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

Keywords: long-distance agreement,parasitic agreement,tier-based strictly local languages

1. Overview Hindi-Urdu (HU) is famous for its verbal agreement system, which involves case-sensitivity, long-distance/cross-clausal agreement (LDA), and **parasitic agreement**, in which the infinitival verb (embedded or otherwise) agrees if and only if the finite verb does. This last item 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 item also agrees. If they do not, then it is not clear why they should agree at all.

Here, I build on Bhatt's (2005) intuition that the infinitival verb is valued as part of the agreement process for the finite verb. I show that the set of formal agreement configurations makes a **tier-based strictly 2-local** (TSL-2) language, just like many other unbounded processes in phonology and syntax (cf. Graf 2022b). This provides a **potential explanation** for the phenomenon, since if language is in general capable of encoding such patterns, we expect them to show up at least occasionally, modulo other factors.

2. Basic Data This data comes from Bhatt (2005). The finite verb/auxiliary agrees with the structurally highest nominative/unmarked DP in its domain, which may be the matrix subject (1), matrix object (2), or embedded object (3). Any infinitive verbs agree with the same DP. If there is no potential goal, default (MSG) agreement occurs (4).

(1) 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.'

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

(3) LDA (ERG sbj. + 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.'

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

LDA appears to be optional in some sentences, but this 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 TPs.

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

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

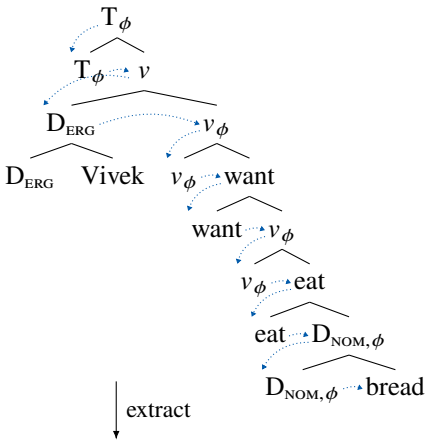
Examples (5) and (6) also demonstrate parasitic agreement: the infinitive agrees iff the finite verb does. LDA/object agreement is impossible without infinitival agreement and vice versa (illicit examples omitted for brevity).

3. TSL-2 patterns A pattern is TSL if it can be described with local constraints over a **tier** of salient elements, treating the rest as invisible. A TSL pattern is TSL-2 if all constraints reference only two adjacent elements on the tier.

	Word	Tier
✓	sakasa	ss
✓	ʃakaʃa	ʃʃ
✗	sakaʃa	sʃ
✓	sataʃa	stʃ

Example. Suppose we have a language with sibilant harmony which is blocked by [t], similar to Slovenian. The tier consists of segments {s, ʃ, t}, which are the sibilants and the blocker. All other segments are invisible. The constraints on the tier are {*sʃ, *ʃs}. As a result, harmony is enforced except when [t] intervenes.

4. Constructing the tier To model HU agreement as a TSL-2 pattern, we consider the string produced by tracing the search path of the probe on finite T. A bare phrase structure diagram for (5) at the relevant point in the derivation is provided on the right. A ϕ diacritic is added to items which agree successfully *in the present derivation*. Omitting the technical details, we follow the complement spine, adding each head *in the order first encountered*—the position of the maximal projection. We construct the tier containing all items *which can bear the diacritic*, which are {T_{FIN}, Aux, v, D_{NOM}}, plus any blockers, including at least T_{INF}. (For simplicity, I treat finite and infinitive verbs identically as parasitic on T. PRO is omitted, but would be invisible if present.)



Here, we have a chain of agreeing elements on the tier, starting with T and ending with D. In a derivation where agreement fails, whether because there is no viable goal or because infinitive T intervenes, no elements in this chain contain the ϕ diacritic. This is summarized below.

Ex.	Configuration	String (Tier elements highlighted)
1	Sbj. Agr.	$\mathbf{T_{FIN,\phi}} \cdot \mathbf{Aux_\phi} \cdot \boldsymbol{v_\phi} \cdot \mathbf{D_{NOM,\phi}} \cdot$ read $\cdot \mathbf{D_{NOM}} \cdot$ book
2	Obj. Agr.	$\mathbf{T_{FIN,\phi}} \cdot \mathbf{Aux_\phi} \cdot \boldsymbol{v_\phi} \cdot D_{ERG} \cdot$ read $\cdot \mathbf{D_{NOM,\phi}} \cdot$ book
4	Dflt. (No goal)	$\mathbf{T_{FIN}} \cdot \mathbf{Aux} \cdot \boldsymbol{v} \cdot D_{ERG} \cdot$ read $\cdot D_{ACC} \cdot$ book
5	LDA	$\mathbf{T_{FIN,\phi}} \cdot \boldsymbol{v_\phi} \cdot D_{ERG} \cdot$ want $\cdot \boldsymbol{v_\phi} \cdot$ eat $\cdot \mathbf{D_{NOM,\phi}} \cdot$ bread
6	Dflt. (Blocked)	$\mathbf{T_{FIN}} \cdot \boldsymbol{v} \cdot D_{ERG} \cdot$ want $\cdot \mathbf{T_{INF}} \cdot \boldsymbol{v} \cdot$ eat $\cdot \mathbf{D_{NOM}} \cdot$ bread

5. The constraints As discussed above, agreement is all or nothing. We enforce this by banning mismatched pairs of (non-)agreeing elements within the chain from T to D:

$$\{ *T_\phi \cdot v, *T \cdot v_\phi, *v_\phi \cdot v, *v \cdot v_\phi, *v_\phi \cdot D_{NOM}, *v \cdot D_{NOM,\phi}, \dots \}.$$

As a result, agreement in sentences like (6) is impossible, since T_{INF} projects yet never agrees. Next, to rule out agreement without a goal in the equivalent of (4), we add $*v_\phi \cdot \ltimes$, where $\ltimes$ indicates end-of-string. Finally, to ensure that agreement takes place when possible in (1/2/5), we need a tier which contains just $T_{\pm FIN}$ and D_{NOM}. On this tier we ban $*T_{FIN} \cdot D_{NOM}$, which is the configuration in which T fails to agree with a visible goal. This cannot be done with v on the tier; here the intuition that finite/infinitival agreement are "part of the same process" breaks down.

6. Typology, cross-domain parallels As discussed by Bhatt (2005), there are languages related to HU which are similar except that infinitive agreement is not parasitic (this also happens in a dialect of HU). In such languages, $T_{INF} \cdot v_\phi$ is not banned—a minimal parametric difference. Similar variation can be observed in extraction morphology along a movement path (Graf 2022a). It is unclear to me to what degree phonological processes mirror parasitic agreement, but certain unbounded circumambient processes (Jardine 2016) might be comparable.

7. Conclusion Parasitic agreement is a natural outcome of the space of possibilities afforded by TSL-2 computations. Simple agreement involves AB pairs on a tier; iterated agreement also allows ABB, ABBB, . . . ; and parasitic agreement adds ACB, ACCB, ACCB, ... By analyzing linguistic patterns in this way, we gain insight into otherwise mysterious phenomena, as well as the ability to directly compare phenomena within and across domains.

References **Bhatt, R.** (2005). "Long Distance Agreement in Hindi-Urdu". In: *Natural Language & Linguistic Theory*. • **Graf, T.** (2022a). "Diving deeper into subregular syntax". In: *Theoretical Linguistics* 48.3–4. • **Graf, T.** (2022b). "Subregular linguistics: bridging theoretical linguistics and formal grammar". In: *Theoretical Linguistics* 48.3–4. • **Jardine, A.** (2016). "Computationally, tone is different". In: *Phonology* 33.2. • **Keine, S.** (2019). "Selective Opacity". In: *Linguistic Inquiry* 50.1.