1 Introduction

- Cyclic Agree (Rezac, 2003, 2004; Béjar and Rezac, 2009):
  - A probe first probes its c-command domain
  - If the probe remains unsatisfied, when the head reprojects to form an intermediate projection, the probe reprojects as well
  - The probe then probes its new, expanded c-command domain (the specifier of the head)
  - A classic example of this is with agreeing v

(1)

- Under the assumptions of Bare Phrase Structure (BPS), there is no formal distinction between the label of intermediate and maximal projections
- The prediction of a Cyclic Agree model coupled with BPS is that maximal projections should be able to serve as probes
- This prediction is difficult to test, given that the c-command domain of Xmax will typically only contain the head that selects it

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- In this talk, I argue that this prediction is borne out in the type of structure in (2)

(2)

- Specifically, I argue for the existence of this structure in Amahuaca (Panoan; Peru) with an agreeing adjunct C
  - Adjunct Cmin probes DPs in its c-command domain, the adjunct clause
  - Because the probe on C remains unsatisfied, Cmax also probes its c-command domain, agreeing with matrix DPs
- Thus, the Amahuaca data provide support for a Cyclic Agree model and suggest that cyclic expansion of probes is fully generalizable to maximal projections

- Roadmap:
  - §1: Introduction
  - §2: Amahuaca agreeing C
  - §3: The analysis: Maximal projections as probes
  - §4: Alternative analyses
  - §5: Predictions and typology
2 Amahuaca agreeing C

- Amahuaca is an endangered Panoan language spoken in the Peruvian and Brazilian Amazon
  - Mostly head final, with a head-initial matrix C
  - SOV word order with scrambling of arguments and adjuncts
  - Head and dependent marking
  - Tripartite alignment with ergative, nominative, and accusative case
- All data were collected during my fieldwork in Sepahua, Peru over four field trips
- In temporal adjunct clauses in Amahuaca, the element indicating the temporal relationship between clauses is an enclitic that typically surfaces on the verb

\[ [\text{jaa=x}_i \text{ vua=x}_o \text{ xano=n}_i \text{ xuki}] \text{3SG= NOM sing=SA.AFTER=C\_MATRIX woman=ERG corn} \]
\[ \text{jova=x}_o \text{ nu} \text{cook=3.PST=DECL} \]

‘After she sang, the woman cooked corn.’

- For simplicity, the focus of this talk will be on ‘after’ clauses, but ‘while’ and ‘before’ show similar behavior

2.1 Internal syntax of ‘after’ clauses

- Amahuaca ‘after’ clauses are full CPs that can contain all arguments of the verb, including case-marked subjects, (4); adverbs, (5); and other adjunct clauses, (6)

\[ [\text{xano=n}_i \text{ chopa patza=\(x\_o\)}=\text{mun} \text{ pro=\(x\_o\)} \text{ hatza woman=ERG clothes wash=SA.AFTER=C\_MATRIX manioc jova=hi=ki=nu} \text{ cook=IPFV=3.PRES=DECL} \]

‘After the woman washed clothes, she is cooking manioc.’

\[ [\text{pro=\(x\_o\)} \text{ koshi ka=\(x\_o\)}=\text{mun} \text{ xano=n}_i \text{ hatza quickly go=SA.AFTER=C\_MATRIX woman=ERG manioc vana=xo=nu} \text{ plant=3.PST=DECL} \]

‘After she went quickly, the woman planted manioc.’

\[ [[\text{pro=\(x\_o\)} \text{ kari choka=\(x\_o\)}] \text{ pro=\(x\_o\)} \text{ hatza xoka=\(x\_o\)}=\text{mun yam wash=SA.AFTER manioc peel=SA.AFTER=C\_MATRIX xano=n}_i \text{ xuki jova=xo=nu} \text{ woman=ERG corn peel=3.PST=DECL} \]

‘[After she peeled manioc [after she washed yams]], the woman cooked corn.’

(7) ‘After I cooked paca, I peeled manioc.’

\[ [\text{hiya=n}_1 \text{ hano jova=\(x\_o\)}=\text{mun} \text{ hun hatza 1SG=ERG paca cook=SA.AFTER=C\_MATRIX 1SG manioc vuro=ku=nu} \text{ peel=1.PST=DECL} \]

\[ [\text{hano hiya=n}_1 \text{ jova=\(x\_o\)}=\text{mun} \text{ hun hatza paca 1SG=ERG cook=SA.AFTER=C\_MATRIX 1SG manioc vuro=ku=nu} \text{ peel=1.PST=DECL} \]

2.2 External syntax of ‘after’ clauses

- ‘After’ clauses also allow clause-internal scrambling

(7) ‘After I cooked paca, I peeled manioc.’

\[ [\text{hiya=n}_1 \text{ hano jova=\(x\_o\)}=\text{mun} \text{ hun hatza 1SG=ERG paca cook=SA.AFTER=C\_MATRIX 1SG manioc vuro=ku=nu} \text{ peel=1.PST=DECL} \]

\[ [\text{pro=\(x\_o\)} \text{ kari choka=\(x\_o\)}] \text{ pro=\(x\_o\)} \text{ hatza xoka=\(x\_o\)}=\text{mun yam wash=SA.AFTER manioc peel=SA.AFTER=C\_MATRIX xano=n}_i \text{ xuki jova=xo=nu} \text{ woman=ERG corn peel=3.PST=DECL} \]

‘[After she peeled manioc [after she washed yams]], the woman cooked corn.’

(7) ‘After I cooked paca, I peeled manioc.’

\[ [\text{hiya=n}_1 \text{ hano jova=\(x\_o\)}=\text{mun} \text{ hun hatza 1SG=ERG paca cook=SA.AFTER=C\_MATRIX 1SG manioc vuro=ku=nu} \text{ peel=1.PST=DECL} \]

\[ [\text{pro=\(x\_o\)} \text{ kari choka=\(x\_o\)}] \text{ pro=\(x\_o\)} \text{ hatza xoka=\(x\_o\)}=\text{mun yam wash=SA.AFTER manioc peel=SA.AFTER=C\_MATRIX xano=n}_i \text{ xuki jova=xo=nu} \text{ woman=ERG corn peel=3.PST=DECL} \]

‘[After she peeled manioc [after she washed yams]], the woman cooked corn.’

The following abbreviations are used in glossing: 1 = first person, 3 = third person, AM = associated motion, C = complementizer, DECL = declarative, DS = different subject, ERG = ergative, IPFV = imperfective, NOM = nominative, OS = object coreferential with intransitive subject, PL = plural, PRES = present, PST = past, SA = subject coreferential with transitive subject, SG = singular, SO = subject coreferential with object, SS = subject coreferential with intransitive subject.
• It is ungrammatical for ‘after’ clauses to appear below aspect marking (Note that nominalized internally-headed relative clauses can appear in this position)

(8) ‘After she, sang, the woman, is washing manioc.’
   a. \[ \text{[pro}_i\text{, vua=xon}=\text{mun}} \text{, xano=ni, hatza sing=SA.AFTER=C}_{\text{MATRIX}} \text{, woman=ERG, manioc wash=IPFV}} \text{, choka=hi=ki=nu}} \text{, wash=IPFV=3.PRES=DECL} \]
   b. \[ \text{* xano=ni=mun}} \text{, hatza choka=hi [pro}_i\text{, woman=ERG=C}_{\text{MATRIX}} \text{, manioc wash=IPFV}} \text{, vua=xon}=\text{ki=nu}} \text{, sing=SA.AFTER=3.PRES=DECL} \]

• ‘After’ clauses do not reconstruct below matrix arguments for Condition C: regardless of the relative position of matrix and adjunct material, a Condition C violation is never triggered

(9) ‘After Maria, went quickly, she, washed clothes.’
   a. \[ \text{[pro}_i\text{, koshi ka=xon}=\text{mun}} \text{, Maria=ni, chopa quickly go=SA.AFTER=C}_{\text{MATRIX}} \text{, Maria=ERG, clothes patza=xo=nu}} \text{, wash=3.PST=DECL} \]
   b. \[ \text{[Maria, koshi ka=xon}=\text{mun}} \text{, pro}_i\text{, chopa Maria quickly go=SA.AFTER=C}_{\text{MATRIX}} \text{, clothes patza=xo=nu}} \text{, wash=3.PST=DECL} \]
   c. \[ \text{jaa=ni=mun}} \text{, [Maria, koshi ka=xon}} \text{, chopa 3SG=ERG=C}_{\text{MATRIX}} \text{, Maria quickly go=SA.AFTER, clothes patza=xo=nu}} \text{, wash=3.PST=DECL} \]

• The proposed syntax for these ‘after’ clauses is as given in (10)

2.3 Agreement in ‘after’ clauses

• There are several different forms of the enclitic used to mean ‘after’
  – These morphemes vary depending on coreference relationships between arguments (Sparing-Chávez, 1998, 2012)
  – If there is coreference between an argument in the adjunct clause and one in the matrix clause, the form of the morpheme is sensitive to the abstract case of the relevant arguments
  – In (11), the adjunct clause subject is coreferential with a matrix transitive subject (ERG), and the agreeing adjunct C takes the form =xon

(11) \[ \text{[jaa=x}_i\text{, vua=xon}=\text{mun}} \text{, xano=ni, xuki 3SG=NOM sing=SA.AFTER=C}_{\text{MATRIX}} \text{, woman=ERG, corn jova=xo=nu}} \text{, cook=3.PST=DECL} \]

‘After she, sang, the woman, cooked corn.’
In (12), the adjunct clause subject is coreferential with a matrix intransitive subject (abstract NOM), and the agreeing adjunct C takes the form =hax

\[
\begin{align*}
&\text{[jaa}=x_i, \text{vua}=[\text{hax}]=\text{mun} \quad \text{xano}_i, \text{chirin}=\text{xo}=\text{nu} \\
&\text{3SG}=\text{NOM} \text{ sing}=\text{SS.AFTER}=\text{C}_\text{MATRIX} \text{ woman dance}=\text{3.PST}=\text{DECL} \\
&\text{‘After she, sang, the woman, danced.’}
\end{align*}
\]

In (13), the adjunct clause subject is coreferential with a matrix object (abstract ACC), and the agreeing adjunct C takes the form =xo

\[
\begin{align*}
&\text{[jaa}=x_i, \text{vua}=[\text{xo}]=\text{mun} \quad \text{hinan} \quad \text{xano}_i \\
&\text{3SG}=\text{NOM} \text{ sing}=\text{SO.AFTER}=\text{C}_\text{MATRIX} \text{ dog,ERG woman} \\
&\text{chivan-vo}=\text{xo}=\text{nu} \\
&\text{chase-AM}=\text{3.PST}=\text{DECL} \\
&\text{‘After she, sang, the dog chased the woman.’}
\end{align*}
\]

In (14), no adjunct clause DP is coreferential with any matrix DP, and adjunct C is spelled out as the default different subject marker =kun

\[
\begin{align*}
&\text{[joni}=\text{xo}, \text{vua}=[\text{kun}]=\text{mun} \quad \text{xano}_j, \text{chirin}=\text{xo}=\text{nu} \\
&\text{man sing}=\text{DS.AFTER}=\text{C}_\text{MATRIX} \text{ woman dance}=\text{3.PST}=\text{DECL} \\
&\text{‘After the man, sang, the woman, danced.’}
\end{align*}
\]

- The full paradigm of ‘after’ morphemes is given in (15)

\[
\begin{array}{|c|c|c|}
\hline
\text{Matrix} & \text{S} & \text{A} & \text{O} \\
\hline
\text{S} & =\text{hax} & =\text{xon} & =\text{xo} \\
\hline
\text{A} & =\text{ha} & =\text{kun} \text{ (DF)} \\
\hline
\end{array}
\]

- From a typological perspective, this phenomenon has been termed ‘switch-reference’ (Jacobsen, 1967)

- It has been noted that switch-reference shares many similarities with complementizer agreement and can potentially be analyzed as involving an agreeing complementizer (Watanabe, 2000; Arregi and Hanink, 2018)

- The Amahuaca pattern looks like complementizer agreement that is sensitive to referential index and abstract case

  - Interestingly, the agreeing complementizer is sensitive to features of DPs in its own clause and the clause to which C\text{\textsuperscript{max}} is adjoined

3 The analysis: Maximal projections as probes

- Cyclic Agree coupled with BPS (Rezac, 2003) predicts that an unsatisfied probe should be able to probe the c-command domain of its maximal projection

  - I argue that the pattern of agreeing adjunct C in Amahuaca is derived via this type of cyclic expansion of the probe’s domain

- The ingredients:
  
  1. Bare Phrase Structure (Chomsky, 1995)
      - There is no formal distinction between intermediate and maximal projections
  
  2. Cyclic expansion (Rezac, 2003, 2004; Béjar and Rezac, 2009)
      - When a label reprojects, an unsatisfied probe associated with it may reproject
      - Probe reprojecting serves to expand the c-command domain of the probe and thus the agreement possibilities
  
  3. Probe insatiability (Deal, 2015)
      - A probe’s interaction conditions can differ from its satisfaction conditions
      - If a probe lacks satisfaction conditions, it will continue probing all possible goals in its c-command domain until reaching a phase boundary

- Adjunct C in Amahuaca is an insatiable probe

- First, C\text{\textsuperscript{min}} probes its c-command domain, which contains the subject and object of the adjunct clause
Note that evidence from remnant VP-fronting suggests that objects undergo shift to Spec, $vP$ (Clem, 2018b).

(16) Agreement inside the adjunct clause

- Given that C’s probe is insatiable, it remains unsatisfied after probing the c-command domain of $C_{\text{min}}$
- When C reprojects to form a maximal projection, the probe is reprojected as well and can probe again
- The c-command domain of this new segment of C, $C_{\text{max}}$, contains the matrix subject and object, keeping with the evidence from Condition C

(17) Agreement into the matrix clause

- The probe on C agrees in:
  - Referential indices (modeled as $\phi$-features; Rezac 2004)
  - Abstract case features
- If two DPs that C agrees with share a referential index, one of the coreference markers will be inserted
  - The form of the marker will be determined by the case of the coreferential DPs
- If no DPs share a referential index, the default different subject marker will be inserted
- Sample vocabulary items are given in (18)²

(18) ‘After’ vocabulary items

| [\text{AFTER}, [i, \text{NOM}^*] [i, \text{NOM}]] | ↔ /hax/ |
| [\text{AFTER}, [i, \text{NOM}^*] [i, \text{ERG}]] | ↔ /xon/ |
| [\text{AFTER}] | ↔ /kun/ |

4 Alternative analyses

- The account outlined here builds on the insight of Watanabe (2000) that switch-reference (SR) shares many similarities with complementizer agreement (CA)
- One advantage of the current account is its simplicity – there are independent arguments for all of the necessary technology
  - Cycliclicity in Agree (Rezac, 2003; Béjar and Rezac, 2009)
  - Probe insatiability (Deal, 2015)
  - Treating indices as $\phi$-features (Rezac, 2004)
- Additionally, previous accounts of SR and/or CA face empirical challenges given the Amahuaca data

²What I label here NOM* is a feature that is common to all embedded subjects, nominative or ergative. Given independent evidence from case assignment in Amahuaca (Clem, 2018b), a good candidate for this feature is a [$T$] feature that indicates agreement with T.
4.1 Non-reference-tracking accounts of SR

- Some recent analyses of SR assume that reference tracking is not directly involved
  - Georgi (2012) argues that same subject marking is a special case of control
  - Keine (2012, 2013) argues that SR reflects coordination height, with same subject clauses being VP coordination
- Both of these accounts predict that a clause bearing a same subject marker should be unable to host an overt subject DP (Clem, 2018a)
- In Amahuaca, ‘after’ clauses can host all arguments of the verb overtly, including case-marked subjects

(19) [moha xano=x, nokoo=(xon)=mun jato=n, hatza already woman= NOM arrive= SA. AFTER= C MATRIX 3PL= ERG yuca xoka=kan=xo=nu peel= 3PL= 3. PST= DECL
  ‘After the women, arrived, they peeled yuca.’

4.2 Accounts of SR parasitic on agreeing T

- Some direct reference-tracking accounts of SR assume that SR is parasitic on agreement on T (Finer, 1984, 1985; Watanabe, 2000; Camacho, 2010)
  - These accounts posit subject agreement on T which is interpreted as SR through some mechanism at the CP level
  - These accounts (sometimes explicitly) rule out object tracking since the probe on T is assumed to only agree with the subject
- These accounts cannot straightforwardly capture the Amahuaca pattern in which C can show agreement with both the matrix and adjunct object

(20) [jaa=x, vua=(xo)=mun hinan xano, 3SG= NOM sing= SO. AFTER= C MATRIX dog, ERG woman chivan-vo=xo=nu chase-AM= 3. PST= DECL
  ‘After she sang, the dog chased the woman.’

4.3 Bound anaphor accounts of CA

- Patterns of upward-oriented CA have been argued to involve local agreement between C and a bound anaphor in its specifier (Diercks, 2013)
- We could imagine that SR as a type of downward-and-upward-oriented CA may involve agreement with a DP argument in the adjunct clause and a bound anaphor in the specifier of the adjunct CP
- However, this type of account is inconsistent with the Amahuaca data
  - There is no distributional evidence that suggests adjunct CPs begin low enough in the structure to allow binding of an anaphor
  - Even if adjunct CPs began low and obligatorily moved higher, they do not reconstruct for Condition C

(21) [joni=n hino, hiin=[ha]=mun pro, koshi man= ERG dog see= OS. AFTER= C MATRIX quickly ka= hi= ki= nu go= IPFV= 3. PRES= DECL
  ‘After the man saw the dog, it is running.’
The cyclic nature of Agree

(22) [Floria=n; Maria, hiin= xo]=mun Maria=n, Floria,
Floria=ERG, Maria see=SO, AFTER=CMATRIX Maria=ERG Floria
chivan-vo=xo=nu chase-AM=3.PST=DECL.
‘After Floria, saw Maria, Maria chased Floria.’

• If there is no reconstruction for Condition C, it is unclear how there could simultaneously be reconstruction for anaphor binding

5 Predictions and typology

> SR can be accounted for with existing Agree technology
• One question we might ask is why the majority of languages with SR only allow tracking of subjects
• The current account suggests several possibilities for how such systems could arise
  1. No object shift
     - In Amahuaca, object shift allows the object to escape the vP phase and be accessible to C’s probe
     - If a language lacks object shift, C will be unable to agree with object DPs, resulting in a subject-only tracking pattern
  2. Case discriminating probe
     - In an accusative language, the probe on C could be case discriminating (Preminger, 2011), agreeing only with nominative DPs
     - This would allow for subject-only tracking even in a language with object shift
  3. Syncretism
     - It is possible that a language could have a probe on C that agrees with objects but lack dedicated morphology to spell out an object coreference relationship
     - Evidence that morphological syncretism may be a relevant factor comes from comparing the paradigms of different temporal adjunct Cs in Amahuaca

> Even within a single language, different paradigms have differing degrees of syncretism with respect to the morphology available to indicate object coreference

(23) a. ‘After’ series

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b. ‘While’ series

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c. ‘Before’ series

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> Probe reprojection is fully generalizable even to maximal projections
• A question we might ask is why we don’t see more instances of maximal projections serving as probes

  - With many common probes (v, T, complement C), the c-command domain of the maximal projection only contains the head that selects it, which usually will not have the correct type of features
  - With adjunct C, this pattern may actually be quite well attested given that SR systems are relatively common
References


