Two Steps to Parasitic Agreement in Hindi-Urdu

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Overview

Some properties of Hindi-Urdu (HU) verbal agreement

- **case-sensitivity** – only unmarked (nominative) DPs can agree
- **long-distance agreement (LDA)** with object of embedded verb
- **default agreement** when there is no viable goal
- **parasitic agreement** – non-finite verbs agree iff finite verb does

Puzzle Why should the non-finite verb care if the finite verb also agrees?

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

→ Parasitic agreement is the natural outcome of the interaction of two **tier-based strictly 2-local (TSL-2)** processes, each unexceptional on its own, operating together in the same language.

Data and Generalizations

Key Generalizations

- Agreement targets the highest visible (nominative) argument
- Infinitives can be *v*P or TP, *v*P is transparent, TP is opaque (Keine 2019)
- Participles/infinitives agree with DP iff the finite verb does

Data (from Bhatt 2005)

Agreeing verb forms are **blue**. Default verb forms are **green**. Agreeing DPs are underlined.

(1) 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. 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.'

(2) 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 (default agreement)
*Ram-ne [$_{TP}$ roṭii khaa-**naa**] chaah-**aa***
Ram-ERG bread.F eat-INF.M want-PFV.MSG
'Ram wanted to eat bread.'

c. LDA blocked by subject (default in infinitive)
*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.'

Summary

Bhatt (2005): T mediates agreement between DP goal and all verbs. Formally, **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

Analysis

What is a TSL-2 pattern?

tier-based strictly 2-local = i) strictly local constraints
ii) over a tier of salient elements (others invisible)
iii) with a constraint window of size 2

Tiers over paths

- Agreement follows the **complement spine** (don't look inside specifiers/adjuncts)
- Only **maximal projections** are relevant (skip other projections)
- **Diacritics** indicate items which move/agree/receive case *in the present derivation*
- Each tier includes all potential **participants** and **blockers** (e.g. T_{INF})
- The **constraints** regulate the distribution of the diacritics

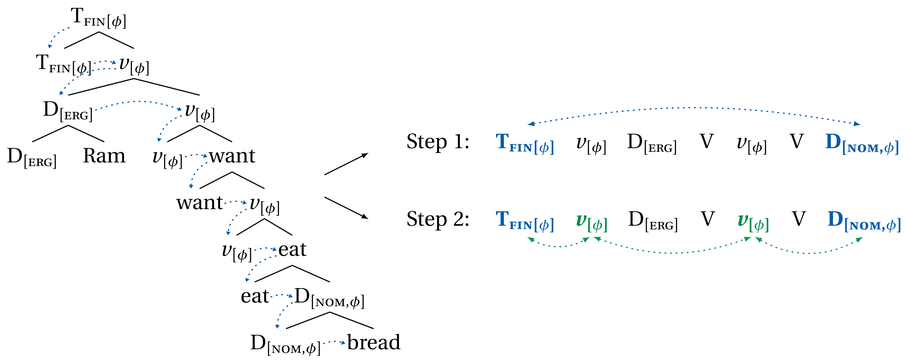

Figure 1: BPS tree, path, and both tiers for LDA configuration (2a)

Deriving the data

	Tier Contents	Tier Constraints
Step 1	T_{FIN}, D_{NOM}, T_{INF}	T_{FIN} and D_{NOM} must agree if adjacent, otherwise they must not
Step 2	T_{FIN}, D_{NOM}, T_{INF}, v, Aux	1. Elements in chain from T_{FIN} to D_{NOM} must all agree/not agree 2. Elements in incomplete chain must not agree

Table 1: Contents and informal constraints for each tier

- In (1a, 1b, 2a), T_{FIN} agrees with D, so *v*/Aux are forced to agree as well (see above figure)
- In (1c), there is no visible DP, so non-agreement is allowed
  Step 1: T_{FIN} ✓ No D to agree with
  Step 2: $T_{FIN} \cdot Aux \cdot v \cdot v$ ✓ All non-agreeing
- In (2b), T_{INF} intervenes, creating two incomplete chains
  Step 1: $T_{FIN} \cdot T_{INF} \cdot D_{[NOM]}$ ✓ Non-adjacent T and D don't agree
  Step 2: $T_{FIN} \cdot v \cdot T_{INF} \cdot v \cdot D_{[NOM]}$ ✓ Each chain is consistently non-agreeing
- In (2c), the subject blocks LDA, making the lower chain incomplete
  Step 1: $T_{FIN[\phi]} \cdot D_{[NOM,\phi]} \cdot D_{[NOM]}$ ✓ Lower D does not agree
  Step 2: $T_{FIN[\phi]} \cdot Aux_{[\phi]} \cdot v_{[\phi]} \cdot D_{[NOM,\phi]} \cdot v \cdot D_{[NOM]}$ ✓ Lower chain non-agreeing

Why one tier isn't enough

With just the one tier (= Step 2), we can *ban* agreement where it should not occur, but we cannot *require* it where it should occur, because every link in a complete chain of non-agreeing pairs is licit.

Figure 2: Visualization of Step 2 for LDA configuration *without* agreement

→ Long-distance dependencies cannot be reduced to local links

More on TSL-2

Example: long-distance harmony with blocking

Slovenian sibilant harmony (simplified)

- Tier contents: {s, ʃ, t}
- Tier constraints: {*sʃ, *ʃs}
- Harmony is enforced except when [t] intervenes

	Word	Tier
✓	**s**aka**s**a	ss
✓	ʃaka**ʃ**a	ʃʃ
✗	saka**ʃ**a	sʃ
✓	**s**at**a**ʃa	stʃ

Notice: a single intervener breaks any long-distance dependency

- Originally proposed for phonology (Heinz et al. 2011)
- Good fit for long-distance phonotactics (McMullin and Hansson 2016) as well as syntax (Graf 2022b; Hanson 2024b)
- In general, each long-distance process has its own tier and constraints

The Form of the Constraints

Constraints for Step 1

- Probe requires a goal: $\{*T_{FIN[\phi]} \cdot D_{[NOM]}, *T_{FIN[\phi]} \cdot T_{INF}, *T_{FIN[\phi]} \cdot \ltimes\}$
- Goal requires a probe: $\{*T_{FIN} \cdot D_{[NOM,\phi]}, *T_{INF} \cdot D_{[NOM,\phi]}, *D_{[NOM]} \cdot D_{[NOM,\phi]}\}$
- Must agree if possible: $\{*T_{FIN} \cdot D_{[NOM]}\}$

Constraints for Step 2

- No mismatched agreement in any chain:
  $\left\{ \begin{array}{llll} *T_{FIN[\phi]} \cdot Aux, & *T_{FIN[\phi]} \cdot v, & *Aux_{[\phi]} \cdot v, & *v_{[\phi]} \cdot v, \quad *v_{[\phi]} \cdot D_{[NOM]}, \\ *T_{FIN} \cdot Aux_{[\phi]}, & *T_{FIN} \cdot v_{[\phi]}, & *Aux \cdot v_{[\phi]}, & *v \cdot v_{[\phi]}, \quad *v \cdot D_{[NOM,\phi]} \end{array} \right\}$
- Agreeing chain must start with T_{FIN} and end with D_{NOM}:
  $\{*T_{INF} \cdot v_{[\phi]}, *v \cdot v_{[\phi]}, *v_{[\phi]} \cdot T_{INF}, *v_{[\phi]} \cdot \ltimes\}$

The Computational Typology of Agreement

We expect to see close variants of these patterns in agreement, as well as similar patterns in other domains. This appears to be bourne out.

Related languages Some dialects of HU (and related languages) lack parasitic agreement. For these, a single tier is sufficient.

Affix hopping Two tiers are needed even in English: i) T agrees with D, skipping verbs; ii) tense/agreement transmitted to closest verb, blocked by Neg. Unlike in HU, affix hopping does not iterate.

Extraction morphology If considered distinct from agreement (Graf 2022a), this is nonetheless formally similar to parasitic agreement.

Phonology Some unbounded circumabient processes (Jardine 2016) might be similar to parasitic agreement.

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