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A Tier-Based Analysis of Parasitic Agreement in Hindi-Urdu

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SYNC 2024
Dec. 7, 2024

Overview

Hindi-Urdu (HU) is famous for its verbal agreement system, which involves:

- case-sensitivity – only unmarked (nominative) DPs can agree
- long-distance agreement – agreement with an argument of an embedded verb
- default agreement – when there is no viable goal, default morphology results
- parasitic agreement – the infinitival verb agrees iff the finite verb does

Puzzle Parasitic agreement is difficult to motivate under common Minimalist assumptions.

- If infinitival verbs bear unvalued ϕ-features which probe, then it should not matter whether or not some higher head also agrees with the same DP.

This work I provide a formal analysis of verbal agreement in HU using the system in Hanson (2024, to appear).

- Building on Bhatt's (2005) intuition that all verbs are valued together when the probe on finite T finds a goal, two separable processes are involved:
  1. Finite T agrees with the closest visible DP, if possible
  2. All verbs along the path from T to DP agree iff T does
- Each of these is a TIER-BASED STRICTLY 2-LOCAL (TSL-2) pattern, like many others in phonology and syntax (McMullin and Hansson 2016; Graf 2022c; Hanson to appear), and each on its own is unexceptional.
- If language is capable of producing such patterns independently, we expect them to sometimes show up together → explanation for the existence of parasitic agreement.

Roadmap

1. Basic data and descriptive generalizations
2. A brief primer on TSL patterns
3. A TSL model of agreement
4. Analyzing parasitic agreement
5. Comments on typology

1 Descriptive generalizations

Note: the data in this section comes from Bhatt (2005).

Generalization #1 The finite verb/auxiliary agrees with the highest nominative (unmarked) DP in its domain.

- This may be the matrix subject (1a), matrix object (1b), or embedded object (1c).
- Any infinitive/participle verbs agree with the same DP.
- Overtly case-marked arguments never agree. If there is no potential goal, default (MSG) agreement occurs on all verbs (1d).[1]

(1) Agreement targets the highest accessible argument

a. Subject agreement (unmarked subject/object)
*Rahul kitaab paṛh-**taa** **thaa***
Rahul.M book.F read-HAB.MSG be.PST.MSG
'Rahul used to read (a/the) book.'

b. Object agreement (ERG subject + unmarked object)
*Rahul-ne kitaab paṛh-**ii** **thii***
Rahul-ERG book.F read-PFV.F be.PST.FSG
'Rahul had read the book.'

c. LDA (ERG subject + unmarked embedded object)
*Vivek-ne [kitaab paṛh-**nii**] chaah-**ii***
Vivek-ERG book.F read-INF.F want-PFV.FSG
'Vivek wanted to read the book.'

d. Default agreement (ERG subject + ACC object)
*Rahul-ne kitaab-ko paṛh-**aa** **thaa***
Rahul-ERG book.F-ACC read-PFV.MSG be.PST.MSG
'Rahul had read the book.'

Generalization #2 Both participle agreement and infinitive agreement are PARASITIC on successful agreement by the finite verb: either all verbs agree or none do.

- Hypothetical versions of (1a–d) in which the finite verb and participle/infinitive act separately (omitted for brevity) are impossible.
- From this point forward, I will not distinguish infinitives and participles, since their descriptive behavior is the same.

Complication #1 LDA is blocked if the subject is visible. In this case, there is agreement only in the matrix clause.

(2) Local agreement blocks LDA
*Shahrukh [ṭehnii kaaṭ-**naa**] chaah-**taa** **thaa***
Shahrukh branch.F cut-INF.M want-PFV.MSG be.PST.MSG
'Shahrukh wants to cut the branch.'

- Agreement occurs along the *path* from the agreeing DP to the finite verb.
- The entire paradigm summarized in the table below.

[1] Verbal agreement morphology is highlighted (green = default form). Agreeing DPs are underlined.

	Agreement on		
Agreement target	Finite verb	Matrix participle	Embedded infinitive
Matrix sbj./obj.	yes	yes	no
Embedded object	yes	yes	yes
None	no	no	no

Table 1: Parasitic agreement in Hindi-Urdu.

Complication #2 LDA appears to be optional, at least at first glance.

(3) a. LDA and infinitive agreement
*Shahrukh-ne [tehnii kaaṭ-**nii**] chaah-**ii** **thii***
Shahrukh-ERG branch.F cut-INF.F want-PFV.F be.PST.FSG
'Shahrukh had wanted to cut the branch.'

b. Infinitival agreement but no LDA
* *Shahrukh-ne [tehnii kaaṭ-**nii**] chaah-**aa** **thaa***
Shahrukh-ERG branch.F cut-Inf.F want-PFV.MSG be.PST.MSG

c. LDA but no infinitival agreement
* *Shahrukh-ne [tehnii kaaṭ-**naa**] chaah-**ii** **thii***
Shahrukh-ERG branch.F cut-Inf.M want-PFV.F be.PST.FSG
'Shahrukh wanted to cut the branch.'

d. No infinitival agreement, no LDA
*Shahrukh-ne [tehnii kaaṭ-**naa**] chaah-**aa** **thaa***
Shahrukh-ERG branch.F cut-INF.M want-PFV.MSG be.PST.MSG
'Shahrukh wanted to cut a/the branch.'

- This optionally is only apparent. Bhatt (2005) shows that restructured clauses require LDA, while other infinitives block it.
- Following Keine (2019), I assume the former to be *v*Ps and the latter to be TPs. In Keine's terms, TP is a *horizon* for ϕ-agreement, but *v*P is not.

(4) a. LDA across *v*P
*Ram-ne [$_{vP}$ roṭii khaa-**nii**] chaah-**ii***
Ram-ERG bread.F eat-INF.F want-PFV.FSG
'Ram wanted to eat bread.'

b. No LDA across TP
*Ram-ne [$_{TP}$ roṭii khaa-**naa**] chaah-**aa***
Ram-ERG bread.F eat-INF.M want-PFV.MSG
'Ram wanted to eat bread.'

Summary We can summarize the HU verbal agreement pattern as follows:

(5) **Verbal agreement in HU**
Given a chain of c-commanding elements $V_{FIN} \cdot (V_{INF})^* \cdot DP_{NOM}$ which is not interrupted by a horizon or another nominative DP, V_{FIN} and all V_{INF} agree with DP_{NOM}. Verbs which are not part of such a chain do not agree.

- In Bhatt's (2005) Minimalist analysis , finite T is the locus of agreement, and somehow mediates agreement between the DP goal and all verbs.
- Our goal is to formalize this idea.

2 A brief primer on TSL patterns

- Recent work has found that many long-distance linguistic dependencies across domains are TSL-2, which is among the simplest classes of formal languages which can handle long distance dependencies at all (Graf 2022b).
- A pattern is TSL if it can be described using local constraints over a TIER of salient elements, treating the rest as invisible (Heinz et al. 2011; Lambert and Rogers 2020). The tier contents and constraints together constitute a TSL grammar.
- For TSL-2, constraints can reference only two adjacent elements on the tier.

Example Suppose we have a language with symmetric sibilant harmony which is blocked by [t], similar to Slovenian.

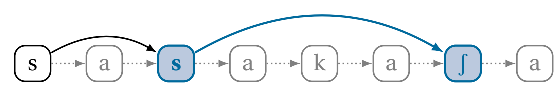
- The tier consists of the segments {s, ʃ, t}, which are the sibilants and the blocker.
- The constraints on the tier are {*sʃ, *ʃs}.
- As a result, harmony is enforced except when [t] intervenes.

(6) Example words and tiers for sibilant harmony with blocking

	Word	Tier Projection	Tier Substrings
✓	sasakasa	sss	{ss}
✓	ʃaʃakaʃa	ʃʃʃ	{ʃʃ}
✗	sasakaʃa	ssʃ	{ss, sʃ}
✗	saʃakasa	sʃs	{sʃ, ʃs}
✓	sasataʃa	sstʃ	{ss, st, tʃ}

Key points

- This kind of tier is inspired by but distinct from those in autosegmental phonology. It encapsulates a model of locality called RELATIVIZED ADJACENCY (Lambert 2023), which can be visualized by adding extra successor arcs to the string model.



- TSL-2 can handle both invisibility and blocking while ruling out most pathological patterns (global boolean logic, counting occurrences, etc.).
- In general, each dependency (sibilant harmony, *wh*-movement, etc.) gets its own tier, but it is possible that what we think of as "a single dependency" might be decomposable.
- Technically, a pattern involving multiple tiers is multi-TSL (MTSL).

3 A TSL model of agreement

TSL languages can be generalized to trees in multiple ways. This analysis is based on the system in Hanson (to appear), which decomposes MG derivation trees into a set of PATHS and constrains these paths using a TSL string grammar. It has been adapted to mainstream Minimalism for presentational purposes as in Hanson (2024).

Formal assumptions Heads are marked with FEATURE DIACRITICS to indicate movement, case assignment, and agreement. In this case, a ϕ diacritic is added to items which agree successfully *in the present derivation*.

Syntactic assumptions Finite T is the locus of ϕ-agreement. Verbal agreement (finite and non-finite) is parasitic on agreement by finite T.

Example

- We consider the BARE PHRASE STRUCTURE tree at the point immediately after finite T is merged; the derivation for the LDA structure in (1c) is provided in Figure 1.

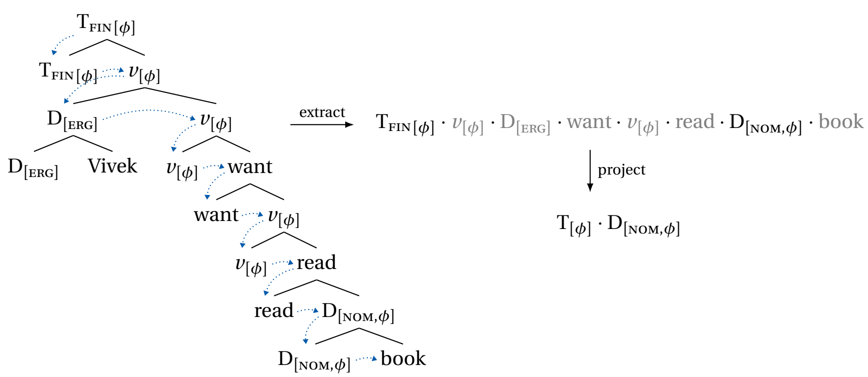


Figure 1: Tree, main spine, and tier for (1c) *Vivek wanted to read the book.*

- **String:** We take the string produced by tracing the SEARCH PATH of the probe on finite T, which is assumed to follow the COMPLEMENT SPINE, placing each head *in the order first encountered*—the position of the maximal projection.[2]

$$T_{FIN[\phi]} \cdot v_{[\phi]} \cdot D_{[ERG]} \cdot \text{want} \cdot v_{[\phi]} \cdot \text{eat} \cdot D_{[NOM,\phi]} \cdot \text{book}$$

- **Analysis:** For the moment, we ignore parasitic agreement and focus on the relation between finite T and the agreeing DP. T_{FIN} and D_{NOM} must bear the ϕ diacritic iff they are adjacent on the tier, otherwise they must not.
- **Tier:** The tier contains just the agreeing elements and blockers:

$$\{T_{FIN}, D_{[NOM]}, T_{INF}\}$$

[2]This string represents the main spine of the tree. Every complex left branch and adjunct gets its own string. In the current example, the only other spine is $D_{[ERG]} \cdot$ Vivek.

- **Constraints:** Agreeing T must be immediately followed by agreeing D, and vice versa. We also ban pairs of non-agreeing T and D, since agreement is obligatory when possible. Note: ⋉ indicates "end of string".

Probe must have a goal:	$\{{}^*T_{FIN[\phi]} \cdot D_{[NOM]}, {}^*T_{FIN[\phi]} \cdot T_{INF}, {}^*T_{FIN[\phi]} \cdot \ltimes\}$
Goal must have a probe:	$\{{}^*T_{FIN} \cdot D_{[NOM,\phi]}, {}^*T_{INF} \cdot D_{[NOM,\phi]}, {}^*D_{[NOM]} \cdot D_{[NOM,\phi]}\}$
Must agree when possible:	$\{{}^*T_{FIN} \cdot D_{[NOM]}\}$

- In the present example, T immediately precedes the embedded object on the tier, so they agree, as required.
- If a blocker intervenes, or there is no possible goal, agreement is ruled out.
- If there is a visible matrix subject, both object agreement and LDA are blocked.
- This covers case-sensitivity, LDA, and default agreement (more examples below).

4 Analyzing parasitic agreement

4.1 Overview

- Bhatt's (2005) intuition is that the infinitival verb does not agree on its own, but is somehow able to agree in tandem with finite T. We require two tiers, corresponding to two logical steps:
  1. Finite T agrees with the closest visible DP
  2. All v/Aux between T and DP agree
- Step 1 was covered above, and determines whether T and DP should agree.
- Step 2 adds the verbs to the tier, and ensures that they agree iff T does. It essentially implements Adger's (2003) analysis of affix hopping, but chained. Alternatively, the second step can be thought of as a kind of concord.[3]
- *The tiers are different* for each step; HU agreement is MTSL-2, not TSL-2. It is not quite possible to get every case right with just one tier.

Step 1: $T_{FIN[\phi]}$ $Aux_{[\phi]}$ $v_{[\phi]}$ $D_{[ERG]}$ V $v_{[\phi]}$ V $D_{[NOM,\phi]}$

Step 2: $T_{FIN[\phi]}$ $Aux_{[\phi]}$ $v_{[\phi]}$ $D_{[ERG]}$ V $v_{[\phi]}$ V $D_{[NOM,\phi]}$

Figure 2: T agrees with the closest visible DP, then all verbs along this path agree.

4.2 TSL Grammars

Step 1 Both the tier and constraints are unchanged from the previous section.

[3]Is this agreement upward or downward? TSL string languages don't have a notion of direction as syntacticians think of it. In previous work, I used two diacritics, for *probe* and *goal*, and implemented directionality by stating whether the probe had to precede the goal or vice versa. If agreement in Step 2 is upward then finite T bears both diacritics, but otherwise nothing substantial changes.

Step 2

- **Tier:** We add Aux and v to the tier, in addition to $\mathrm{T}_{\mathrm{FIN}}/\mathrm{T}_{\mathrm{INF}}/\mathrm{D}_{\mathrm{NOM}}$.
- **Constraints:** We must ensure that either all elements in a chain from $\mathrm{T}_{\mathrm{FIN}}$ to $\mathrm{D}_{\mathrm{NOM}}$ bear the ϕ diacritic, or none do.

$$\begin{Bmatrix} {}^*\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}, & {}^*\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot v, & {}^*\mathrm{Aux}_{[\phi]}\cdot v, & {}^*v_{[\phi]}\cdot v, & {}^*v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM}]}, \\ {}^*\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{Aux}_{[\phi]}, & {}^*\mathrm{T}_{\mathrm{FIN}}\cdot v_{[\phi]}, & {}^*\mathrm{Aux}\cdot v_{[\phi]}, & {}^*v\cdot v_{[\phi]}, & {}^*v\cdot\mathrm{D}_{[\mathrm{NOM},\phi]} \end{Bmatrix}$$

- Additionally, elements in an incomplete chain must not agree. This happens when a blocker intervenes or there is no goal.

$$\{{}^*v_{[\phi]}\cdot\mathrm{T}_{\mathrm{INF}},\ {}^*\mathrm{T}_{\mathrm{INF}}\cdot v_{[\phi]},\ {}^*v_{[\phi]}\cdot\ltimes\}$$

- Other uninteresting and redundant constraints are omitted for brevity.

4.3 Deriving the data

Licit configurations We first show that the analysis rules in the licit agreement configurations, focusing on those in Table 2.

Ex.	Configuration	String (Key elements highlighted)
1a	Sbj. agreement	$\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM}]}\cdot$ book
1b	Obj. agreement	$\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot$ book
1c	LDA	$\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ want $\cdot\,v_{[\phi]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot$ book
1d	Dflt. (No goal)	$\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{Aux}\cdot v\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ want $\cdot\,v\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{ACC}]}\cdot$ book
4b	Dflt. (Blocked)	$\mathrm{T}_{\mathrm{FIN}}\cdot v\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ want $\cdot\,\mathrm{T}_{\mathrm{INF}}\cdot v\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM}]}\cdot$ book
2	Blocked by sbj.	$\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot$ want $\cdot\,v\cdot$ cut $\cdot\,\mathrm{D}_{[\mathrm{NOM}]}\cdot$ branch

Table 2: Licit agreement and non-agreement configurations.

Case 1: Licit agreement

- (1a/1b/1c) have a well-formed agreement chain. We take (1a) as representative.

  Step 1: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ Adjacent T and D agree

  Step 2: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ All verbs in chain agree

Case 2: Licit non-agreement

- In (1d), there is no visible DP, so non-agreement is allowed.

  Step 1: $\mathrm{T}_{\mathrm{FIN}}$ ✓ No D to agree with

  Step 2: $\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{Aux}\cdot v\cdot v$ ✓ All non-agreeing

- In (4b), $\mathrm{T}_{\mathrm{INF}}$ intervenes, creating two incomplete chains.

  Step 1: $\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{T}_{\mathrm{INF}}\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ Non-adjacent T and D don't agree

  Step 2: $\mathrm{T}_{\mathrm{FIN}}\cdot v\cdot\mathrm{T}_{\mathrm{INF}}\cdot v\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ Each chain is consistently non-agreeing

- In (2), the subject blocks LDA, making the lower chain incomplete.

  Step 1: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ Lower D does not agree

  Step 2: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot v\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ Lower chain non-agreeing

Illicit configurations Now, we consider key structures that should be ruled out, shown in Table 3. We ignore chains with mismatched diacritics, whose ungrammaticality is straightforwardly ruled out in Step 2.

Ex.	Configuration	String (Tier elements highlighted)
1a′	No sbj. agreement	$\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{Aux}\cdot v\cdot\mathrm{D}_{[\mathrm{NOM}]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM}]}\cdot$ book
1b′	No bbj. agreement	$\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{Aux}\cdot v\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM}]}\cdot$ book
1c′	No LDA	$\mathrm{T}_{\mathrm{FIN}}\cdot v\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ want $\cdot\,v\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM}]}\cdot$ book
1d′	Agreeing with nothing	$\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ want $\cdot\,v_{[\phi]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{ACC}]}\cdot$ book
4b′	Locality violation	$\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{ERG}]}\cdot$ want $\cdot\,\mathrm{T}_{\mathrm{INF}}\cdot v_{[\phi]}\cdot$ read $\cdot\,\mathrm{D}_{[\mathrm{NOM},\phi]}\cdot$ book

Table 3: *Illicit* agreement and non-agreement configurations, inverting the whether agreement occurs compared to the licit configurations.

Case 3: Illicit agreement

- In (1d′), T/Aux/v agree even though there is no visible DP. This violates constraints in Steps 1 and 2.

  Step 1: $\mathrm{T}_{\mathrm{FIN}[\phi]}$ ✗ Probe has no goal

  Step 2: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}\cdot v_{[\phi]}$ ✗ No D at end of chain

- 4b′ is a locality violation. $\mathrm{T}_{\mathrm{INF}}$ intervenes, breaking the chain. This violates constraints in Steps 1 and 2.

  Step 1: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot\mathrm{T}_{\mathrm{INF}}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}$ ✗ Probe and goal not adjacent

  Step 2: $\mathrm{T}_{\mathrm{FIN}[\phi]}\cdot v_{[\phi]}\cdot\mathrm{T}_{\mathrm{INF}}\cdot v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}$ ✗ Agreement in incomplete chains

Case 4: Illicit non-agreement

- In (1a′/1b′/1c′), agreement fails to occur where it should. This is ruled out in Step 1. Importantly, there are *no violations* in Step 2.

  Step 1: $\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{D}_{[\mathrm{NOM}]}\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✗ T and D are adjacent but don't agree

  Step 2: $\mathrm{T}_{\mathrm{FIN}}\cdot\mathrm{Aux}\cdot v\cdot\mathrm{D}_{[\mathrm{NOM}]}\cdot\mathrm{D}_{[\mathrm{NOM}]}$ ✓ All non-agreeing

4.4 Why a single-tier analysis does not work

Using just one tier (based on Step 2), we can rule in all of the licit structures, and rule out agreement where it should not occur, but we cannot mandate agreement when it should occur. The immediately proceeding example shows why.

- We must allow pairs of non-agreeing elements at all positions in the chain since they occur in licit structures where agreement fails.

$$\begin{Bmatrix} \mathrm{T}_{[\phi]}\cdot v_{[\phi]}, & \mathrm{T}_{[\phi]}\cdot\mathrm{Aux}_{[\phi]}, & \mathrm{Aux}_{[\phi]}\cdot v_{[\phi]}, & v_{[\phi]}\cdot v_{[\phi]}, & v_{[\phi]}\cdot\mathrm{D}_{[\mathrm{NOM},\phi]}, \\ \mathrm{T}\cdot v, & \mathrm{T}\cdot\mathrm{Aux}, & \mathrm{Aux}\cdot v, & v\cdot v, & v\cdot\mathrm{D}_{[\mathrm{NOM}]} \end{Bmatrix}$$

- Once we allow this, complete chains of non-agreeing elements are always allowed. For example, all of the pairs in (1c′) — $\mathrm{T}_{\mathrm{FIN}}\cdot v\cdot v\cdot\mathrm{D}_{[\mathrm{NOM}]}$ — occur in (1d) or (4b).
- In general, non-local dependencies *cannot* be reduced to local links.

5 Typology, cross-domain parallels

We expect to see variants of these patterns in different languages, as well as similar patterns in other linguistic domains.

5.1 Related languages and dialects

As discussed by Bhatt (2005), there are related languages (as well as a dialect of HU) which are similar except that infinitive agreement is not parasitic on matrix clause agreement. We could analyze such languages as follows.

- Infinitives and participles can always agree with closest visible DP. Higher heads agree with lower heads, up to $\mathrm{T_{FIN}}$ (which agrees) or $\mathrm{T_{INF}}$ (which does not).
- Formally, a single tier, based on Step 2, appears adequate. The constraints are mostly unchanged, but $\mathrm{T_{INF}} \cdot v_{[\phi]}$ is allowed and $* \, v \cdot \mathrm{D_{NOM}}$ is banned.

5.2 English

We actually need two tiers even for the traditional generative analysis of English.

- Finite T, not the verb, agrees with the subject, and a second process of affix hopping gets the tense and agreement morphology onto the verb, if applicable.
- The present analysis of HU essentially implements the version in Adger (2003), which treats the second step as agreement.
- The only difference is that in HU: 1) only nominatives are visible, and 2) agreement in the second step is chained.

5.3 Extraction morphology

Extraction morphology as analyzed by Graf (2022a) is similar to parasitic agreement.

- In general, two tiers are needed, as with agreement. The first pairs movers and landing sites The second places constraints on certain elements along this path.
- One notable difference is that while agreement regularly fails, movement cannot.

5.4 Phonology

- Some unbounded circumambient processes (Jardine 2016; McCollum et al. 2020) might be similar to parasitic agreement.
  - Some elements depend on information coming from both directions.
  - Complication: existing work focuses on the MAP from UR to SR, rather than constraints on structures or derivations.
- The variant of the HU pattern in Section 5.1 is similar to simple spreading, with $\mathrm{T_{INF}}$ as a blocker and $\mathrm{T_{FIN}}$ as an "icy target" which agrees but terminates harmony.

Conclusion

- Parasitic agreement involves two logical steps, implemented on two tiers. T mediates agreement between DP and Aux/v, not the other way around (cf. Bhatt 2005).
- In general, it is not possible to reduce long-distance dependencies to local links, with limited exceptions. This is why we need tiers in the first place!
- Overall, parasitic agreement in HU is just a variant of phenomena found in other languages and in domains outside of agreement, all making use of the same computational resources (Graf 2022b).

Acknowledgments

This work was partly supported by NSF Grant BCS-1845344 and by the Institute for Advanced Computational Science at Stony Brook University.

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