedded clause, however, theme signs fairly straightforwardly track only the person features of the object:

(3) **Embedded Clause Theme Signs:**

O \ S	1s	2s	3s	Excl	Incl	2p	3p
1s		I	I			I	I
2s	I-NO		I-NO	IGOO			I-NO
3s	AA	AA	AA	AA	AA	AA	AA
Excl		I	I			I	I
Incl		I-NO					I-NO
2p	I-NO		I-NO	IGOO			I-NO
3p	AA	AA	AA	AA	AA	AA	AA

Four distinct morphemes are evident in this paradigm:

1. /**-i**/ — 1st person object
2. /**-i-no**/[2], /**-igoo**/ — addressee object (2nd person or inclusive)
3. /**-aa**/ — 3rd person object

2.3 Proximate Clitic

After agreement proper, Ojibwe has a slot dedicated to tracking the presence of proximate (≈ discourse-salient) 3rd person arguments (Oxford 2014):

(4) **Proximate Clitic:**

O \ S	1s	2s	3s	Excl	Incl	2p	3p
1s			g				gwaa
2s			k				kwaa
3s	g	d	d	d	(g)	(g)	gwaa
Excl			d				dwaa
Incl			(g)				(g)waa
2p			(g)				(g)waa
3p	gwaa	dwaa	dwaa	dwaa	(g)waa	(g)waa	gwaa

---

[2]The second part of the /-i-no/ theme sign is realized after negation, and so might be regarded as a separate morpheme. However, it always only tracks the person features of the internal argument, just like the theme sign, and so here is lumped in.

That /d/, /g/, and /k/ are all allomorphs of a single morpheme can be seen from the intransitive proximate clitic paradigm:

(5)   **Intransitive Proximate clitic:**

	V-Final Stem		N-Final Stem	
	AFFIRMATIVE	NEGATIVE	AFFIRMATIVE	NEGATIVE
3s	-d	-g	-g	-g
3p	-waad	-gwaa	-waad	-gwaa

In the intransitive, /g/ and /d/ clearly alternate based on both phonological and morphosyntactic context. As such, we'll treat them both (and the devoiced form /k/) as realizations of a single morpheme in the transitive paradigm, as well.[3]

2.4   Agreement Proper

We'll turn now to the primary focus of this talk, agreement proper. This agreement uses the same set of morphemes as intransitives, so it will be helpful to have the intransitive agreement paradigm in mind:

(6)   **Intransitive Agreement:**

1s	-aan
2s	-an
3s	ø
Excl	-aang
Incl	-ang
2p	-eg
3p	ø

Turning back to transitives, we will show you that the correct generalization for this paradigm is as follows:

[3] The form of the third person plural clitic /-gwaa/ is very similar to the form of the third person plural pronoun (/-wiinwaa/ "they"). For additional arguments in favor of treating /–gwaa/ as a clitic see Oxford (2014 p. 103-110).

(7)   **Generalization for Agreement Proper:**
    a.   If the object is both local and plural, agree with it in all features.
    b.   Otherwise, agree with the subject in all features.

To see that this is true, we'll consider the agreement paradigm quadrant-by-quadrant.

Quadrant 1: Singular → Singular

(8)   **Agreement proper: singular S → singular O**

O \ S	1s	2s	3s
1s		an_s	$ø_s$
2s	aan_s		$ø_s$
3s	$ag_?$	$ad_?$	$ø_s$

- Considering the $2s \rightarrow 1s$ and $1s \rightarrow 2s$ cells, we see that agreement is with the subject. Similarly, when the subject is 3rd person, agreement is /ø/ exactly as it would be if agreeing with an intransitive nonlocal subject.

- When the object is 3rd, we see the new forms /-ag/ and /-ad/. But these morphemes look like portmanteaux of the normal 1st and 2nd forms with the non-local agreement. If we separate out the two parts of this morpheme, we can still see agreement with the subject:

(9)   **Revised — Agreement proper: singular S → singular O**

O \ S	1s	2s	3s
1s		an_s	$ø_s$
2s	aan_s		$ø_s$
3s	$a(an)_s - g$	$a(n)_s - d$	$ø_s$

Now we can see that agreement proper in this quadrant is always and only with the subject.

Quadrant 2: Plural → Singular

(10)   **Agreement proper: plural S → singular O**

O \ S	Excl	Incl	2p	3p
1s			eg_s	$ø_s$
2s	$an_?$			$ø_s$
3s	$aang_s$	ang_s	eg_s	$ø_s$

- In the quadrant with plural subjects and singular objects, agreement proper once again tracks the features of the subject.

- When the subject is exclusive and the object is 2nd singular, the agreement form is /-an/, which looks like the intransitive agreement form for the object. This is the only cell in the paradigm which behaves this way, and we will treat this as exceptional.

Quadrant 3: Singular → Plural

(11)   **Agreement proper: singular S → plural O**

O \ S	1s	2s	3s
Excl		$aang_o$	$aang_o$
Incl			ang_o
2p	$agog_?$		eg_o
3p	a_s	a_s	$ø_s$

- Here, when the object is 3rd plural agreement is with the subject, but when the object is local agreement proper is with the object.

- There is one morpheme, /-agog/, which appears only once in the inflectional material of the language, so we cannot tell what this agreement is with.

Quadrant 4: Plural → Plural

(12)   **Agreement proper: plural S → plural O**

O \ S	Excl	Incl	2p	3p
Excl			$aang_o$	$aang_o$
Incl				ang_o
2p	eg_o			eg_o
3p	$aang_s$	ang_s	eg_s	$ø_s$

- Finally, in the quadrant where both subject and object are plural, we see the same pattern: Agreement is with the object, unless the object is 3rd person.

- Thus, the generalization given above holds across all four quadrants: **Agree with local plural objects if possible; otherwise, agree with the subject.**

3.   **BACKGROUND**

There are several prior accounts of the kind of 'preferential' agreement we see in Ojibwe. We'll be concerning ourselves with two that specifically handle the selection of the goal in the narrow syntax, namely Béjar & Rezac (2009) and Preminger (2014).

3.1   Béjar & Rezac (2009)

- These accounts aim to capture :

  1. differences in sensitivity to person and number hierarchies
  2. the preference for agreement with objects
  3. agreement displacement to subjects in certain argument combinations

- A language with agreement displacement is illustrated schematically below.

(13) a. $3 \rightarrow 1 = 1$ (14) a. $1 \rightarrow 3 = 1$
      b. $2 \rightarrow 1 = 1$ b. $1 \rightarrow 2 = 1$

- Articulated probes as well as the notions of cyclicity and locality are used to capture such patterns.

(15) An articulated probe for the hierarchy: $1 > 2 > 3$
$[u - 3 - 2 - 1] = [\pi \, [\text{local} \, [\text{author}]]]$

- Each feature probes individually and can match features on a DP (or not) independently.

- The action of this probe is shown in (16).

(16) Articulated probes: *(from Béjar & Rezac 2009)*

Subj	Probe		Obj
[3]	[u3]	—	[3]
[2]	[u2]	—	[2]
[1]	—	[u1]	

- The articulated probe is positioned between the subject and the object.

- The first cycle of agreement is in the c-command domain of the probe.

- If the object does not match in all features with the probe, then there is cyclic expansion of the search space and the probe goes for a second cycle of agreement with the subject in its specifier.

- Since in the given example the object is less specified than the subject, the last segment of the probe [u1] can search upwards and agree with the argument in its specifier.

3.2 Preminger (2014)

- This account aims to capture patterns of *omnivorous agreement*: agreement that seeks out only DPs with particular features, regardless of structural position.

- Probes are relativized to particular features, e.g. the interrogative *C* probe only finds *wh* phrases and skips non-*wh* phrases.

- Agreement probes are relativized to features on the φ feature geometry:

(17) A simplified feature geometry
(based on Harley & Ritter 2002 via Preminger 2014)

$$[\varphi]$$

[PERSON]   [NUMBER]

[local]   [plural]

[author]
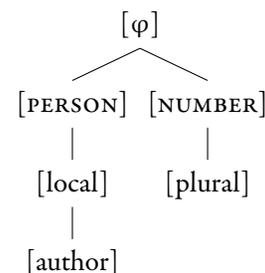
- *Omnivorous agreement*:

  - A probe relativized to [local] can only see DPs bearing the feature [local].

  - Such a probe skips not only non-DPs but also DPs that are not 1st or 2nd person

3.3 On the need to extend the existing accounts

The systems outlined above alone cannot account for the Ojibwe data.

- Alternative 1: Completely independent person and number probes

  - The shape of the φ feature geometry is meant to capture the independence of person and number hierarchies.

  - Each probe is specified either for person or number, but not both.

  - In particular, separate articulated/relativized probes might target different goals and express e.g. plural features from one argument but local features from the other.

  - Crucially, this is not observed in Ojibwe as agreement is either with local plural objects or failing that with the subject irrespective of its feature composition.

- Alternative 2: A single probe targeting a feature combination — [[LOCAL] [PLURAL]]- fares no better

– If no argument exists with that combination, we expect either:

1. failed agreement in the case of a relativized probe; or
2. Partial Agreement with some features of the object on the first cycle and partial agreement with another argument on the second cycle in the case of an articulated probe.

– But we don't see failed or partial agreement in Ojibwe when the object doesn't bear the right combination of features

– Rather agreement is with the person and number features of the subject when the object is not [[LOCAL] [PLURAL]]

Thus, some extension or modification is necessary to account for the Ojibwe agreement facts.

4. INDIRECT INTERACTION OF PROBES

We propose that the Ojibwe pattern can be accounted for through the indirect interaction of three relativized probes placed in a feeding relationship: Each probe will raise the argument it agreed with into its specifier, making it available to be targeted by the next probe.

This proposal relies on a strict locality condition in the spirit of Relativized Minimality (Rizzi 1990):

(18) **Relativized Minimality** (paraphrased):
Let P be a φ probe and G a goal. AGREE(P,G) only if there is no φ probe P′ such that P c-commands P′ and P′ commands G.

In other words, agreement probes may not 'see past' other agreement probes; thus, potential goals of a low probe are invisible to a higher probe unless they have been moved up.[4]

For Ojibwe, we will assume the following structure:

(19)

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[4]We use Relativized Minimality, rather than phases or some other locality condition, because of the proximate clitic: The probe for this must be positioned higher in the structure, but must be able to see both arguments. We propose that it is not a φprobe and so the other φprobes are not barriers for it.
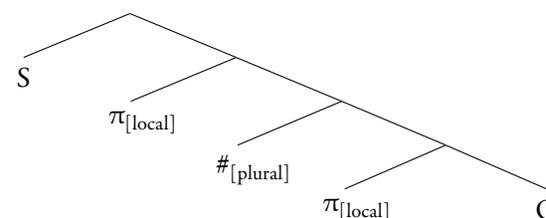
- A low person probe relativized to [local], spelled out as the THEME SIGN

- A number probe relativized to [plural]

- A high person probe relativized to [local], jointly spelled out with the number probe as AGREEMENT PROPER
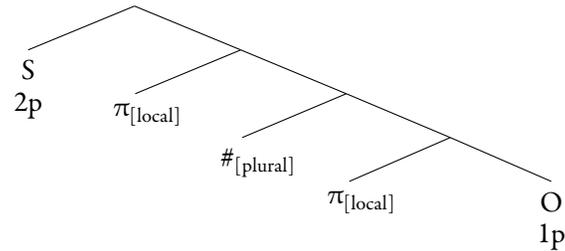
- All probes are relativized as in Preminger (2014).

The derivation proceeds as follows:

1. The low person probe searches the object for [local] features and raises it if found, copying PERSON features in the process.

2. The number probe searches its c-command domain, which includes the object *if and only if the low person probe raised it*, and raises the object if it is plural, copying NUMBER features in the process.

3. The high person probe looks in its c-command domain, which includes the object *if and only if the number probe raised it*, and agrees with it in all φ-features.

4. If the high person probe finds nothing in its c-command domain, it goes for a second cycle (Béjar & Rezac 2009) and searches its specifier.
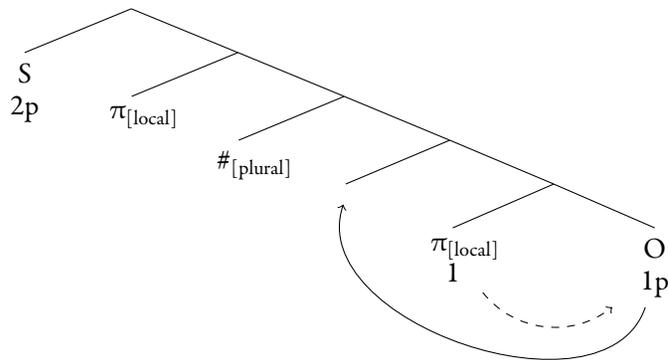
We will step through several illustrative derivations below.
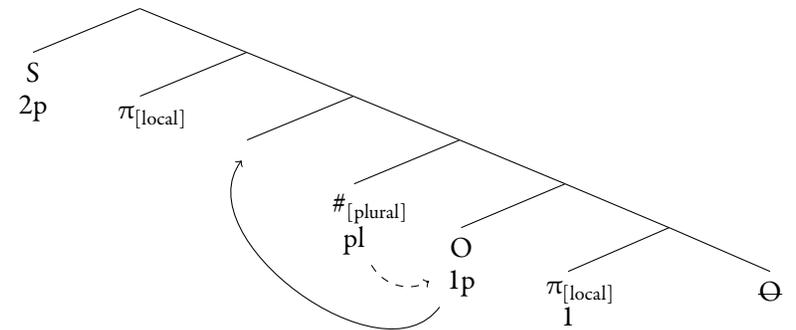
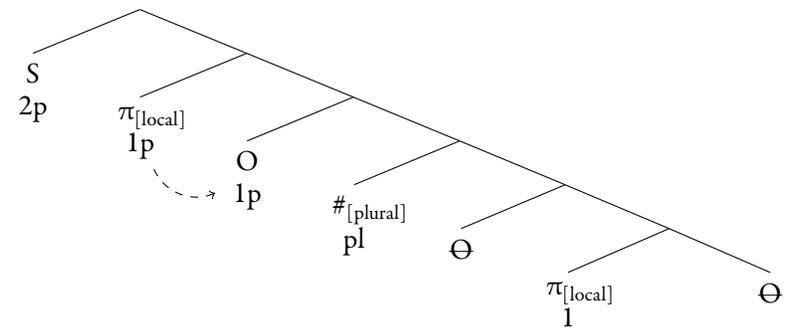## 4.1   Local Plural → Local Plural

(20)   **2p → 1p = 1p**

S
2p $\pi_{[local]}$
        $\#_{[plural]}$
            $\pi_{[local]}$
            1p   O
                    1p

S
2p $\pi_{[local]}$
        $\#_{[plural]}$
        pl   O
                1p $\pi_{[local]}$
                        1   Ө

1. The low person probe searches its c-command domain, agrees with the object, and raises it:

S
2p $\pi_{[local]}$
        $\#_{[plural]}$
            $\pi_{[local]}$
            1   O
                    1p

3. The high person probe searches its c-command domain and agrees with the object:

S
2p $\pi_{[local]}$
        1p   O
                1p $\#_{[plural]}$
                        pl   Ө
                                $\pi_{[local]}$
                                1   Ө

4. **Spellout: 1p**

2. The number probe searches its c-command domain, agrees with the object, and raises it:

4.2   Local Plural → Local Singular

(21)   **2p → 1s = 2p**
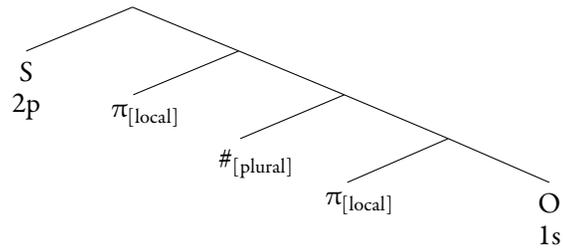
```
        S
        2p    π[local]
                   #[plural]
                        π[local]    O
                                    1s
```
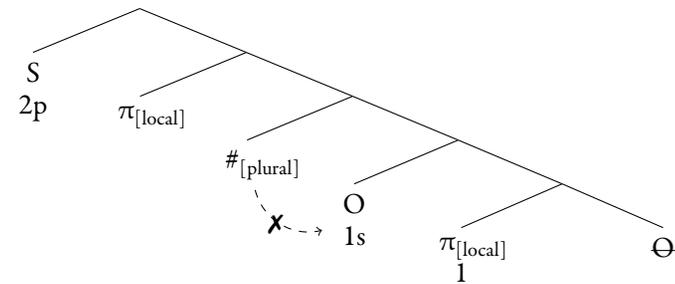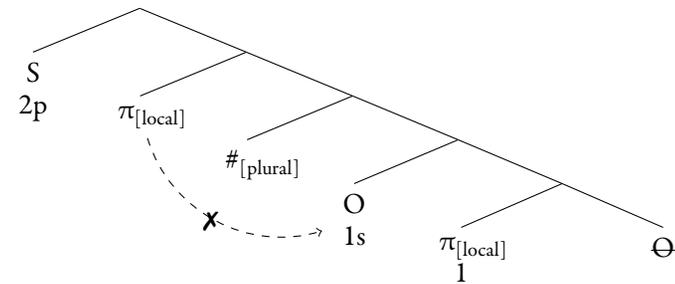
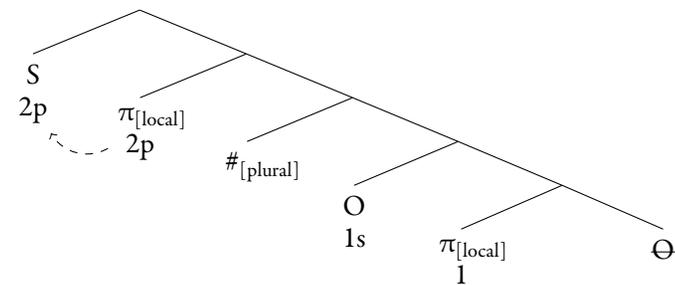1. The low person probe searches its c-command domain, agrees with the object, and raises it:

```
        S
        2p   π[local]
                  #[plural]
                       π[local]   O
                       1          1s
```
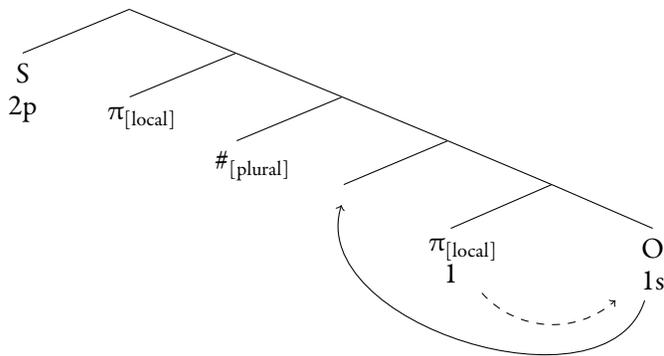
2. The number probe searches its c-command domain, but finds nothing — the object is singular and thus not visible to it.

```
        S
        2p   π[local]
                  #[plural]
                  ✗--→    O
                          1s
                              π[local]   O̶
                              1
```

3. The high person probe searches its c-command domain, but is unable to agree with object — the number probe intervenes.

```
        S
        2p   π[local]
                  #[plural]
             ✗----→    O
                       1s
                           π[local]   O̶
                           1
```
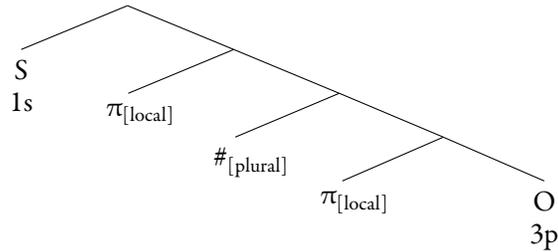
4. The high person probe goes for a second cycle and probes into its specifier, finding and agreeing with the subject, copying all of its features:
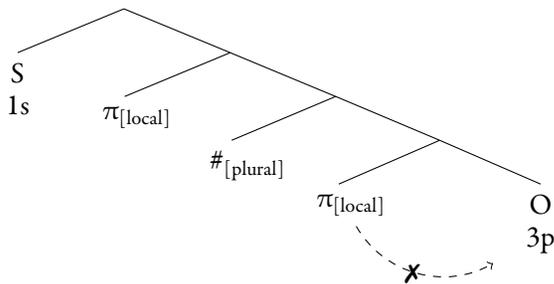
```
        S
        2p   π[local]
         ⌐--  2p
                  #[plural]
                       O
                       1s
                           π[local]   O̶
                           1
```

5. **Spellout: 2p**

4.3 Local Singular → Nonlocal Plural

(22) **1s → 3p = 1s**

S
1s $\pi_{[local]}$
$\#_{[plural]}$
$\pi_{[local]}$ O
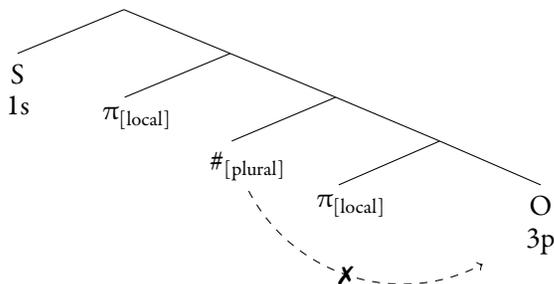3p

1. The low person probe searches its c-command domain, but finds nothing — the object is not local and so is not visible:

S
1s $\pi_{[local]}$
$\#_{[plural]}$
$\pi_{[local]}$ O
3p

2. The number probe searches its c-command domain, but finds nothing — the low person probe intervenes between it and the object:
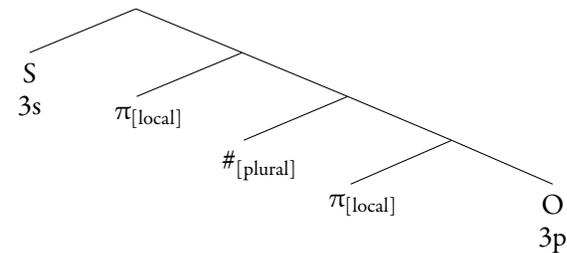
S
1s $\pi_{[local]}$
$\#_{[plural]}$
$\pi_{[local]}$ O
3p

3. The high person probe searches its c-command domain, finds nothing, and goes for a second cycle, agreeing with the subject:
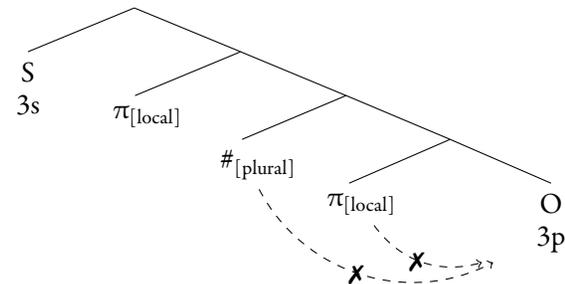
S
1s $\pi_{[local]}$
1s
$\#_{[plural]}$
$\pi_{[local]}$ O
3p
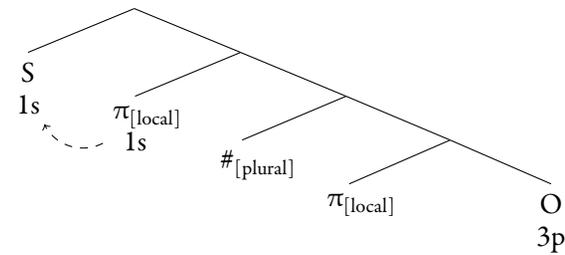
4. **Spellout: 1s**

4.4 Nonlocal Singular → Nonlocal Plural
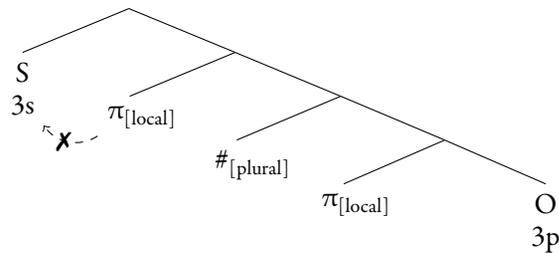
(23) **3s → 3p = Ø**

S
3s $\pi_{[local]}$
$\#_{[plural]}$
$\pi_{[local]}$ O
3p

1. The early part of the derivation proceeds as above — the low person probe and the number probe fail to agree:

S
3s $\pi_{[local]}$
$\#_{[plural]}$
$\pi_{[local]}$ O
3p

2. When the high person probe goes for its second cycle, it finds nothing — the subject is nonlocal and hence invisible to it.

3. **Spellout: Ø**

4.5   Conclusion

Thus we've shown that indirect interaction of probes mediated by Relativized Minimality is capable of deriving the pattern we see in Ojibwe embedded clauses.

5.   Conclusion

- We've shown that Ojibwe has a preference for agreeing with objects which are both plural and local, but not only one or the other, and that we cannot account for this by allowing probes to be relativized to both person and number.

- Instead, our analysis derives the attested pattern through indirect interaction of person and number probes, rather than through a stipulated agreement hierarchy, and does so by placing probes of different kinds in a feeding relationship.

Our analysis provides a mechanism whereby other languages could resolve competition for control of agreement by way of a combination of person and number hierarchies. We've looked at at least two other languages that show such agreement patterns:

- In Cree (Algonquian) embedded clauses, the agreement preferably happens with the first person argument.

- However, the object does not participate in the competition for the relevant agreement slot if it is not plural. If the object is singular, the agreement slot invariably tracks the features of the subject even if the object has the first person features.

- In Dumi (Kiranti, spoken in Nepal) one of the agreement slots is controlled by a non-singular argument that is higher on the person hierarchy.

- Singular arguments do not compete for the control of this agreement slot even if they are highest on the person hierarchy.

Our proposal is an extension of the Preminger and Béjar & Rezac systems and allows us to derive additional agreement patterns. Sources of cross-linguistic variation in our system include not only the featural specification of the probes, but also their ordering with respect to subject and object:

- In Ojibwe and Cree, all the agreement probes are between the subject and the object, which allows the highest probe to still 'prefer' the object over the subject.

- In Dumi, both the number and the person probe are above both the subject and the object, resulting in no observable agreement assymmetry between subject and object.

This extended system remains relatively restrictive, however — there are patterns of agreement we predict to be impossible. One such pattern is the reverse of the Ojibwe pattern:

(24)   **Reverse Ojibwe Generalization:** (predicted to be impossible)
       Agree with subject if it is [PLURAL] and [LOCAL]; otherwise, agree with object.

- In our analysis, this system would require two probes (relativized to [LOCAL] and [PLURAL], respectively) above the subject, raising it into the domain of a still-higher probe.

- However, that highest probe would then be too far from the object to agree with it if the intermediary probes didn't find anything.

More generally, our proposal predicts that any time agreement selects a target based on combinations of types of features, if that combination is not found agreement cannot default to a structurally-lower argument.

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APPENDIX 1: CREE

- We propose that a very similar mechanism can account for the embedded clause agreement in a closely related language, Cree.

- Like Ojibwe, Cree shows distinct agreement paradigms in matrix and embedded clauses. We are going to focus on the embedded paradigm.

- Cree embedded morphology shows the same general template as Ojibwe:

(25)   Stem   -THEME -AGREE -PROX
       waapam -iko   -yahk   -ok
       see   1   12p   3p
       '(if) they hadn't seen us (inclusive)'

- Agreement proper shows a pattern of agreement that very slightly different from the Ojibwe pattern:

(26)   **Generalization for Cree Agreement Proper:**
       a.   If the object is [[LOCAL] [PLURAL]], agree with it *unless the subject is 1st person*.
       b.   Otherwise, agree with the subject.

- In other words, there is a preference in the system to agree with a 1st person argument over a 2nd person argument, but only if the object is plural. If the object is not plural, then it does not participate in the competition.

We'll step through a few examples of this:

- If the object is plural and local and the subject is not 1st person, agreement happens with the object:

(27)   3p → 2p = 2p   (28)   2s → 1p = 1p
       waapam -iko -yeek -ok   waapam -ii -yaahk
       see   TS   2p   -3p   see   TS   1p

       "(if) they see you-all"   "(if) you see us-all"

2

(29)   2p → 1p = 1p
       waapam -ii -yaahk
   see   TS   1p

       "(if) you-all see us"

- If the subject is 1st person, then agreement is with the subject, *even if the object is local plural:*

(30)   1p → 2p = 1p
       waapam -it -yaahk
       see   TS   1P

       "(if) we see you-all"

- If both subject and object are singular, then the agreement happens with the subject irrespective of the person features of the object.

(31)   1s → 2s = 1s   (32)   2s → 1s = 2s
       waapam -it -aan   waapam -i -yan
       see   TS   1s   see   TS   2s

       "(if) I see you-all"   "(if) you-all see me"

- We propose to derive this pattern by the same arrangement of probes as in Ojibwe:

(33)

$$S \quad \pi_{[u\text{-}3\text{-}2\text{-}1]} \quad \#_{[plural]} \quad \pi_{[local]} \quad O$$
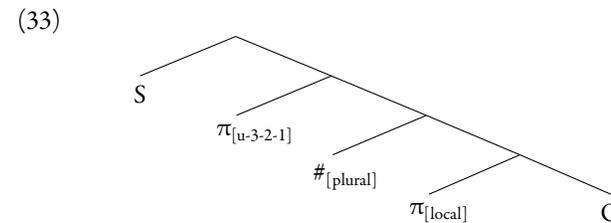
- As in Ojibwe, the lowest person probe (realized as the theme sign) is relativized to [LOCAL] and number probe is to [PLURAL].

- We suggest that the relevant difference between Ojibwe and Cree is that the higher person probe in Cree is a fully articulated probe with the geometry [u-3-2-1]. This person probe copies the entire feature set of most specified argument.

- If the object is not local or plural it will not be accessible to the higher person probe and this person probe will agree with the argument in its specifier (the subject).

- In the **1p → 2p** case: The [AUTHOR] feature of the highest probe will not be satisfied by probing the object and will go for a second cycle, causing agreement with the subject.

Appendix 2: Ojibwe Embedded Agreement Paradigm

O \ S	1s	2s	3s	Excl	Incl	2p	3p
1s		I **an**$_s$	I **ø**$_s$ *g*			I **eg**$_s$	I **ø**$_s$ *gwaa*
2s	I-NO **aan**$_s$		I-NO **ø**$_s$ *k*	IGOO **an**$_?$			I-NO **ø**$_s$ *kwaa*
3s	AA **a**$_s$ *g*	AA **a**$_s$ *d*	AA **ø**$_s$ *d*	AA **aang**$_s$ *d*	AA$_s$ **ang**	AA$_s$ **eg**	AA **ø**$_s$ *gwaa*
Excl		I **aang**$_o$	I **aang**$_o$ *d*			I **aang**$_o$	I **ang**$_o$ *dwaa*
Incl			I-NO **ang**$_o$				I-NO **ang**$_o$ *waa*
2p	I-NO **agog**$_?$		I-NO **eg**$_o$	IGOO **eg**$_o$			I-NO **eg**$_o$ *waa*
3p	AA **a**$_s$ *gwaa*	AA **a**$_s$ *dwaa*	AA **ø**$_s$ *dwaa*	AA **aang**$_s$ *dwaa*	AA **ang**$_s$ *waa*	AA **eg**$_s$ *waa*	AA **ø**$_s$ *gwaa*