The cyclicity of φ-Agree: Evidence from scrambling[*]

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1.   Introduction

In their influential study of agreement displacement and hierarchy effects, Rezac (2003) and Béjar & Rezac (2009) propose that the search space of a probe is not static, but that it expands along the projection line of a head as syntactic structure is assembled, a process that they dub *cyclic Agree.* One example is ergative displacement in Basque. Here, the verb agrees with the object of a transitive verb if this object is 1st or 2nd person, but if the object is 3rd person and the subject is 1st or 2nd person, the verb agrees with the subject instead. This is illustrated in (1), from Béjar & Rezac (2009, 37). In (1a), the verb agrees with its 1st person object; in (1b), the object is 3rd person and the subject is 1st person, and in this case the verb shows the same 1st person agreement morphology (*n-*) as in (1a).

(1)   a.   ikusi **n**-ind-u-en   b.   ikusi **n**-u-en   [Basque]
              seen **1**-x-have-PAST   seen **1**-have-PAST
              'He saw <u>me</u>.'   3>1 → *agr:* 1   '<u>I</u> saw him.'   1>3 → *agr:* 1

In a nutshell, Rezac (2003) and Béjar & Rezac (2009) propose that a φ-probe on head H first searches for a goal in H's complement, as in (2). If this search is unsuccessful because H's complement does not comprise a valid goal, then the φ-probe can agree with H's specifier (3). Rezac (2003) and Béjar & Rezac (2009) deduce this preference for Agree into the complement from the assumption that Agree and Merge are interspersed, combined with the Earliness Condition, according to which Agree has to be established as early in the derivation as possible (Pesetsky & Torrego 2001, Collins 2003).

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(2) $[_{\text{HP}} \text{H}_{[\phi:\underline{\quad}]} [_{\text{XP}} \ldots]]$

first-cycle
Agree

(3) $[_{\text{HP}} \text{DP} [_{\text{H}'} \text{H}_{[\phi:\underline{\quad}]} [_{\text{XP}} \ldots]]]$

second-cycle
Agree

Applied to the Basque facts, Rezac (2003) and Béjar & Rezac (2009) suggest that the relevant ϕ-probe is located on v, and that 3rd person is underspecified for person. The ϕ-probe first searches through VP for a 1st or 2nd person DP. If such a DP exists, as in (1a), Agree is established with the object. If the object is 3rd person, first-cycle Agree is unsuccessful, and the ϕ-probe subsequently agrees with the subject in Spec,vP once it is merged, yielding subject agreement as in (1b).

Rezac's (2003) and Béjar & Rezac's (2009) principal motivation for cyclic Agree comes from person-based interactions between coarguments. In this paper, we present evidence for cyclic Agree in a novel domain, thereby extending the empirical basis for cyclic Agree. We investigate interactions between ϕ-agreement and scrambling in Hindi-Urdu (henceforth Hindi). We will show that scrambling above a subject in a higher clause can feed ϕ-agreement in a specific set of circumstances, but only if the subject is not itself a possible agreement controller. We furthermore observe that only A-scrambling interacts with ϕ-agreement in this way; A̅-scrambling does not. We then argue that an account in terms of cyclic Agree provides a principled explanation for this otherwise puzzling set of facts. It explains (i) why subject agreement, when it is possible, preempts object agreement despite the fact that the subject is structurally lower, (ii) why scrambling does not normally interact with agreement in Hindi, and (iii) why only A-scrambling has an effect on agreement. In addition to broadening the empirical motivation for cyclic Agree to include interactions between arguments of different clauses, and our account suggests that cyclic-Agree effects can also be brought about by movement.

We proceed as follows: Section 2 lays out the background on Hindi ϕ-agreement and the crucial scrambling–agreement interactions. Section 3 develops the account, and section 4 extends the account to infinitival agreement. Section 5 concludes.

2. Agreement and scrambling in Hindi

2.1 Background on agreement

Verb agreement in Hindi targets the structurally highest DP that does not bear an overt case marker. Both the subject and direct object can appear without a case marker and are hence in principle able to control agreement. Hindi is a split-ergative language, and whether the subject bears an overt ergative case marker or not is determined by the aspect of the clause. Object case marking is an instance of differential object marking, and is determined by the specificity and animacy of the object. The two systems are independent, so that the case marking of the subject and the object can be manipulated independently of each other.

To illustrate, consider the paradigm in (4). In (4a), both the subject *laṛke* 'boys' and the object *kitaab* 'book' are not overtly case-marked. In this case, verb agreement is obligatorily controlled by the subject. In (4b), the subject bears ergative case, and the object is not overtly case-marked. Here, verb agreement is controlled by the object. Finally, in (4c), both the

subject and the object are overtly case-marked. As a result, the verb cannot agree with either, and it instead appears in the 3rd person masculine singular default agreement form.

(4) a. **laṛke** kitaab paṛh-t-**e**/*-ii/*-aa   hãĩ
          boys.M book.F read-HAB-M.PL/*-F.SG/*-DFLT AUX.3PL
          'Boys read a book.'   (*subject agreement*)

     b. laṛkõ-<u>ne</u> **kitaab** paṛh-**ii**/*-e/*-aa   hai
          boys.M-ERG book.F read.PFV-F.SG/*-M.PL/*-DFLT AUX.3SG
          'Boys have read a book.'   (*object agreement*)

     c. laṛkõ-<u>ne</u> kitaab-ko   paṛh-**aa**/*-e/*-ii   hai
          boys.M-ERG book.F.SG-ACC see.PFV-DFLT/*-M.PL/*-F.SG AUX.3SG
          'Boys have read the book.'   (*default agreement*)

The verbal agreement morphology is identical for subject and object agreement, suggesting that it is the realization of a single φ-probe that variably targets the subject or object.

There is no evidence that agreement is dependent on movement in Hindi. In other words, there is no indication from scope or binding that objects that control agreement occupy a different phrase-structural position than those that do not (Bhatt 2005, Keine 2016, to appear). Furthermore, idioms provide some positive evidence that φ-agreement is not parasitic on movement. As noted by Bhatt & Keine (to appear), certain idiomatic objects resist movement in Hindi. An example is the idiom *bhains ke aage biin bajaa* 'to teach something to someone who usually doesn't listen' (*lit.* 'to play the flute in front of buffalo'). Importantly, the object *biin* 'flute' resists movement on the idiomatic interpretation (see (5a)), but it nonetheless controls φ-agreement in the same way as other objects, even on the idiomatic reading (5b).

(5) a. #**biin₁** Ram-ne [bhains ke aage *t₁* bajaay-ii   ]
          flute Ram-ERG buffalo in front of play.PFV-F.SG
          #'Ram taught something to someone who usually doesn't listen.'
          lit: 'Ram played a flute in front of a buffalo.'

     b. Ram-ne [bhains ke aage **biin** bajaay-**ii**   ]
          Ram-ERG buffalo in front of flute.F play.PFV-F.SG
          'Ram taught something to someone who usually doesn't listen.'

This asymmetry strongly suggests that verb agreement is not parasitic on movement of the agreement controller.

Hindi allows fairly liberal scrambling, but with one important exception to be discussed below, verb agreement is not affected by scrambling. As illustrated in (6), agreement with the subject is obligatory even in a variant of (4a) in which the object has been scrambled over the subject.

(6) kitaab₁ **laṛke** *t*₁ paṛh-t-**e**/*-ii/*-aa   hãĩ
     book.F boys.M   read-HAB-M.PL/*-F.SG/*-DFLT AUX.3PL
     'Boys read a book.'   (*object scrambling does not affect subject agreement*)

In addition to agreement between a verb and its argument, Hindi also exhibits long-distance agreement (LDA) between an embedding verb and the object of an embedded nonfinite clause (see Mahajan 1989, Davison 1991, Butt 1995, Bhatt 2005, Chandra 2007, Keine 2016, to appear). An example is provided in (7a), in which the the matrix verb *chaah-ii* 'want' agrees with the embedded object *kitaab* 'book'. LDA is usually optional in Hindi and alternates with default agreement as in (7b). Note that the infinitival verb also displays agreement when the matrix verb carries LDA. For most embedding verbs, infinitival agreement is required when LDA obtains. Conversely, infinitival agreement is possible only if the matrix verb shows LDA. In other words, the two options in (7) are the only agreement possibilities. All other combinations of matrix and infinitival agreement are ruled out.

(7) a. saare shikṣakõ-<u>ne</u>   [**kitaab** khariid-**nii**] caah-**ii**
         all   teachers.M-ERG   book.F buy-INF.F.SG want.PFV-F.SG
         'All the teachers wanted to buy a book.'   (*LDA*)

     b. saare shikṣakõ-<u>ne</u>   [**kitaab** khariid-**naa**] caah-**aa**
         all   teachers.M-ERG   book.F buy-INF.DFLT want.PFV-DFLT
         'All the teachers wanted to buy a book.'   (*default agreement*)

Like local object agreement, LDA is possible only if the matrix subject is overtly case-marked and hence not itself an eligible agreement controller. Otherwise, the matrix verb has to agree with this subject and the embedded verb has to appear in its default agreement form (8a). LDA is ruled out in this case, regardless of whether the infinitival verb agrees (8b).

(8) a. **saare shikṣak**   [kitaab khariid-**naa/*-nii**]   caah-t-**e**   hãĩ
         all   teachers.M   book.F buy-INF.DFLT/*-INF.F.SG want-HAB-M.PL AUX.3PL
         'All the teachers want to buy a book.'   (*subject agreement*)

     b. *saare shikṣak   [**kitaab** khariid-**naa**/-**nii**]   caah-t-**ii**   hai
         all   teachers.M   book.F buy-INF.DFLT/-INF.F.SG want-HAB-F.SG AUX.3SG
         'All the teachers want to buy a book.'   (*subject agreement preempts LDA*)

The impossibility of agreement between the embedded verb *khariid* 'buy' and *kitaab* 'book' in (8a) demonstrates that infinitival verbs cannot agree with their objects unless the matrix verb exhibits LDA with this object. Infinitival agreement as in (7a) is thus parasitic on LDA. We will return to the question of how to model this dependence of infinitival agreement on LDA in section 4. For now, we conclude that infinitival agreement is a by-product of agreement with the matrix verb, and we will focus on agreement with the matrix verb instead.

We will assume here without discussion that the surface of optionality of LDA in (7) is epiphenomenal, and that it arises from a structural ambiguity in the size of the embedded

clause, adopting proposals by Boeckx (2004), Bhatt (2005), and Keine (2016, to appear). On this analysis, one type of nonfinite clause is opaque to φ-agreement, leading to default agreement (7b); the other is transparent to φ-agreement, yielding obligatory LDA (7a).

Just as in the case of local agreement, there is no evidence that LDA in Hindi requires movement of the controller. For example, objects that resist movement (such as *biin* 'flute' in the idiom in (5)) are able to control LDA:

(9)   Ram-ne [bhains ke aage   **biin**   bajaanii] caah-**ii**
          Ram-ERG buffalo in front of flute.F play.INF   want.PFV-F.SG
          'Ram wanted to teach something to someone who usually doesn't listen.'

Finally, LDA is not normally affected by scrambling. (10) is a variant of (8) above where the embedded object has been scrambled above the matrix subject, which is not overtly case-marked. As shown, the verb still agrees with the subject, and agreement with the object leads to ungrammaticality.

(10)   kitaab$_1$ **saare shikṣak**   [t_1 khariid-**naa**] caah-t-**e**/*-ii   hãĩ
        book.F   all   teachers.M   buy-INF.DFLT want-HAB-M.PL/*-F.SG AUX.3PL
        'All the teachers want to buy a book.'

In sum, the instances of agreement so far display a *top-down* agreement pattern, in the sense that the verb agrees with the structurally highest unmarked argument, and scrambled positions furthermore appear to be invisible for determining agreement. The evidence in the next section will complicate this picture.

2.2   Scrambling–agreement interactions

In this section, we make the novel observation that in certain configurations scrambling is able to feed agreement. As a starting point, we observe that extraposition of the nonfinite clauses bleeds LDA into it, as shown in (11). Here, LDA between *caah* 'want' and the embedded object *kitaab* 'book' is severely degraded. Because the matrix subject is overtly case-marked, this effect is not due to interference by the subject. Given that infinitival agreement is dependent on LDA (as noted above), it is likewise impossible in (11). Thus, both verbs must bear default agreement, and in this respect (11) stands in clear contrast to (7).

(11)   saare shikṣakõ-ne t_1 caah-**aa**/?*-**ii**   [**kitaab** khariid-**naa**/?*-**nii**]$_1$
        all   teachers-ERG want.PFV-DFLT/?*-F.SG book.F buy-INF.DFLT/?*-INF.F.SG
        'All the teachers wanted to buy a book.'   (*no LDA into extraposed clause*)

We will consider this effect of extraposition on verb agreement an instance of freezing (Wexler & Culicover 1980). In the interest of space, we will note it is an empirical fact here, but not investigate it more closely. See Keine & Dash (2018) for a more detailed discussion.

Importantly, while extraposed clauses are opaque to LDA into them, they still allow scrambling out of them. In (12), the embedded object *kitaab* 'book' is scrambled out of the extraposed clause into the matrix clause. Crucially, in this case LDA becomes possible (12a) again. Default agreement is still an option (12b).

(12) a. **kitaab₂** saare shikṣakõ-ne *t₁* caah-**ii**   [*t₂* khariid-**nii**]₁
        book.F all teachers-ERG want.PFV-F.SG   buy-F.SG
        'All the teachers wanted to buy a book.'   (*LDA with scrambled object*)

      b. kitaab₂ saare shikṣakõ-ne *t₁* caah-**aa**   [*t₂* khariid-**naa**]₁
        book.F all teachers-ERG want.PFV-DFLT   buy.DFLT   (*LDA*)

Because agreement into an extraposed clause is impossible (see (11)), LDA in (12b) cannot be established with the base position of *kitaab* 'book' inside the extraposed clause, but it must instead target the landing site of the object in the matrix clause. (12) thus constitutes a configuration in which scrambling is able to feed φ-agreement in Hindi. If follows, then, that the two are not always independent of each other, and that φ-agreement is not altogether 'blind' to scrambling. But this raises two immediate questions: First, why does scrambling not otherwise interact with agreement (see (6) and (10))? Second, why is agreement in (12) optional when other instances of clausemate agreement never are (cf. (4))?

Let us investigate the second question first. A rich body of literature argues that scrambling in Hindi is not a uniform phenomenon, and that Hindi employs (at least) two kinds of scrambling, which we will refer to as 'A-scrambling' and 'A̅-scrambling' here (Déprez 1989, Mahajan 1990, 1994, Gurtu 1992, Bhatt 2016, Keine to appear).[1] Following the analysis in Mahajan (1990), A-scrambling cannot leave a finite clause and is not subject to weak crossover (WCO), whereas A̅-scrambling can cross finite clause boundaries and is subject to WCO. Simple word order permutations such as (12) underdetermine the type of scrambling involved because they are compatible with either. We now show that once the scrambling type is controlled for, the surface optionality of LDA in (12) disappears.

We begin by considering A-scrambling. Because A̅-scrambling is subject to WCO, crossover can be used to isolate A-scrambling. In (13), a quantificational object is scrambled out of an extraposed clause over the matrix subject, binding a pronoun inside that subject. In this case, LDA becomes obligatory, and default agreement is no longer a possibility. Note that, in keeping with the characterization above, the infinitival verb agrees as well.

(13) **har**   **kitaab₂** [uske₂   lekhakõ-ne]   *t₁*   caah-**ii**/*-**aa**   [*t₂*
      every book.F   its   authors-ERG   want.PFV-F.SG/*-DFLT
      khariid-**nii**/*-**naa**]₁
      buy-INF.F.SG/*-INF.DFLT
      'For every book *x*, *x*'s authors wanted to buy *x*.'   (*A-scrambling*)

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[1]We intend these to be convenient labels. In some respects, the two scrambling types do not align cleanly with the distinction between A- and A̅-movement in English (Dayal 1994, Kidwai 2000), but they do for the purpose of variable binding (Mahajan 1990) and, as we will show, agreement. We will therefore use these labels for ease of reference, without making a commitment as to their relationship to English A- and A̅-movement.

Because A̅-scrambling would give rise to a WCO violation, (13) must involve A-scrambling of *har kitaab* 'every book'. What this demonstrates, then, is that A-scrambling obligatorily feeds φ-agreement (note, however, that the subject is ergative case-marked in (13), a point to which we will return shortly).

Let us now consider A̅-scrambling. One domain that allows us to unambiguously identify A̅-scrambling are finite clauses, because, as noted above, finite clauses only allow A̅-scrambling out of them (Déprez 1989, Mahajan 1990, Gurtu 1992). This is demonstrated in (14). Here, the embedded object *har kitaab* 'every book' is scrambled above the matrix subject, but it is unable to bind the subject-internal pronoun *uske* from there. This follows if scrambling out of finite clauses is possible, but must be A̅-scrambling, hence subject to WCO. Against this background, the crucial observation about (14) is that it is not possible for the matrix verb *soc* 'think' to agree with the A̅-scrambled object. Instead, default agreement is the only licit agreement form of the matrix verb (note that the embedded verb does agree with its object, as expected). Because the matrix subject bears ergative case, this restriction is not due to an interaction with the subject.

(14) **har kitaab₁** [uske*₁/₂ lekhakõ-ne] soc-**aa/*-ii**   [CP ki Mona-ne
       every book.F   its   authors-ERG think.PFV-DFLT/*-F.SG   that Mona-ERG

       t_1 paṛh-ii   thii   ]
          read.PFV-F.SG AUX.3SG.F

       'Its*₁/₂ authors think that Mona read every book₁.'   (*A̅-scrambling*)

(14) shows that A̅-scrambling cannot feed agreement in Hindi, unlike A-scrambling.[2] The contrast between (13) and (14) also suggests that the agreement with the A-scrambled object in (13) is established with the A-landing site of the object and not with, e.g., an intermediate position, as such an intermediate position would also be created by A̅-scrambling as in (13), and this would consequently predict agreement to be possible in (13) as well. See Keine & Dash (2018) for more detailed discussion.

We hence conclude that A- and A̅-scrambling in Hindi differ in their ability to feed φ-agreement: while A-scrambling is able to feed agreement, A̅-scrambling is not. As a consequence, the surface optionality of agreement in (12) is hence plausibly epiphenomenal, resulting from the fact that the scrambling step could be either A- or A̅-scrambling.

The final piece of empirical evidence concerns the role of subject agreement in the configurations of interest. In all the examples considered so far, the subject is overtly case-marked and hence irrelevant for verbal φ-agreement. If this case marker is removed, the matrix verb invariably agrees with the subject (15a). Agreement with an A-scrambled object is no longer a possibility (15b), and neither is default agreement (15c). In these respects, (15) clearly contrasts with (13), where the matrix subject bears ergative case.

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[2]A second configuration that leads to the same conclusion are case-marked infinitival clauses. Like finite clauses, they only allow A̅-movement out of them, and such movement cannot feed matrix φ-agreement. See Keine & Dash (2018) for illustration and discussion.

(15) a. *har* *kitaab*$_2$ **uske$_2$** **lekhak** t_1 caah-t-**e** hãĩ [t_2
   every book.F its authors.M want-HAB-M.PL AUX.3PL

   khariid-**naa**]$_1$
   buy-INF.DFLT

   'For every book *x*, *x*'s authors want to buy the *x*.' (*subject agreement*)

 b. *har *kitaab*$_2$ uske$_2$ lekhak t_1 caah-t-**ii** hai [t_2 khariid-**nii**]$_1$
   every book.F its authors.M want-HAB-F.SG AUX.3SG buy-INF.F.SG

       (*agreement with A-scrambled object impossible*)

 c. *har *kitaab*$_2$ uske$_2$ lekhak t_1 caah-t-**aa** hai [t_2
   every book.F its authors.M want-HAB-DFLT AUX.3SG

   khariid-**naa**]$_1$
   buy-INF.DFLT   (*default agreement impossible*)

(15) demonstrates that when both the subject and the A-scrambled object are in principle viable agreement controllers, subject agreement takes precedence. This is in line with the overarching preference for agreement with the subject, but in terms of the phrase-structural positions involved, it poses an interesting puzzle. In the instances of the subject preference above ((4), (8)), the subject is structurally *higher* than the object. In (15), by contrast, the subject is structurally *lower* than the A-landing site of the object (given that the object binds the subject-internal pronoun). Put differently, in (15), agreement with the structurally *higher* DP (the A-scrambled object) is impossible because it is bled by agreement with a structurally *lower* DP (the matrix subject). This contrasts with the top-down agreement pattern in section 2.1, where agreement with a structurally *lower* DP is possible if agreement with a structurally *higher* DP is impossible. In terms of the phrase-structural positions involved, then, these configurations instantiate a descriptive *agreement reversal*.

  This agreement reversal poses an interesting challenge to standard conceptions of Agree. For instance, if a head can only agree with elements that it c-commands (Chomsky 2000), the top-down agreement pattern may be captured by locating the φ-probe above the subject. But this fails to extend to (15): If the φ-probe is placed above the A-scrambled object, the object should incorrectly intervene for, and hence preempt, subject agreement. Alternatively, if the probe is placed between the object and the subject in (15), object scrambling should never feed agreement, contrary to (13). A more nuanced account is therefore required.

3. Account

We propose that this state of affairs receives a principled explanation if Agree is cyclic in the sense of section 1 and if it can be fed by movement. We will assume that the verbal φ-probe in Hindi is located on T^0, hence above the base positions of the internal and external arguments. Suppose furthermore that scrambling targets a *v*P-external position (at least scrambling that lands above the subject, hence the type that is of interest to us here). Taken together, these assumptions entail that scrambling targets a position above the T^0 head hosting the φ-probe.

Moreover, Keine (2017, to appear) argues that A- and $\overline{\text{A}}$-scrambling in Hindi differ in their landing site, and that $\overline{\text{A}}$-scrambling targets a structurally higher position than A-scrambling. Specifically, he provides evidence that $\overline{\text{A}}$-scrambling in Hindi lands in Spec,CP, and that A-scrambling targets a TP-internal position. We adopt these conclusions here and will hence assume that A-scrambling to a pre-subject position lands in (an outer) Spec,TP.

As we will now show, these assumptions combined with cyclic Agree enable a straightforward account of the range of facts above. Recall from the discussion in section 1 that in Rezac's (2003) and Béjar & Rezac's (2009) model, a probe P on head H first searches through H's complement (*first-cycle Agree*). If this search is unsuccessful, P agrees with H's specifier if possible (*second-cycle Agree*), an ordering that is itself deducible from the cyclicity of Merge and the Earliness Condition.

Against this backdrop, we propose that the top-down agreement pattern in section 2.1 realizes first-cycle Agree (i.e., standard downward Agree), as schematized in (16): The φ-probe on T^0 searches its c-command domain and agrees with the structurally closest accessible (i.e., not overtly case-marked) DP: If subject agreement (①) is possible, it preempts object agreement (②); otherwise, object agreement is possible. If both the subject and the object are case-marked and hence inaccessible, the φ-probe remains unvalued, yielding default agreement (Preminger 2014).

(16)   *First-cycle Agree*
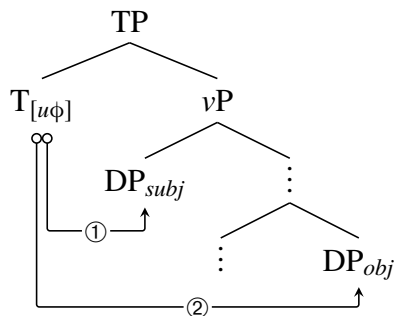
Let us now turn to the interactions between A-scrambling and φ-agreement discussed in section 2.2. We saw there that agreement with an A-scrambled object is possible, but only if the subject, which is structurally lower, cannot control agreement. This pattern is the result of second-cycle Agree. In these configurations, the embedded clause is extraposed and hence opaque to agreement into it (see (11)). As soon as T is merged (hence before scrambling of the object out of the extraposed clause takes place), the φ-probe launches a first cycle of Agree, shown in (17). If the matrix subject is not overtly case-marked and hence accessible to the probe, the probe agrees with it, and subject agreement obtains (①). By contrast, if the subject is not a licit Agree goal for the φ-probe, then first-cycle Agree fails. Subsequent A-scrambling of the embedded object to Spec,TP (②) then enables second-cycle Agree between the φ-probe and the scrambled object (③) if the φ-probe is still unvalued at this point of the derivation (i.e., if first-cycle Agree was unsuccessful).

(17)   *Second-cycle Agree in complex clauses*
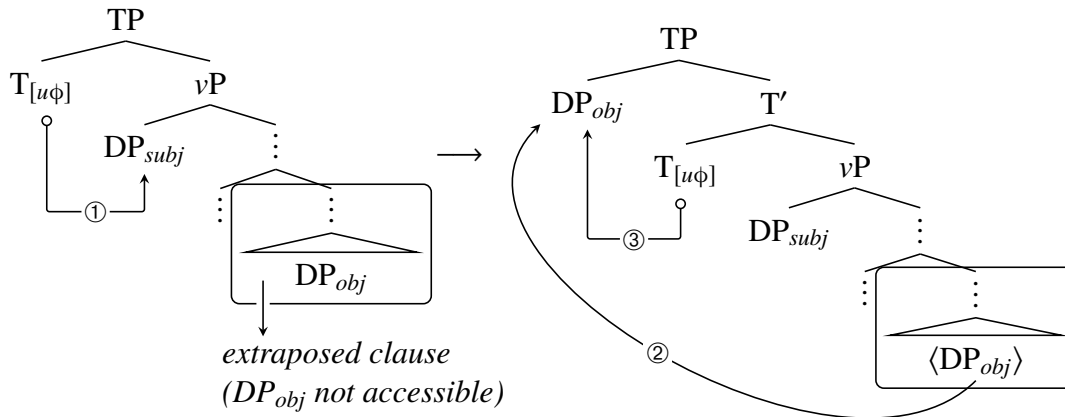
Because second-cycle Agree is only possible if first-cycle Agree has failed, A-scrambling feeds agreement only if *v*P does not contain a viable goal for Agree, i.e., if the subject is inaccessible to Agree. Thus, second-cycle Agree with the object (③) is possible only if first-cycle Agree with the subject (①) is not. This has the consequence that subject agreement, if possible, preempts agreement with a scrambled object, precisely what we saw in (15).

    If A-scrambling is able to feed second-cycle Agree along the lines just sketched, this raises the question as to why scrambling does not normally interact with verb agreement (see (6) and (10)). The cyclic-Agree account offers a straightforward answer: In simple clauses (or complex clauses in which the embedded clause is not extraposed and hence transparent to ϕ-agreement), Agree with an accessible DP is always successful in the first cycle, and no second-cycle Agree hence takes place, see (18). When T^0 is merged, the ϕ-probe searches through its c-command domain, and if either the subject or the object are accessible, Agree will be established (① or ②). Because this Agree takes place before A-scrambling of the object (③), scrambling has no impact on agreement due to derivational cyclicity. Conversely, if first-cycle Agree is unsuccessful because neither the subject nor the object are licit goals for the ϕ-probe, then the object will also not constitute a licit goal after A-scrambling. It follows, then, that A-scrambling does not normally have any impact on verb agreement in Hindi. This is a desirable consequence, as it reconciles the scrambling–interaction in (12a) and (13) with the general absence of such an interaction in other structures.

(18)   [$_{TP}$ ↓ T$_{[u\phi]}$ ... DP$_{subj}$ ... DP$_{obj}$ ...]

We have so far focused on A-scrambling and its interactions with ϕ-agreement. As we saw on the basis of (14) above, there exists an interesting contrast between A- and $\overline{A}$-scrambling in this domain—unlike A-scrambling, $\overline{A}$-scrambling is never able to feed second cycle-Agree, even if first-cycle Agree is unsuccessful. We propose that this asymmetry is a consequence of the independently motivated landing site difference between the two scrambling types. As mentioned above, Keine (2017, to appear) argues that unlike A-scrambling, $\overline{A}$-scrambling lands in Spec,CP in Hindi. If so, then the inability of $\overline{A}$-scrambling to feed second-cycle
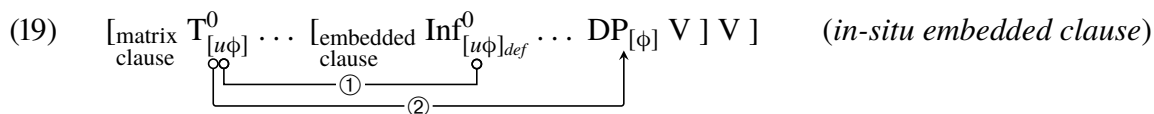
Agree might plausibly reflect a locality condition on second-cycle Agree. Concretely, if second-cycle Agree is limited to agreement with a local specifier and hence phrase-bounded, then it follows that Spec,CP is too far away from the φ-probe on T^0 to enter into second-cycle Agree with it. A-scrambling, on the other hand, is able to feed second-cycle Agree in virtue of landing in Spec,TP (see Keine & Dash 2018 for more detailed discussion and an analytical proposal). It is noteworthy that this ban on agreeing with the specifier of a higher projection already follows from the formalism in Rezac (2003) and Béjar & Rezac (2009), but was not crucial for the data they investigate. The Hindi evidence hence indicates that this restriction has an empirical payoff.

In sum, a cyclic-Agree account derives both the primacy of top-down agreement and the agreement reversal from the cyclicity of Merge and Agree if cyclic Agree interacts with Internal Merge in the same way it does with External Merge.

4.   Infinitival agreement

We have so far focused on the agreement carried by the matrix verb. But as noted in section 2 above, LDA is accompanied by agreement with the infinitival verb. The two furthermore entail each other: LDA requires agreement of the infinitival clause, and conversely infinitival agreement is possible only if the matrix verb agrees with the embedded object, i.e., in cases of LDA. Significantly, infinitival agreement is also required if the matrix verb agrees with the landing site of an A-scrambled object inside the matrix clause (see (12a) and (13)). In this section, we extend our account to accommodate infinitival agreement.

We draw here on an analysis of infinitival agreement by Bhatt (2005, 768–772), who suggests that the head of the infinitival clause (Inf^0) bears a defective φ-probe ($[u\phi]_{def}$), which is unvalued but unable to initiate search by itself. All else equal, then, this φ-probe is unable to acquire a value, and will hence surface in the masculine singular default agreement form. Focusing on LDA with an object in its base position, Bhatt (2005) proposes that infinitival agreement is established as schematized in (19): The matrix φ-probe on T^0 encounters the defective probe on Inf^0 and enters into a feature-sharing dependency with it (①). Because both are unvalued, matrix T^0 continues probing, finds the embedded object and agrees with it (②). Due to the dependency between matrix T^0 and inf^0 created earlier, Inf^0 is covalued with the φ-features of the object as well, yielding infinitival agreement.

(19) $[_{\text{matrix clause}} T^0_{[u\phi]} \cdots [_{\text{embedded clause}} Inf^0_{[u\phi]_{def}} \cdots DP_{[\phi]} V] V]$ (*in-situ embedded clause*)

Bhatt's (2005) account successfully captures the fact that LDA and infinitival agreement entail each other. LDA requires infinitival agreement because T^0's φ-probe invariably encounters Inf^0 before the embedded object. Conversely, infinitival agreement is possible only in the context of matrix agreement because $[u\phi]_{def}$ can acquire a value only if it has entered into a dependency with T^0's φ-probe.

As noted above, infinitival agreement is also required if the infinitival clause is extraposed and the matrix verb agrees with an object A-scrambled out of it (see (12a) and (13)). Extending

Bhatt's (2005) account to the evidence in section 2.2 hence requires that T^0's ϕ-probe enter into a dependency with Inf^0's $[u\phi]_{def}$ before agreeing with the A-scrambled object. Cyclic Agree provides an explanation of this pattern. Let us assume that Inf^0's defective ϕ-probe projects up to the InfP level (Béjar & Rezac 2009, Carstens 2016). Also suppose that the freezing constraint that prevents a ϕ-probe from searching into an extraposed clause does not block Agree with the embedded clause itself (i.e., with the InfP).[3] If so, then our cyclic-Agree analysis, combined with Bhatt's (2005) account of infinitival agreement in the absence of movement, captures the agreement facts in the presence of movement, as schematized in (20). In its first cycle of Agree, matrix T^0's $[u\phi]$ probes through its c-command domain, where it encounters InfP's $[u\phi]_{def}$ and establishes a feature-sharing dependency with it (①). Due to freezing, the interior of the extraposed clause is inaccessible to $[u\phi]$, as before, leaving $[u\phi]$ and $[u\phi]_{def}$ unvalued after first-cycle Agree. Next, the embedded object A-scrambles to Spec,TP of the matrix clause (②). This movement feeds second-cycle Agree with T^0's $[u\phi]$ (③). Because of the dependency established between T^0 and InfP as the result of first-cycle Agree, InfP's $[u\phi]_{def}$ is co-valued, and with it Inf^0's (assuming that projected occurrences of a probe are non-distinct from the occurrence on the head).

(20) *Cyclic Agree and infinitival agreement with extraposed clauses*
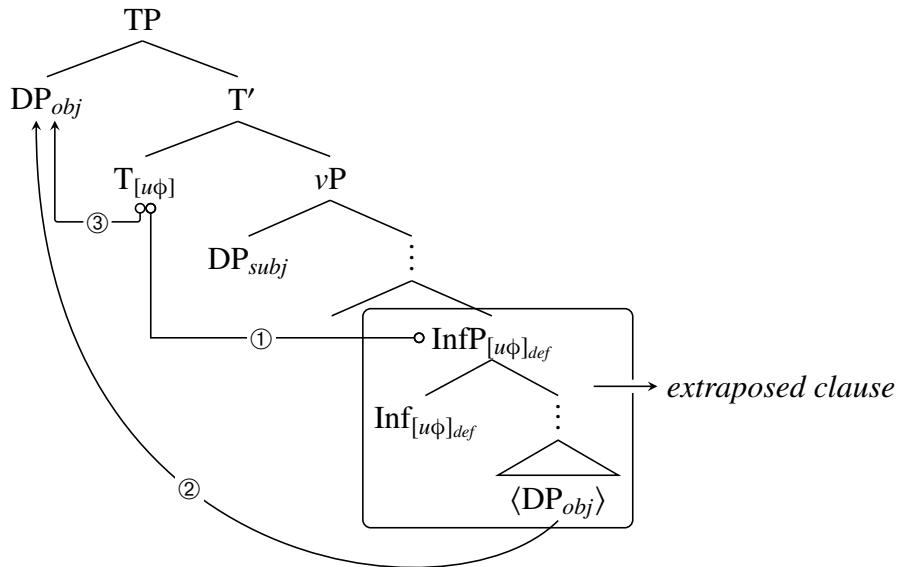
Because second-cycle Agree with an A-scrambled object is necessarily preceded by first-cycle Agree into T^0's complement, such agreement will invariably be accompanied by agreement of the infinitival verb, as desired. Moreover, if matrix T^0 agrees with the matrix subject instead (in cases where it is not overtly case-marked), it establishes this agreement and hence valuation before it encounters the embedded InfP. In such cases, the infinitival verb is hence predicted to not show agreement. This is indeed the case (see (15a)). This

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[3]This seems reasonable in light of similar patterns in the domain of movement. Typically, moved constituents are opaque for extraction out of them, but they can themselves be moved (e.g., successive-cyclic movement through phase edges or movement to Spec,TP followed by movement to Spec,CP in subject questions).

account therefore derives the observation that infinitival agreement and LDA stand in a one-to-one relationship even if LDA is established with a scrambled object in its landing site.

5.   Conclusion

This paper investigated novel instances of scrambling–agreement interactions in Hindi and argued that they provide support for Rezac's (2003) and Béjar & Rezac's (2009) theory of cyclic Agree in a new domain. In a nutshell, verb agreement in Hindi is standardly established in a top-down fashion: the verb agrees with the structurally highest accessible DP, and scrambling has no impact on the choice of agreement controller. We then observed that in a narrow class of configurations, this pattern flips and the verb preferentially agrees with a structurally lower DP. This apparent directionality reversal can be given a principled explanation in terms of cyclic Agree, whereby a ϕ-probe first searches through its c-command domain, and if this search is unsuccessful, the probe's search domain is extended to its specifier. This behavior is itself derived from the cyclicity of structure building and interactions between (Internal) Merge and Agree. We showed how this account captures the overwhelming top-down pattern as well as the agreement reversal. It furthermore provides an explanation for why scrambling does not generally affect agreement in Hindi.

If our account is on the right track, then it expands the empirical basis of cyclic Agree beyond hierarchy effects between coarguments to interactions between arguments of different clauses. It also indicates that cyclic-Agree effects can not only be brought about by the interactions of Agree with External Merge, but also through interactions with movement (i.e., Internal Merge). This is, of course, precisely what is expected if cyclic Agree is an general result of the way the syntactic structure unfolds over the course of the derivation.

References

Béjar, Susana, & Milan Rezac. 2009. Cyclic Agree. *Linguistic Inquiry* 40:35–73.

Bhatt, Rajesh. 2005. Long distance agreement in Hindi-Urdu. *Natural Language and Linguistic Theory* 23:757–807.

Bhatt, Rajesh. 2016. Minimalist approaches to South Asian syntax. In *The languages and linguistics of South Asia: A comprehensive guide*, ed. Hans Henrich Hock & Elena Bashir, 506–529. Berlin: de Gruyter.

Bhatt, Rajesh, & Stefan Keine. to appear. Long-distance agreement. In *The companion to syntax: Second edition*, ed. Martin Everaert & Henk van Riemsdjik. Hoboken, NJ: Wiley-Blackwell.

Boeckx, Cedric. 2004. Long-distance agreement in Hindi: Some theoretical implications. *Studia Linguistica* 58:23–36.

Butt, Miriam. 1995. *The structure of complex predicates in Urdu*. Stanford, California: CSLI Publications.

Carstens, Vicki. 2016. Delayed valuation: A reanalysis of goal features, "upward" complementizer agreement, and the mechanics of case. *Syntax* 19:1–42.

Chandra, Pritha. 2007. (Dis)Agree: Movement and agreement reconsidered. Doctoral dissertation, University of Maryland, College Park.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by step: Essays in syntax in honor of Howard Lasnik*, ed. Roger Martin, David Michaels, & Juan Uriagereka, 89–155. Cambridge, MA: MIT Press.

Collins, Chris. 2003. Eliminating labels. In *Derivation and explanation in the minimalist program*, ed. Samuel David Epstein & T. Daniel Seely, 42–64. Oxford: Blackwell.

Davison, Alice. 1991. Feature percolation and agreement in Hindi/Urdu. Ms., University of Iowa.

Dayal, Veneeta. 1994. Binding facts in Hindi and the scrambling phenomenon. In *Theoretical perspectives on word order in south asian languages*, ed. Miriam Butt, Tracy Holloway King, & Gillian Ramchand, 237–262. Stanford: CSLI.

Déprez, Viviane. 1989. On the typology of syntactic positions and the nature of chains: Move α to the specifier of functional projections. Doctoral dissertation, MIT, Cambridge, MA.

Gurtu, Madhu. 1992. *Anaphoric relations in Hindi and English*. New Delhi: Munshiram Manoharlal.

Keine, Stefan. 2016. Probes and their horizons. Doctoral dissertation, University of Massachusetts, Amherst, MA.

Keine, Stefan. 2017. Case vs. positions in the locality of A-movement. Ms., University of Southern California.

Keine, Stefan. to appear. Selective opacity. *Linguistic Inquiry*.

Keine, Stefan, & Bhamati Dash. 2018. The ups and downs of agreement. Ms., University of Southern California.

Kidwai, Ayesha. 2000. *XP-adjunction in universal grammar: Scrambling and binding in Hindi-Urdu*. Oxford: Oxford University Press.

Mahajan, Anoop. 1989. Agreement and agreement phrases. In *Functional heads and clause structure*, ed. Itziar Laka & Anoop Mahajan, volume 10 of *MIT Working Papers in Linguistics*, 217–252. Cambridge, MA: MIT.

Mahajan, Anoop. 1990. The A/A-bar distinction and movement theory. Doctoral dissertation, MIT, Cambridge, MA.

Mahajan, Anoop. 1994. Towards a unified theory of scrambling. In *Studies on scrambling: Movement and non-movement approaches to free word-order phenomena*, ed. Norbert Corver & Henk van Riemsdijk, 301–330. Berlin: de Gruyter.

Pesetsky, David, & Esther Torrego. 2001. T-to-C movement: Causes and consequences. In *Ken hale: A life in language*, ed. Michael Kenstowicz, 355–426. Cambridge, MA: MIT Press.

Preminger, Omer. 2014. *Agreement and its failures*. Cambridge, MA: MIT Press.

Rezac, Milan. 2003. The fine structure of cyclic Agree. *Syntax* 6:156–182.

Wexler, Ken, & Peter Culicover. 1980. *Formal principles of language acquisition*. Cambridge, MA: MIT Press.

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