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Preface

The (Formal) Approaches to South Asian Languages conference is the main venue in North America for discussion of theoretical and theory-driven research in South Asian linguistics. The 12th (F)ASAL was hosted by the Department of Linguistics at the University of Utah, on the 9th and 10th of April 2022. The present proceedings stem from eleven of the works presented at this venue by researchers from all over the globe.

The papers presented in this volume cover a wide array of topics related to South Asian linguistics, touching on several aspects of linguistic analysis. These include phonetics and phonology (Horo, Anderson, Singha, Sonowal & Gomango; Chaursiya & Sanyal), morpho-syntax (Aitha; Bhatt & Davis; Deo; Driemel & Murugesan; Fenger & Weisser; Sinha), semantics and pragmatics (Hollenbaugh; Deo; Phadnis) and language acquisition and processing (Chaursiya & Sanyal; Mukherjee). This diversity reflects the interdisciplinary nature of the conference, which, albeit being focused on formal aspects of linguistic analysis, draws on insights and methodologies from various subfields.

Not only are the papers presented here diverse in terms of subfield and methodology, they are also quite diverse in terms of the South Asian languages and language families from which they introduce and consider data. These include various Indo-Aryan languages (Hindi-Urdu, Sinhala, Vedic Sanskrit, Bangla, Marathi), Dravidian languages (Telugu, Tamil, Kuṛux), a Tibeto-Burman language (Meiteilon), and an Austroasiatic one (Sora). This diversity reflects the linguistic richness (both synchronically and diachronically) of South Asia and speaks to the future of the field — which languages and varieties will be present at (f)ASAL 13 and beyond?

As editors of this volume, we would like to thank the Department of Linguistics at the University of Utah, especially Prof. Benjamin Slade for organizing the conference. Thanks also to the graduate student volunteers for their administrative and logistical service, especially in making the hybrid sessions possible. We also want to extend our heartfelt thanks to all the authors and presenters for their valuable contributions which will add to the body of work on South Asian languages. We hope this volume serves as a valuable resource for researchers, students, and practitioners, and inspires further inquiry and collaboration in this vibrant field of study.

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The OC/NC distinction in Telugu

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1 Introduction

One of the more prevalent, yet often implicit, assumptions in the the study of control is that non-finite complement clauses should always exhibit OC (obligatory control) across languages. Telugu has two types of non-finite complement clauses - gerunds, headed by the nominalizing morpheme *-aDam*, and true infinitives, where embedded verbs show up as bare verb stems. I show that Telugu has an OC/NC (non-control) split in non-finite complement clauses - some gerunds and infinitives are OC, while other gerunds and infinitives are NC, depending solely on the choice of matrix verb. Crucially, there is no clear structural difference between OC non-finite complements and NC non-finite complements - in both cases, the gerunds and infinitives look the same morphologically and act the same syntactically.

I argue from these facts that existing syntactic accounts of control, which often place a large burden on the structure of the complement clause in explaining whether or not OC will occur in a given sentence, are only partway adequate for Telugu, where the burden is largely on the choice of matrix verb. While I adopt a version of McFadden & Sundaresan's (2018) UPro analysis, I tweak the implementation to capture the Telugu facts, placing the OC-inducing probe on matrix v (which selects the matrix verb) the instead of on the controller itself.

The paper is structured as follows: Section 2 considers previous work on Telugu control (Kissock, 2014; Sundaresan, 2014), clarifying and adding observations to their results to come up with new, more complete generalizations about the distribution of Telugu OC. Section 3 makes a careful argument about why such a distribution is problematic for some modern syntactic accounts of control, introducing new data which show that even subtler diagnostics for structural difference fail to demonstrate a clear distinction between OC and NC non-finite complements. Section 4 proposes a simple solution based on the McFadden & Sundaresan account which much better accounts for the Telugu facts presented. Finally, Section 5 concludes.

2 Does Telugu even *have* OC? Cleaning up a messy empirical landscape

The main (and to my knowledge, only) previous work on subject complement control in Telugu comes in the form of two articles in the same issue of *NLLT* in 2014 - the second (Sundaresan 2014) a direct response to the first (Kissock 2014). The conclusions of these two papers are somewhat contradictory and incomplete - Kissock argues that Telugu lacks

control altogether, while Sundaresan argues that in fact Telugu does show evidence of control. My aim in this section is to show that both scholars are correct about the data they present, and that the right conclusion is somewhere in the middle - *i.e.,* that Telugu *does* have obligatory subject complement control, but that its distribution is quite unexpected given established cross-linguistic tendencies.

2.1 Background

In order to better evaluate the examples which follow, some background on Telugu argument structure and case is needed. Telugu is largely a nominative-accusative language:

(1) నేను ఆ కుక్కని చూసాను.
nenu aa kukka-ni cuus-aa-nu
1sg.pro.nom that dog.obl-acc see-pst-1sg
'I saw that dog.'

Like many other South Asian languages, Telugu nouns have two separate stem forms - one which appears in the nominative, and the other (known as the oblique) which appears in all other cases. The nominative case in Telugu does not have an overt case marker. The accusative morpheme, *-ni*, is a DOM marker - while it is obligatory on animate direct objects, it is optional (and in elicitation contexts, often dispreferred) on inanimate direct objects.

(2) నేను బల్ల(ని) చూసాను.
nenu balla-(ni) cuus-aa-nu
1sg.pro.nom table.obl-(acc) see-pst-1sg
'I saw a table.'

In this paper, I gloss non-DOM-marked direct objects as noun.acc. There are also some verbs (often experiencer or psych verbs) which take dative subjects and nominative objects:

(3) నాకు ఇది నచ్చింది.
naa-ku idi nacc-in-di
1sg.pro.obl-dat this.nom like-pst.3sg.nm-3sg.nm
'I liked this.'

As we will see below, certain instances of both types of verbs will be candidates for control. One more piece of essential background involves the structure of gerunds, which in Telugu are the most productive way to form non-finite complement clauses. Gerunds in Telugu feature the characteristic nominalizing suffix *-aDam*.

(4) గెలవడం
gelav-aDam
win-nmlz
'winning'

Gerunds can never co-occur with any TAM or agreement morphology, meaning that they are non-finite:

(5) **Gerunds cannot take verbal morphology**

Category	Example
Tense	*gelic-aa-aDam 'won-ing'
Modals	*gelav-aali-aDam 'must-win-ing'
Participles	*gelic-ina-aDam 'having-won-ing'
Agreement	*gelava-ø-nu-aDam 'I-won't-win-ing'

As would be expected for a nominalizing suffix, *-aDam* can host both plural and case morphology[1]:

(6) **Gerunds can take nominal morphology**

Category	Example
Plural	gelav-aDaa-lu 'winnings'
Case	gelav-aDaani-ki 'in order to win'

This shows that we can and should fruitfully think of these complement clauses as nominalizations along the lines of English *-ing* gerunds.

2.2 Kissock 2014: Gerund complements in Telugu are not controlled

In her 2014 paper, Madelyn Kissock argues that Telugu lacks the phenomenon of control altogether. She observes that even under canonically OC verbs like *try* (*prayatnincu* in Telugu), gerund complement clauses can optionally have overt, disjoint subjects, and that furthermore, these subjects must be in the nominative case[2]:

(7) **Telugu *try* can have overt disjoint embedded subjects**

a. శ్రీధర్ అన్నం తినడం ప్రయత్నించాడు.
Sridhar$_i$ [EC$_i$ annam tin-aDam] prayatninc-aa-Du
Sridhar.nom [EC rice.acc eat-nmlz.acc] try-pst-3sg.m
'Sridhar tried to eat food.'

b. పల్లవి శ్రీధర్ ఆమె డ్రెస్ వేసుకోవడం
Pallavi$_i$ [Sridhar$_j$ tana dress veesu-koo-aDam]
Pallavi.nom [Sridhar.nom her dress.acc put-kun-nmlz.acc]
ప్రయత్నించింది.
prayatninc-in-di
try-pst.3sg.nm-3sg.nm
'Pallavi tried for Sridhar to put on her dress.'

[1] Like other nouns ending in *-am*, *-aDam* has an oblique in *-aani* as well as a special allomorph appearing before the plural suffix *-lu*.

[2] For now, I gloss null subjects as EC (empty category) to avoid making any unnecessary theoretical commitments as to the status of null subjects in Telugu too early on. I come back to this question in Section 4.

Kissock draws from traditional Case-based analyses of control (Chomsky & Lasnik, 1993) which tie the occurrence of pro in non-finite clauses to the non-finite T head not being able to assign nominative case. If this tight connection between nominative case and finiteness is universal, then gerund complements in Telugu are actually finite clauses, meaning that there is no such thing as syntactically non-finite complementation in Telugu and thus no control, either. Kissock further supports her conclusion by showing that sentences with matrix verb *try* or *aashincu* 'hope' allow *de re* readings of the null embedded subject, given the right context:

(8) శ్రీధర్ బహుమతి గెలవడం ఆశించాడు
Sridhar$_i$ [EC$_i$ bahumati gelav-aDam] aashinc-aa-Du
Sridhar.nom [EC prize.acc win-nmlz.acc] hope-pst-3sg.m
'Sridhar hoped to win the prize.'

In a situation where Sridhar is not aware that the person he hopes will win the prize is in fact himself, Kissock's consultants judged the above sentence as true. Following the reasoning of the diagnostic, this provides evidence that a bound variable reading of the null subject is not obligatory, and thus that OC (obligatory control) is not present. The final diagnostic that Kissock uses is that of sloppy readings under ellipsis. She finds that the predicates *try* and *ishTam* 'to like' both allow strict readings under ellipsis (I give the example with *like* to illustrate):

(9) పల్లవికి తన డ్రెస్ వేసుకోవడం ఇష్టం. శ్రీధర్కి కూడ.
Pallavi-ki [EC tana dress veesu-koo-aDam] ishTam. Sridhar-ki kuuDa.
Pallavi.obl-dat [EC her dress put-kun-nmlz.acc] like. Sridhar.obl-dat too.
'Pallavi likes to put on her dress. Sridhar does too.'

Kissock's consultants had two possible readings of the second sentence in the example. The first was one in which Sridhar likes putting his own dress on (the only one possible in English), and the second was one in which what Sridhar likes is Pallavi putting a dress on. Based on these three diagnostics, Kissock concludes that Telugu is a language entirely without obligatory control.

2.3 Sundaresan 2014: Wait, but some gerund complements *are* controlled!

In a response to Kissock's paper, Sandhya Sundaresan cites data which weaken Kissock's generalization that Telugu lacks control altogether. First, Sundaresan notes that Kissock's consultants had difficulty getting disjoint readings when the embedded subject of gerund complement is null:

(10) శ్రీధర్ పోటి గెలవడానికి ప్రయత్నించాడు.
Sridhar$_i$ [EC$_{i,??j}$ pooTi gelav-aDaani-ki] prayatninc-aa-Du
Sridhar.nom [EC competition.acc win-nmlz.obl-dat] try-pst-3sg.m
'Sridhar tried to win the competition.'

While Kissock puts this down to pragmatics, arguing that the meaning of verbs like *try* make it more likely for the embedded subject and the matrix subject to be co-referent, Sundaresan argues that this preference is in fact a requirement and that this is preliminary evidence that, at least when the embedded subject is null, there is obligatory control in Telugu. The second argument that Sundaresan makes that Telugu does in fact show evidence of OC is based on evidence from the behavior of the aspectual verb *modalupeTTu* 'to begin', which Kissock does not consider. Sundaresan notes that gerund complements under this verb show telltale signs of obligatory control. In the following example (Sundaresan's (11a)) , the null subject of the gerund complement in the sentence below does not have a free interpretation - it must refer to the subject of the matrix clause:

(11) నేను పోటి గెలవడం మొదలుపెట్టాను.
nenu$_i$ [EC$_{i,*j}$ pooTi gelav-aDam] modalupeTT-aa-nu
I.nom [EC competition.acc win-nmlz.acc] begin-pst-3sg.m
'I began to win the competition.'

Unlike Kissock's examples, an overt, disjoint embedded subject is impossible under this matrix verb (Sundaresan's (11b)):

(12) *నేను శ్రీధర్ పోటి గెలవడం మొదలుపెట్టాను.
*nenu$_i$ [Sridhar$_j$ pooTi gelav-aDam] modalupeTT-aa-nu
I.nom [Sridhar.nom competition.acc win-nmlz.acc] begin-pst-3sg.m
Attempted: 'I began for Sridhar to win the competition.'

Beyond this, Sundaresan also shows that, unlike the examples from Kissock's paper, *begin* also passes other traditional diagnostics for control. For example, *begin* only allows sloppy readings under ellipsis:

(13) నేను పోటి గెలవడం మొదలుపెట్టాను. ఆనంద్
nenu$_i$ [EC$_{i,*j}$ pooTi gelav-aDam] modalupeTT-aa-nu. aanand
I.nom [EC competition.acc win-nmlz.acc] begin-pst-3sg.m Anand.nom
కూడ.
kuuDa.
too
'I began to win the competition. Anand did too.'

The sentence above can only mean that Anand also began to win the competition, not that Anand began for me to win the competition. Sundaresan concludes from the evidence of this verb that Telugu exhibits OC, contrary to Kissock's conclusions.

2.4 Both gerund and infinitival complements can be either controlled or non-controlled

To recap, Kissock (2014) claims that Telugu does not have OC in non-finite complement clauses, showing that verbs such as *try*, *hope*, and *like* consistently fail standard diagnostics for control. Sundaresan (2014), on the other hand, shows that the aspectual verb *begin*

passes standard diagnostics for control while questioning some of how Kissock chooses to interpret her data, to the end of arguing that Telugu does show evidence of OC in non-finite complement clauses.

2.4.1 Gerund complements

So, what gives? Which scholar is correct? Does Telugu have OC, or not? If it does, what is its distribution? The current investigation takes these questions as its starting point. Empirically, I find that both Kissock and Sundaresan's data hold up - my consultants' judgements largely corroborate both of their generalizations about the status of control in gerund complements. Certain verbs, including *hope* and *like* (I contribute *decide*, *plan*, and *enjoy*) do not trigger OC in their gerund complements, even when the embedded subject is null. On the other hand, certain verbs, including *begin* (I contribute *quit* and *know how to*), do trigger OC in their gerund complements.

So as not to bore the reader by showing the results of every diagnostic for every predicate considered, I summarize below my results, giving examples for those which were different from Kissock's or Sundaresan's. One crucial difference between my and both their results was that, given enough context, my consultants were in fact able to get disjoint readings for null embedded subjects of gerund complements under *naccu* 'enjoy' and *plan ceyyu* 'plan' (these same verbs, like those studied by Kissock, also allow overt disjoint embedded subjects):

(14) **Some verbs allow disjoint null embedded subjects in non-finite complements**

a. రాజేష్కి ఈదడం నచ్చింది.
Rajesh$_i$-ki [EC$_{i,j}$ iid-aDam] nacc-in-di
Rajesh.obl-dat [EC swim-nmlz.acc]
'Rajesh enjoyed (himself, someone else) swimming.'

b. రవి హవాయికి వెళ్లడానికి ప్లాన్ చేసాడు.
Ravi$_i$ [EC$_{i,j}$ Hawaii-ki vell-aDaani-ki] plan cees-aa-Du
Ravi.nom [EC Hawaii.obl-dat go-nmlz.obl-dat] plan do-pst-3sg.m
'Rajesh planned (for himself, for someone else) to go to Hawaii.'

I also use two additional diagnostics for obligatory control - the first is that of exhaustivity. There are certain verbs in Telugu, like *samaavesham ay* 'to gather', which require plural subjects:

(15) *రవి సమావేశం అయ్యాడు.
*Ravi samaavesham ayy-aa-Du
Ravi.nom group become-pst-3sg.m
Attempted: 'Ravi gathered.'

(16) వాళ్లు సమావేశం అయ్యారు.
vaaLLu samaavesham ayy-aa-ru
3pl.nom group become-pst-3pl.h

'They gathered.'

An (exhaustive) subject control predicate with a singular matrix subject should not allow non-finite embedding of such a verb, because if the null embedded subject must be co-referent with the matrix subject, the former is singular, which as we see results in ungrammaticality for verbs like *gather*. However, I find that under verbs like *enjoy* and *plan*, *gather* is fine even if the matrix subject is singular:

(17) రవి సమావేశం అవ్వడానికి ప్లాన్ చేసారు.
Ravi$_i$ [EC$_{i+j,j+k}$ samaavesham avv-aDaani-ki] plan ches-aa-ru
Ravi.nom [EC group become-nmlz.obl-dat] plan do-pst-3pl.h
'Ravi planned (for them) to gather.'

(18) రవికి సమావేశం అవ్వడం నచ్చింది.
Ravi$_i$-ki [EC$_{i+j,j+k}$ samaavesham avv-aDam] nacc-in-di
Ravi.obl-dat [EC group become-nmlz.nom] enjoy-pst-3sg.nm
'Ravi enjoyed (them) gathering.'

Interestingly, this diagnostic also shows that this set of predicates does not exhibit partial control. Telugu, in fact, does not appear to have any partial control predicates at all. The best candidates, propositional attitude predicates which take non-finite complements (Pearson, 2016), are all NC predicates in Telugu.

The final relevant diagnostic used in the current study was that of long-distance control (Landau, 2013). One property of obligatory subject control is that the controller must be the subject of the predicate which directly embeds the controlled clause. If the embedded null subject in question can be co-referent with a less local DP, then the matrix predicate in question is not an OC predicate. Applying this diagnostic to Telugu, I find that, again, sentences with *plan* are not restricted in this way:

(19) నాన్నకి ఆరుష్ హవాయి వెళ్లడానికి ప్లాన్
naanna$_i$-ki [Aarush$_j$ [EC$_{i,j}$ hawaii vell-aDaani-ki] plan
father.obl-dat [Aarush.nom [EC Hawaii go-nmlz.obl-dat] plan
చేస్తున్నాడు అని తెలిసింది.
ches-tu-unnaa-Du ani] telis-in-di.
do-prog-cop-3sg.m that] know-pst-3sg.nm
'Father came to know that Aarush was planning for (Aarush, Father) to go to Hawaii.'

If *plan* had been a subject OC predicate in Telugu, its choice of controller would have been restricted to its own subject, 'Aarush'. The fact that the null subject of the gerund complement can also refer to the less local 'Father' means that this test, too, points to 'plan' not being an OC predicate in Telugu, even with a non-finite complement. To recap, it seems that the following must be true in Telugu:

(20) **(Certain) non-finite gerund complements in Telugu are NC.**

On the other hand, I was also able to confirm Sundaresan's observations about *modalupeTTu* 'to begin' and also to demonstrate that other verbs, including *maaneyyu* 'quit', *maricipoovu*

'to forget (implicative)', and *vaccu* 'know how to', also show the same behavior. Again, to avoid redundancy, I will avoid giving detailed explanations of the tests already run by Sundaresan, but I will show results for the exhaustivity and long-distance control tests, as above.

(21) ***quit* does not allow a non-exhaustive reading**

*రవి సమావేశం అవ్వడం మానేసడు.
*Ravi$_i$ [EC$_{i,*j}$ samaavesham avv-aDam] maanes-aa-Du
Ravi.nom [EC group become-nmlz.acc] quit-pst-3sg.m
Attempted: 'Ravi quit gathering.'

(22) ***begin* does not allow long-distance control**

మేరి జాన్ అన్నం తినడం మొదలుపెట్టాడు అని
Mary$_j$ [John$_i$ [EC$_{i,*j}$ annam tin-aDam] modalupeTT-aa-Du ani]
Mary.nom [John.nom [EC rice.acc eat-nmlz.acc] begin-pst-3sg.m that]
తెలుసుకుంది.
telusu-kun-di
know-kun-3sg.nm
'Mary realized that John started eating rice.'

The following is a table showing (a portion of) the results of the control diagnostic tests I ran on the relevant predicates in Telugu:

(23) **Control test results for gerund complements**

	disjoint overt	disjoint null	sloppy	exhaustive	long-distance
begin	pass	pass	pass	pass	pass
quit	pass	pass	pass	pass	N/A
forget	pass	pass	pass	pass	N/A
know how to$_{ger}$	pass	pass	pass	N/A	N/A
plan	fail	fail	fail	fail	fail
enjoy	fail	fail	fail	fail	N/A

While the results are somewhat incomplete, the data are at least very strongly suggestive of the following facts (to re-recap):

(24) **Non-finite gerund complements under certain Telugu predicates are NC.**

(25) **Non-finite gerund complements under certain Telugu predicates are OC.**

The next chunk of data extends this generalization to another class of non-finite complements in Telugu.

2.4.2 Infinitival complements

Another strategy for non-finite clausal complementation in Telugu, which neither Kissock nor Sundaresan consider, is what I am calling the *true infinitive*. These look like bare verb stems - this construction appears to be cognate to what is usually glossed as infinitive in other Dravidian languages (David, 1999).

(26) నాకు ఈదొస్తది.
naa-ku iid-ostadi
I.obl-dat swim.inf-know.how.to
'I know how to swim.'

The distribution of this construction is quite restricted - the vast majority of predicates, including the ones which take gerund complements, do not allow infinitival complements[3]:

(27) *నేను పని చెయ్యనాశిస్తున్నాను.
*nenu pani cheyyan-aashis-tunnaa-nu
1sg.nom work do.inf-hope-prog-1sg
Attempted: 'I am hoping to work.'

(28) *నేను పని చెయ్యమొదలుబెట్టాను.
*nenu pani cheyya-modalupeTT-aa-nu
1sg.nom work do.inf-begin-pst-1sg
Attempted: 'I began to work.'

Like gerund complements, infinitival complements cannot take any TAM or agreement morphology:

(29) **Gerunds cannot take verbal morphology**

Category	Example
Tense	*naa-ku iid-aa-ostadi 'I know how to have swum.'
Modals	*naa-ku iid-aali-ostadi 'I know how to have to swim.'
Participles	*naa-ku iid-ina-ostadi 'I know how to have swum.'
Agreement	*naa-ku iida-nu-ostadi 'I know how to I won't swim.'

Unlike gerund complements, however, infinitival complements also cannot take any nominal morphology like plural or case marking:

(30) **Gerunds cannot take nominal morphology**

Category	Example
Plural	*naa-ku iida-lu-ostaayi 'I know how to swims.'
Case	*naa-ku iida-ku-ostadi 'I know how to for swimming.'

Thus, the infinitival clausal complementation structure is clearly distinct from gerund complementation. The former's lack of nominal morphology also shows that it has even less structure than the latter. Perhaps unexpectedly, then, we see the same OC/NC alternation for this set of predicates that we saw for gerunds - *-ostadi* 'know how to' passes our control diagnostics:

(31) ***-ostadi* 'know how to' does not allow disjoint embedded subjects**

[3]The status of the *-n-* in (27) is unclear - I consider it to be epenthesis to avoid vowel hiatus (we can see that in the following example, the consonant-initial matrix verb does not have the *-n-* before it), but the descriptive grammar (Krishnamurti & Gwynn, 1985) argues that it is part of an infinitive suffix *-an-*.

a. రాజేష్కు చెట్టు ఎక్కొస్తది.
Rajesh$_i$-ku [EC$_{i,*j}$ cheTTu ekk]-ostadi
Rajesh.obl-dat [/EC tree.acc climb.inf]-know.how.to
'Rajesh knows how to climb the tree.'

b. *రాజేష్కు శ్రీకర్ చెట్టు ఎక్కొస్తది.
*Rajesh$_i$-ku [Sreekar cheTTu ekk]-ostadi
Rajesh.obl-dat [Sreekar.nom tree.acc climb.inf]-know.how.to
Attempted: 'Rajesh knows how Sreekar to climb the tree.'

(32) ***-ostadi* does not allow strict readings under ellipsis**

రాజేష్కు చెట్టు ఎక్కొస్తది. రవికి కూడ.
Rajesh-ku [cheTTu ekk]-ostadi. Ravi-ki kuuDa.
Rajesh.obl-dat [tree.acc climb.inf]-know.how.to Ravi.obl-dat too
'Rajesh knows how to climb the tree. Ravi does, too.' (Only sloppy readings)

(33) ***-ostadi* has exhaustive co-reference between matrix and embedded subjects**

*రవికి గుంపు గూడొస్తది.
*Ravi-ki [gumpu guuD]-ostadi
Ravi.obl-dat [group gather.inf]-know.how.to
Attempted: 'Ravi knows how to gather.'

On the other hand, *-avasaramu ledu* 'not need' consistently fails them:

(34) ***-avasaramu ledu* 'to not need' does allow disjoint embedded subjects**

a. రాజేష్కు చెట్టు ఎక్కనవసరము లేదు.
Rajesh$_i$-ku [EC$_{i,j}$ cheTTu ekkan]-avasaramu ledu
Rajesh.obl-dat [EC tree.acc climb.inf]-need not
'Rajesh needs (himself, someone else) to climb the tree.'

b. రాజేష్కు శ్రీకర్ చెట్టు ఎక్కనవసరము లేదు.
Rajesh$_i$-ku [Sreekar cheTTu ekkan]-avasaramu ledu
Rajesh.obl-dat [Sreekar.nom tree.acc climb.inf]-need not
'Rajesh needs Sreekar to climb the tree.'

(35) ***-avasaramu ledu* does allow strict readings under ellipsis**

శ్రీకాంత్కు ఇక్కడనించి వెళ్లిపోనవసరము లేదు. అమీర్కు కూడ.
Srikanth-ku [ikkaDa-ninchi vellipoon]-avasaramu ledu. Amir-ku kuuDa.
Srikanth.obl-dat [here-from go.away.inf]-need not Amir.obl-dat too
'Srikanth doesn't need to go away from here. Amir doesn't, either.' (Strict and sloppy readings)

(36) ***-avasaramu ledu* does not require exhaustive co-reference between subjects**

రవికి గుంపు గూడనవసరము లేదు.
Ravi-ki [gumpu guuDan]-avasaramu ledu
Ravi.obl-dat [group gather.inf]-need not

'Ravi doesn't need to gather.'

To now re-re-recap, we have identified four different types of predicates with respect to type of non-finite complementation and the presence of OC vs. NC:

(37) **Non-finite complement-taking predicates in Telugu**

	Gerunds	Infinitives
OC	*begin, quit...*	*know how to*
NC	*enjoy, plan...*	*not need*

2.4.3 Finite complementation in Telugu

So far I have only considered Telugu sentences with non-finite (gerund or infinitival) clausal complements, and only exhaustive OC and NC. This subsection fills out the paradigm with a short discussion of finite complementation in Telugu.

The main strategy for finite complementation in Telugu is through the complementizer *ani*, which is derived from the verb *anu* 'say'. Finite complements in Telugu include fully inflected verbs, with TAM and agreement marking licit and required inside of these clauses:

(38) నేను నువ్వు చదువుతున్నావు అని వాడికి చెప్పాను.
nenu [nuvvu chaduvu-*(tu)-*(unnaa)-*(vu) ani] vaaDi-ki chepp-aa-nu
I.nom [you.sg.nom read-prog-cop-2sg that] he.obl-dat tell-pst-1sg
'I told him that you are reading.'

These complements, though they can have null subjects, never show obligatory co-reference or bound-variable readings between any matrix arguments and aforementioned null subjects:

(39) [$EC_{i,j}$ ఆ పని చేసాడు అని] రవి$_i$ చెప్పాడు.
[$EC_{i,j}$ aa pani cees-aa Du ani] ravi$_i$ cepp-aa-Du
[EC that work.acc do-pst-3sg.m that] Ravi.nom say-pst-3sg.m
'Ravi said that $he_{i,j}$ did that work.'

Thus, though the expected correlation between non-finiteness and OC clearly does not hold for Telugu, the corresponding correlation between finiteness and non-control does.

3 Existing accounts of the OC/NC split

Most modern syntactic accounts of control derive the difference between exhaustive OC and NC from a difference in the syntactic structure of the two types of complement clauses. This is because in the languages that the control literature has studied best, there is a very strong correlation between morphological finiteness and NC. For example, in English, non-finite complements with null subjects are *always* OC, while finite complements 1) can never have null subjects and 2) are always NC:

(40) John$_i$ tried $EC_{i,*j}$ to open the door.

(41) John$_i$ remembered EC$_{i,*j}$/him$_{*i,j}$ opening the door.

(42) John$_i$ remembered that *EC/he$_{i,j}$ opened the door.

I begin this section by discussing how this finiteness-OC correlation is cashed out in a variety of accounts of control (Chomsky/Lasnik, Landau 2004, McFadden & Sundaresan 2018) and evaluating their abilities to explain the Telugu generalizations.

3.1 Chomsky/Lasnik - NC clauses are those that have nominative subjects

Based on paradigms like the English one given above, Chomsky and Lasnik point out that in English, nominative subjects and null subjects are totally mutually exclusive - where one is licensed, the other is ungrammatical. Thus, they argue, null subjects in English are an instance of the special lexical item PRO - an obligatorily bound, obligatorily null pronoun which only occurs in non-finite clauses, where nominative cannot be assigned. When PRO is in the right structural relationship with an overt subject (e.g., the subject position of a complement clause), it is obligatorily bound by and co-referent with that overt subject. Thus, NC clauses are finite, because finite complements are where PRO is not licensed, while all non-finite complements with null subjects are OC, because all null subjects are PRO and PRO is obligatorily bound.

This type of account is a non-starter for Telugu, as noted by Kissock (2014) and Sundaresan (2014), as well as by Sundaresan (2010) for the related language Tamil. Firstly, null subjects have a much wider distribution in Telugu than they do in English - matrix, finite clauses, too, can be subjectless:

(43) ఇది తిన్నాను.
EC idi tinn-aa-nu
EC this.acc eat-pst-1sg
'I ate this.'

The canonical way to get around this, of course, is to claim that null subjects in finite clauses of pro-drop languages like Telugu are actually a different lexical item, *pro*, which can be assigned nominative case. This leaves us room to say that null subjects of *non-finite* clauses, even in pro-drop languages, are still PRO. However, even in non-finite clauses, null subjects in Telugu alternate with overt nominative DPs:

(44) నేను నువ్వు చదవడం చూసాను.
nenu [nuvvu/EC chadav-aDam] chuus-aa-nu
I.nom [you.sg.nom/EC read-nmlz.acc] see-pst-1sg
'I saw you reading.'

Thus, since the tight connection between control and case assignment in English does not extend to Telugu, the Chomsky/Lasnik account fails.

3.2 Landau (2004) - NC clauses must be [+T], [+Agr]

Landau's influential account of control uses as its base mechanism Agree. However, in his 2004 paper on scales of finiteness, he posits that the difference between controlled and non-controlled clauses across languages is tied to certain abstract features of both embedded and matrix C and T heads. He calls these abstract features [±T(ense)] and [±Agr(eement)]. He crucially states that "the co-occurrence of [+T] and [+Agr] on the [embedded] T head is a necessary condition for a clause to be non-controlled" (Landau, 2004, p.840–841). He also states that [+Agr] on T heads is limited to those which instantiate overt ϕ-agreement. Interestingly, he divorces these featural specifications from morphological finiteness in order to explain phenomena like Portuguese inflected infinitives. Since these complements are [+Agr] (and tensed), it is expected that they should be NC. However, Telugu non-finite NC complements are [-Agr] - no overt ϕ-agreement morphology is allowed on them:

(45) రవి హవాయికి వెళ్లడానికి ప్లాన్ చేసాడు.
Ravi$_i$ [EC$_{i,j}$ Hawaii-ki vell-aDaani-ki] plan cees-aa-Du
Ravi.nom [EC Hawaii.obl-dat go-nmlz.obl-dat] plan do-pst-3sg.m
'Rajesh planned (for himself, for someone else) to go to Hawaii.'

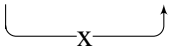
Thus, regardless of whether they are [+T] or [-T], the account presented in Landau (2004) would falsely predict Telugu gerunds and infinitives to be OC across the board.

3.3 McFadden & Sundaresan 2018 - NC clauses have more structure than exhaustive OC clauses

The McFadden & Sundaresan account, like the Landau account, treats control as a consequence of a syntactic Agree dependency between the controller and the controllee. Exhaustive OC occurs when a complement clause lacks a C layer, thus rendering it transparent to Agree between the matrix controller and the embedded controllee:

(46) **McFadden & Sundaresan 2018: Exhaustive Control**
DP$_i$ V [UPro$_{i,*j}$...]

On the other hand, NC complement clauses (e.g. prototypical finite complements) have a C layer which blocks Agree into its c-command domain due to CP being a phase.

(47) **McFadden & Sundaresan 2018: Non-Control**
DP$_i$ V [C UPro$_{i,j}$...]


Importantly, they also assume that there is only one type of null subject in the languages that they consider, which they call UPro. This null subject is interpreted as PRO (i.e. controlled) just when it is Agreed with successfully by the matrix controller. When it isn't Agreed with, it is interpreted as *pro*. This allows them to sidestep the issue of the licensing of PRO - they don't need to say anything about special case-assigning properties of non-finite clauses

because their analysis has nothing to do with a special null subject which is restricted to non-finite clauses. Considering that the case facts in Telugu are exactly the same as those in the language which forms the basis of their account (Tamil), I follow them in assuming UPro.

The notion that the OC/NC distinction is tied to the lack of a C layer in the former type of complement clause works quite nicely for the OC/finite distinction in Telugu, because true finite complements in Telugu have an overt complementizer and consequently show no OC properties, while non-finite OC complements (as we've seen) do not have an overt complementizer.

However, the McFadden & Sundaresan account has a clear problem when it comes to the core empirical generalization of this paper - what should we do when we have an OC/NC distinction that does not correlate to any surface complementizer, like in the following examples?

(48) రవి హవాయికి వెళ్లడానికి ప్లాన్ చేసాడు.
Ravi$_i$ [UPro$_{i,j}$ Hawaii-ki vell-aDaani-ki] plan ches-aa-Du
Ravi.nom [UPro Hawaii-dat go-nmlz.obl-dat] plan do-pst-3sg.m
'Ravi planned for (himself, someone else) to go to Hawaii.'

(49) రవి పొగ తాగడం మానేసాడు.
Ravi$_i$ [UPro$_{i,*j}$ poga thaag-aDam] maanes-aa-Du
Ravi.nom [UPro smoke drink-nmlz.acc] quit-pst-3sg.m
'Ravi quit smoking.'

To see what they might say, we can look to their account of partial control. For them, partial control involves a non-finite complement with a special, null C head which mediates Agree in such a way that triggers the partial co-reference that partial control predicates require between the controller and the controllee.

(50) **McFadden & Sundaresan 2018: Partial Control**
DP$_i$ V [C UPro$_{i,j}$...]

For Telugu, then, one might argue that there is simply a different special null C than the ones seen in partial control languages - this one behaves like overt finite C in blocking Agree between controller and controllee, but it still selects a non-finite T. We might expect that if this is the case, there should be independent evidence for this extra structure in non-finite NC clauses - the following subsection tests this prediction.

3.4 Could NC gerunds and infinitives be covertly finite?

If the 'null finite C' hypothesis is correct, we expect that NC gerunds and infinitives, crucially to the exclusion of OC gerunds and infinitives should pattern with finite clausal complements with respect to finiteness diagnostics. In this section, I show that scrambling, NPI licensing, and inverse scope readings, which are all blocked by finite complements in Telugu, never make the desired cut between NC and OC non-finite complements.

3.4.1 Scrambling

In Telugu, word order in a sentence is relatively free modulo information structural factors - in other words, Telugu features scrambling. For a simple three-word transitive sentence, all possible word orders are allowed - the following sentences could all be translated into English as 'I ate this.':

(51) **Scrambling possibilities in finite clauses**

a. *nenu idi tinnaanu.*
b. *idi nenu tinnaanu.*
c. *nenu tinnaanu idi.*
d. *idi tinnaanu nenu.*
e. *tinnaanu nenu idi.*
f. *tinnaanu idi nenu.*

Scrambling is also possible within gerund clauses:

(52) *Scrambling possibilities in gerunds*

a. *nenu idi tinaDam* 'me eating this'
b. *idi nenu tinaDam* 'me eating this'

Crucially, scrambling possibilities appear to be sensitive to finiteness - finite complement clauses cannot be scrambled out of:

(53) **Scrambling of the object of an embedded finite clause to a matrix clause-internal position is ungrammatical**

a. రాజేష్ శ్రీకర్ అన్నం తింటాడు అని చెప్పాడు.
Rajesh [Sreekar annam tin-Taa-Du ani] chepp-aa-Du
Rajesh.nom [Sreekar.nom rice.acc eat-fut/hab-3sg.m that] see-pst-3sg.m
'Rajesh said that Sreekar will eat rice.'

b. *రాజేష్ శ్రీకర్ తింటాడు అని అన్నం చెప్పాడు.
*Rajesh [Sreekar tin-Taa-Du ani] annam chepp-aa-Du
Rajesh.nom [Sreekar.nom eat-fut/hab-3sg.m that] say-pst-3sg.m
Attempted: 'Rajesh said that Sreekar will eat rice.'

If it is the case that non-finite OC clauses are truly non-finite, while non-finite NC clauses are covertly finite, we might expect that the former allow scrambling out of them while the latter do not. It turns out, however, that elements of a gerund complement can never scramble into the matrix clause, regardless of control:

(54) **No scrambling out of a non-controlled gerund**

a. ఆరుషుకు అన్నం ఎక్కువ తినడం అవసరము.
Aarush$_i$-ku [UPro$_{i,j}$ annam ekkuva tin-aDam] avasaramu
Aarush.obl-dat [rice.acc more eat-nmlz.nom] need
'Aarush needs (himself, someone else) to eat more rice.'

b. *ఆరుషుకు ఎక్కువ తినడం అన్నం అవసరము.
*Aarush$_i$-ku [UPro$_{i,j}$ ekkuva tin-aDam] annam avasaramu
Aarush.obl-dat [more eat-nmlz.nom] rice.acc need
'Aarush needs (himself, someone else) to eat more rice.'

(55) **No scrambling out of a controlled gerund**

a. రవి అన్నం తినడం మొదలుపెట్టాడు.
Ravi$_i$ [UPro$_{i,*j}$ annam tin-aDam] modalupeTT-aa-Du
Ravi.nom [EC rice.acc eat-nmlz.acc] begin-pst-3sg.m
'Ravi began to eat rice.'

b. *రవి తినడం అన్నం మొదలుపెట్టాడు.
*Ravi$_i$ [UPro$_{i,*j}$ tin-aDam] annam modalupeTT-aa-Du
Ravi.nom [EC eat-nmlz.acc] rice.acc begin-pst-3sg.m
Attempted: 'Ravi began to eat rice.'

On the other hand, elements of an infinitival complement can *always* scramble into the matrix clause, again regardless of control:

(56) **Scrambling out of a non-controlled infinitival clause is allowed**

a. రవికి నేను పని చెయ్యనక్కర లేదు.
Ravi-ki [nenu pani cheyyan]-akkara ledu
Ravi.obl-dat [1sg.nom work do]-need is.not
'Ravi doesn't need me to work.'

b. రవికి పని చెయ్యనక్కర లేదు నేను.
Ravi-ki [pani cheyyan]-akkara ledu nenu
Ravi.obl-dat [work do]-need is.not 1sg.nom
'Ravi doesn't need me to work.'

(57) **Scrambling out of a controlled infinitival clause is allowed**

a. రవికి అన్నం తినొస్తది.
Ravi$_i$-ki [UPro$_{i,*j}$ annam tin]-ostadi
Ravi.obl-dat [EC rice.acc eat]-know.how.to
'Ravi knows how to eat rice'

b. రవి తినొస్తది అన్నం.
Ravi$_i$ [UPro$_{i,*j}$ tin]-ostadi annam
Ravi.nom [EC eat]-know.how.to rice.acc
'Ravi knows how to eat rice.'

So the scrambling test, while it is clearly sensitive to structure and makes a very clear cut between infinitives on the one hand and gerunds/finite clauses on the other, is not at all sensitive to the OC/NC distinction.

3.4.2 NPI licensing

In Telugu, wh-words are NPIs - in the context of verbal negation, they can be interpreted as negative indefinites:

(58) ***eemi* as a wh-word**

వాడు ఏమి చేసాడు?
vaaDu eemi ches-aa-Du?
3sg.m.nom what do-pst-3sg.m
'What did he do?'

(59) ***eemi* as an NPI**

వాడు ఏమి చెయ్యలేదు.
vaaDu eemi cheyya-ledu.
3sg.m.nom anything do-pst.neg
'He didn't do anything.'

This NPI interpretation of wh-words is clausebound - negation in the matrix clause does not license a negative indefinite interpretation of a wh-word in an finite complement clause:

(60) **Wh-subjects of embedded finite clauses cannot be NPIs**

పని ఎవరు చేసాడు అని రమేష్ చెప్పలేదు.
[pani evaru ches-aa-Du ani] Ramesh cheppa-ledu.
[work.acc who.nom do-pst-3sg.m that] Ramesh.nom say-pst.neg
'Ramesh did not say who did the work/*Ramesh did not say anyone did the work.'

Non-finite OC gerunds and infinitives allow NPI licensing into them from matrix negation:

(61) **Gerund complements of exhaustive control verbs are transparent to NPI licensing**

నేను దేన్ని తినడం మానెయ్యలేదు.
nenu$_i$ [UPro$_{i,*j}$ deen-ni tin-aDam] maaneyya-ledu
1sg.nom [EC anything.obl-acc eat-nmlz.acc] quit-pst.neg
'I didn't quit eating anything.'

(62) **Infinitive complements of exhaustive control verbs are transparent to NPI licensing**

నాకు ఏ భాష చదవరాదు.
naa$_i$-ku [UPro$_{i,*j}$ ee bhaasha chadava]-raadu
1sg.obl-dat [EC any language read]-know.how.to.neg
'I do not know how to read any language.'

However, so do NC gerunds and infinitives:

(63) **Gerund complements of non-control verbs are transparent to NPI licensing**

నేను		ఎవరిని	కొట్టడానికి	ప్లాన్ చెయ్యలేదు.
nenu$_i$	[UPro$_{i,j}$	evari-ni	koTT-aDaani-ki]	plan cheyya-ledu
1sg.nom	[EC	anyone.obl-acc	hit-nmlz.obl-dat]	plan do-pst.neg

'I didn't plan to hit anyone.'

(64) **Infinitive complements of non-control verbs are transparent to NPI licensing**

నాకు		ఎవరిని	కొట్టనవసరము	లేదు.
naa$_i$-ku	[UPro$_{i,j}$	evari-ni	koTTan]-avasaramu	ledu
1sg.obl-dat	[EC	anyone.obl-acc	hit]-need	not

'I do not need (myself, someone) to hit anyone.'

Thus, we again have a phenomenon which is clearly blocked by finite complementation that does not make a cut between OC gerunds/infinitives vs. NC gerunds/infinitives.

3.4.3 Inverse scope readings

The final diagnostic I use for finiteness is the possibility of inverse scope readings of quantifiers. As in many languages, sentences like the following have two different interpretations in Telugu based on which quantifier scopes over the other:

(65) **Inverse scope in Telugu**

ఒక	మనిషి	ప్రతి	ఇంటిముందు	ఉన్నాడు.
oka	manishi	prati	inTi-mundu	unn-aa-Du
a	man	every/each	house.obl-in.front	be-nonpst-3sg.m

'A man is in front of every house' $\exists > \forall / \forall > \exists$

However, when one quantifier is in the matrix clause while the other is buried in a finite complement, the inverse scope reading is gone:

(66) **IS readings are blocked by finite clause boundaries**

ఒక	మనిషి	ప్రతి	ఇంటిముందు	ఉన్నాడు	అని	చెప్పాడు.
oka	manishi	[prati	inTi-mundu	unn-aa-Du	ani]	chepp-aa-Du
a	man	[every/each	house.obl-in.front	be-nonpst-3sg.m	that]	say-pst-3sg.m

'A man said he was in front of every house.' $\exists > \forall / * \forall > \exists$

If NC gerunds and infinitives are covertly finite, we might expect them, too, to block inverse scope readings of quantifiers inside of them. On the other hand, if OC gerunds and infinitives are truly non-finite, we might expect them to allow inverse scope readings of quantifiers inside of them with respect to quantifiers outside of them. This is not what we see - gerunds are always opaque to inverse scope readings, regardless of control:

(67) **Inverse scope readings are blocked across controlled clause boundaries**

ఒక	మనిషి		ప్రతి	ఇంటుముందు	నిలబడడం	మానేసాడు.
oka	manishi$_i$	[UPro$_{i,*j}$	prati	inTi-mundu	nilabaD-aDam]	maanes-aa-Du
a	man.nom	[EC	every	house.obl-in.front	stand-nmlz.acc]	quit-pst-3sg.m

'A man quit standing in front of every house.' $\exists > \forall / * \forall > \exists$

(68) **IS readings blocked across non-controlled clause boundaries**

ఒక మనిషి ప్రతి ఇంటిముందు నిలబడడానికి ప్లాన్
oka manishi$_i$ [EC$_{i,j}$ prati inTi-mundu nilabaD-aDaani-ki] plan
a man.nom [EC every house.obl-in.front stand-nmlz.obl-dat] plan
చేసాడు.
ches-aa-Du
do-pst-3sg.m
'A man planned to stand in front of every house.' $\exists > \forall / * \forall > \exists$

(69) **IS readings blocked across embedded clauses with overt disjoint subjects**

ఒక మనిషి రాజేష్ ప్రతి ఇంటిముందు నిలబడడానికి ప్లాన్
oka manishi [Rajesh prati inTi-mundu nilabaD-aDaani-ki] plan
a man.nom [Rajesh.nom every house.obl-in.front stand-nmlz.obl-dat] plan
చేసాడు.
ches-aa-Du
do-pst-3sg.m
'A man planned for Rajesh to stand in front of every house.' $\exists > \forall / * \forall > \exists$

Inverse scope readings are ameliorated for infinitives, regardless of control:

(70) ప్రతి ఇంటిముందు ఒక మనిషికి నిలబడొస్తది.
prati inTi-mundu oka manishi$_i$-ki [UPro$_{i,*j}$ nilabaD]-ostadi
every house.obl-in.front a man.obl-dat [EC stand]-know.how.to
'A man knows how to stand in front of every house.' $\exists > \forall / ? \forall > \exists$

(71) ప్రతి ఇంటిముందు ఒక మనిషికి నిలబడనవసరము లేదు.
prati inTi-mundu oka manishi$_i$-ki [UPro$_{i,j}$ nilabaDan]-avasaramu ledu
every house.obl-in.front a man.obl-dat [EC stand]-need not
'A man doesn't need to stand in front of every house.' $\exists > \forall / ? \forall > \exists$

It is entirely possible that some other less obvious diagnostic would actually make the cut between NC and OC gerunds/infinitives. In the case that future work uncovers such a diagnostic, the hypothesis that OC complements are smaller than NC complements would be much more enticing. However, given what we know, such an analysis is arbitrary at best and unexplanatory at worst.

4 A modified version of the UPro account

It is clear that, at least for Telugu, an account of control which places too much emphasis on properties of the embedded clause will be, at best, inefficient. However, existing Agree-based accounts (especially that of McFadden & Sundaresan) do provide us with some very useful results. First, the restriction of controlled elements to subject position, which is naturally explained due to Agree's being sensitive to structural height. Secondly, the notion

of UPro, which is ambiguous between *pro* and PRO, allows us to build an account that doesn't depend on certain embedded clauses licensing PRO while others only license *pro*.

4.1 A solution - OC is triggered by a probe on v

In building my alternative, I begin with the observation that the real generalization about the distribution of OC in Telugu is that it is a property of the matrix verb itself. The predicates *modalupeTTu* 'begin' and *plan cheyyu* 'plan' both take the same type of gerund complement, but the former is OC and the latter NC. I translate this key observation into the Agree framework in the following way: I posit that there exist two v heads in Telugu - v_{OC}, which selects OC predicates (a category which presumably carries some feature in common which v_{OC} can be sensitive to), and v_{NC}, which selects NC predicates. v_{OC} probes into the embedded clause and Agrees with null embedded subjects. I follow McFadden & Sundaresan in assuming that there is only one type of embedded subject in Telugu, UPro, which is interpreted as OC PRO just when v_{OC} agrees with it successfully. Successful Agree between v_{OC} and embedded UPro forces the matrix subject (Merged in Spec,vP) to share the same index as UPro.

(72) **Exhaustive Subject Control in Telugu**
DP$_i$ v$_{OC}$ V [UPro$_{i,*j}$...]

Non-control predicates, whether they take finite or non-finite complements, are selected by v_NC, which does not have the relevant probe. Thus, null subjects of complement clauses under this class of verbs are not controlled because there is no Agree relation between matrix v and UPro.

(73) **Non-Control in Telugu**
DP$_i$ v$_{NC}$ V [C UPro$_{i,j}$...]
[No Agree]

This analysis preserves the benefits of the UPro-Agree analysis while also better capturing the core generalization about OC in Telugu - it is not a property of the embedded clause but instead a property of the matrix verb (now more specifically, a property of the v head which selects the matrix verb).

5 Conclusion

The traditional bijection between finiteness and control has been problematized many times in the 40-odd years since the Chomsky/Lasnik Case-based account of control was introduced to the field. However, while finiteness being a sufficient condition for NC has been doubted often (i.e. by Landau (2004) on Hebrew finite control), the corresponding assumption that non-finiteness is a sufficient condition for OC has not been pushed nearly as much.

In this paper, I show conclusively that Telugu has both OC and NC non-finite complement clauses. I argue that many modern syntactic accounts of control, which often explain

the OC/NC distinction by assuming structural differences between OC and NC embedded clauses, cannot handle such a language without positing null structure for which there is a lack of independent evidence. I then posit a slightly tweaked version of McFadden & Sundaresan's Agree-based account which captures the core generalization about subject OC in Telugu - that non-finiteness is an insufficient condition for it, and that the choice of matrix verb is relevant as well.

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Number, Honor, and Agreement in Hindi-Urdu

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ABSTRACT

In Hindi-Urdu, the honorific marker *ji:* can be added to a third person nominal to signal honorification of the nominal referent. The use of *ji:* triggers plural agreement, despite the nominal itself being singular. We propose that the formative that carries the semantics of plurality ($*$) and the formative that carries the semantics of honorification (Hon) occupy the same syntactic position, which we identify as Num. These two formatives have the same formal features, which correspond to the features responsible for what is called plural agreement, and make the same selectional demand of their complement, namely that it appear in the oblique form. However the formatives have distinct realizations and distinct semantics. Both can have zero realization or overt realization; for honorification the overt realization can be at least *-ji:, sa:b, mahoday, sir, ma'am*, and for pluralization *-ã:, -õ*. The two formatives are in complementary distribution; Hon blocks $*$ and vice-versa; this means that the complement of Hon has no choice but to stay singular. We end by describing the honorific distinctions shown with second-person pronouns, describing additional complexities that their analysis requires.

1 Introduction

1.1 Number agreement and honorificity: Basic data and starting analysis

The examples in (1) show the basic contrast in Hindi-Urdu number agreement. In these examples, *hɛ* 'to be' is used with the third person singular subject *Mi:na:*, while with the third person plural subject *ve laṛkiyã:* 'those girls' the verb is realized as *hɛ̃*. That is, the presence or absence of nasalization serves as the realization of number agreement, with nasalization signaling agreement with a plural subject.

(1) a. Mi:na: lambi: hɛ
Mina.F tall.F be.PRS.3.SG
'Mina is tall.'

b. ve laṛkiyã: lambi: hɛ̃
DEM.PL girl.F.PL tall.F be.PRS.3.PL
'Those girls are tall.'

In (2), the third person singular subject *Mi:na:* appears with the honorific suffix *ji:*. Despite still denoting a singular referent, the *ji:*-marked third person subject is no longer compatible with singular agreement, as demonstrated by the ungrammaticality of (2a). Instead, the

adjective and verb must appear with plural agreement morphology, as see in (2b), the same forms that appear with semantically plural subject noun phrases like that in (1b).

(2) a. * Mi:na:-ji: lambi: hɛ
Mina.F-HON tall.F be.PRS.3.SG

b. Mi:na:-ji: lambi: hɛ̃
Mina.F-HON tall.F be.PRS.3.PL
'Mina, who I respect, is tall.'

Based on this pattern, we begin by arguing that the honorific suffix *ji:* expresses the morpheme Hon, attaching to an NP and signaling the speaker's respect toward the NP referent. Hon in turn brings in a formal PL feature which triggers plural agreement. This PL feature, though formally identical to that which is elsewhere associated with semantic plurality, does not in this environment signal semantic plurality. Instead, it seems to mark honorification of the subject.

In §2, we provide evidence pertaining to the location of Hon within the NP structure, showing that it attaches above the head noun and below the demonstrative. The formal PL feature borne by Hon is shown to trigger agreement with higher NP elements, in particular with demonstratives, while simultaneously requiring apparently singular morphology and semantics on its nominal complement. In §3, we introduce a puzzle related to masculine nouns, which seem to appear with plural morphology when combined with Hon, in contrast to feminine nouns, which appear with singular morphology. This apparent contradiction is resolved by arguing that the nominal complement of Hon appears in the singular oblique form, which for masculine nouns results in a syncreticism with the plural direct form. §4 offers two alternative analyses of the facts presented in the previous sections, one in terms of contextual allosemy (see Wood 2020) and the other based on ambiguity. The basic idea in both analyses is that there is a single PL feature associated with one of two meanings: a meaning associated with pluralization and a meaning associated with honorification. §5 introduces a number of other lexical bearers of Hon, all of which trigger plural agreement and are thus analyzed has having a formal PL feature. One such variant is phonologically null, so that a singular subject with plural agreement can in some circumstances be interpreted as honorific without an overt Hon morpheme. Finally, section 6 extends the discussion to second person pronouns, which show a three-way distinction in honorific status, with complex effects on their resulting agreement patterns.

2 Where is honorificity?

Given that Hon attaches to an NP, the question naturally arises as to what kind of NP[1] it attaches to. That is, does it attach to a maximal NP, or to some subconstituent thereof? To explore this question, we look within the NP, starting with honorification of common

[1]For convenience, we refer to the maximal nominal projection as NP, which corresponds to DP in many theories; this terminology is merely an attempt at maintaining theory-neutrality.

nouns. The examples in (3) show the basic singular-plural contrast in non-honored third person feminine common nouns, here illustrated by *laṛki:* 'girl' and *laṛkiyã* 'girls'. Note that the verb shows overt number agreement with the subject: *hɛ* for singular and *hɛ̃* for plural.

(3) a. laṛki: lambi: hɛ
girl.F.SG tall.F be.PRS.3.SG
'The girl is tall.'

b. laṛkiyã: lambi: hɛ̃
girl.F.PL tall.F be.PRS.3.PL
'The girls are tall.'

The examples in (4) show that while *ji:* triggers plural agreement, it attaches to common nouns that are both morphologically and semantically singular. The grammatical example in (4a) satisfies this requirement, while the ungrammatical example in (4b) does not. Note that the use of *ji:* requires a *singular* noun but triggers *plural* agreement, making *hɛ* ungrammatical in (4a). The use of *ji:* with a plural noun, meanwhile, leads to ungrammaticality regardless of verb agreement, as shown in (4b).

(4) a. laṛki:-ji: lambi: hɛ̃ / *hɛ
girl.F.SG-HON tall.F be.PRS.3.PL / *be.PRS.3.SG
'The girl, who I respect, is tall.'

b. * laṛkiyã:-ji: lambi: hɛ̃ / hɛ
girls.F.PL-HON tall.F be.PRS.3.PL / be.PRS.3.SG
intended: 'The girls, who I respect, are tall.'

We conclude that *ji:* requires a semantically and morphologically singular noun complement. But the following example shows that the *entire* NP is *not* morphologically singular. In this example, the *ji:*-marked subject NP is headed by the singular noun *lambi:* 'girl', but contains the plural demonstrative *ve*.[2]

[2]The plural demonstrative *ve* contrasts with *vo*, but the latter is number-neutral rather than singular; that is, the two demonstratives are analyzed as follows:

i. a. *ve* = DEM.PL
ve is marked for number, can only combine with formally plural NPs.

b. *vo* = DEM, ≠ DEM.SG
vo is unmarked for number, can combine both with singular NPs and formally plural NPs.

Hence the following example with *vo* is grammatical, but this is not a challenge to the idea that the part of the nominal up from Hon (the *ji:*) is formally plural, since *vo* is number-neutral and thus compatible with plural NPs:

ii. vo larki:-ji: lambi: hɛ̃
DEM girl.F.SG-HON tall.F be.PRS.3.PL
'That girl, who I respect, is tall.'

(5) Dem is plural; N is singular:

[ve larki:-ji:] lambi: hɛ̃
DEM.PL girl.F.SG-HON tall.F be.PRS.3PL

'That girl, who I respect, is tall.'

While the head noun has to be singular, the demonstrative itself cannot be singular. To see this we need to switch to an oblique context[3] – in direct contexts, the 'singular' demonstrative *vo* is actually unmarked for number (see footnote 2, ex. ii). In oblique contexts, there is a contrast between the singular demonstrative *us* and the plural demonstrative *un*. We find that only the plural demonstrative is acceptable with *ji:*.

(6) Dem is plural; N is singular:

[un/*us larki:-ji: ko] bulaa-o
DEM.PL.OBL/*DEM.SG.OBL girl.F.SG-HON DAT call-IMP

'Call that girl, who I respect'

It seems that Hon (expressed by *ji:*) in effect splits the NP in two, with the demonstrative required to appear with plural morphology and the head noun to appear with singular morphology (insofar as these contrasts are morphologically realized). In a picture:

Dem Plural ⇐ Hon ⇒ Singular N

We propose that this picture is derived as follows: Hon (which is realized by *ji:*) selects a semantically singular complement N. The selected N in turn inflects for SG (reflecting its semantics). Hon itself has a formal PL feature, which projects. Higher nominal elements (in particular, Dem) agree with this formal PL feature, leading to a formally plural NP with singular semantics and a formally singular head noun. Predicate agreement with an honored NP subject tracks the projected PL feature projected by Hon.

We stress that the projected PL feature is purely formal, and in no sense encodes semantic plurality, as shown by the compatibility of honorificized NPs with the numeral *ek* 'one':

(7) a. ek laṛki: lambi: hɛ
one girl.F.SG tall.F be.PRS.3.SG
'One girl is tall.'

b. * ek laṛkiyã: lambi: hɛ̃
one girl.F.PL tall.F be.PRS.3.PL
Literally: 'One girls are tall.'

c. ek laṛki:-ji: lambi: hɛ̃ / *hɛ
one girl.F.SG-HON tall.F be.PRS.3.PL / be.PRS.3.SG
'One girl, who I respect' is tall.'

[3]We discuss the phenomenon of obliqueness in §3.

Having argued that Hon selects for singular head nouns, we now turn to data that seem to contradict this conclusion.

3 Honorification and obliqueness

3.1 A puzzle: Masculine common nouns

All the examples in the previous section involved feminine common nouns. This is no accident. When we look at masculine common nouns, an apparent contradiction with the generalizations derived thus far emerges:

(8) a. laṛka: lamba: hɛ
boy.M.SG tall.M.SG be.PRS.3.SG
'The boy is tall.'

b. laṛke lambe: hɛ̃
boy.M.PL tall.M.PL be.PRS.3.PL
'The boys are tall.'

c. laṛk**e**-ji: lambe: hɛ̃
boy.M.**??**-HON tall.M.PL be.PRS.3.PL
'The boy, who I respect, is tall.'
unavailable: 'The boys, who I respect, are tall.'

Comparing (8c) with (8a) and (8b), the honored subject in (8c) has what looks like plural marking on the NP but has only a singular meaning. (8c) is also in conflict with (4b), which showed that morphological marking of plurality on the noun was incompatible with *-ji:*. This would apparently lead us to the following description:

1. feminine nouns + Hon: noun appears in a 'singular' form; 'plural' form is bad.

2. masculine nouns + Hon: noun appears in a 'plural' form; 'singular' form is bad.

Despite the apparent plural morphology, the masculine head noun does not signal semantic plurality; masculine nouns are still compatible with *ek* 'one', just like feminine honorificized nouns:

(9) a. ek laṛka: lamba: hɛ
one boy.M.SG tall.M.SG be.PRS.3.SG
'One boy is tall.'

b. * ek laṛke lambe: hɛ̃
one boy.M.PL tall.M.PL be.PRS.3.PL
Literally: '*One boys are tall.'

c. ek laṛk**e**-ji: lambe: hɛ̃
one boy.M.**??**-HON tall.M.PL be.PRS.3.PL
'One boy, who I respect, is tall.'

It would seem, then, that there are conflicting data patterns: for feminine nouns, *ji:* selects for a semantically and morphologically singular head noun, while for masculine nouns, *ji:* selects for a semantically singular but morphologically plural head noun.

3.2 A solution: Obliqueness

In Hindi-Urdu and many other Indo-Aryan languages nominals have two distinct forms: a direct form that appears when the nominal is not the complement of a postposition and an oblique form that appears when the nominal is the complement of a postposition. For the noun we saw in the previous section meaning 'boy', the singular direct form is *laṛka:* 'boy.M.SG', as seen in (10a). When appearing as the complement of the dative postposition *ko*, however, it appears in the oblique form *laṛke ko* 'boy.M.SG.OBL DAT', as seen in (10b).

(10) a. DIRECT

laṛka: a:j a:-ya:
boy.M.SG.DIR today come-PFV.M.SG

'The boy came today.'

b. OBLIQUE

laṛke ko a:j a:-na: hɛ
boy.M.SG.OBL DAT today come-INF be.PRS.3.SG

'The boy has to come today.'

The realization of the direct/oblique distinction depends upon the particular nominal. A subset of masculine nouns that end in *-a:* behave as in (11). Most other masculine nouns behave as in (12). (13) is representative of feminine nouns.

(11) most *-a:* ending MASCULINE NOUNS

	DIRECT	OBLIQUE
SG	laṛka:	laṛke
PL	laṛke	laṛkõ

(12) other MASCULINE NOUNS

	DIRECT	OBLIQUE
SG	dhobi:	dhobi:
PL	dhobi:	dhobiyõ

(13) FEMININE NOUNS

	DIRECT	OBLIQUE
SG	laṛki:	laṛki:
PL	laṛkiyã:	laṛkiyõ:

With masculine nouns, there is a syncretism between M.PL.DIR and M.SG.OBL; that is, the plural direct form is homophonous with the singular oblique form. So when we see a form like *laṛke*, we cannot tell from morphology alone whether it is M.PL.DIR or M.SG.OBL. The syncretism does not hold for feminine nouns – compare *laṛkiyã:* 'girl.PL.DIR' with

laṛki: 'girl.SG.DIR/OBL'. With feminine nouns, there is instead syncretism of DIRECT and OBLIQUE *singular*.

Putting the pieces together, we argue that the contrast noted above between masculine and feminine nouns is only apparent: *ji:* selects for a singular head noun, but requires that this noun appear in the *oblique* rather than the direct form. The data with feminine common nouns tells us only that *ji:* requires a singular noun, since there is no formal difference between singular direct and oblique forms. The fact that *ji:* selects for an oblique common noun only becomes apparent when looking at masculine nouns, and this fact is obscured by the systematic syncretism between the oblique singular and the direct plural.[4]

(14) a. laṛk**e**-ji: lambe hɛ̃
boy.M.**SG.OBL**-HON tall.M.PL be.PRS.3.PL
'The boy, who I respect, is tall.'

b. laṛk**i:**-ji: lambi: hɛ̃
girl.F.**SG.OBL**-HON tall.F be.PRS.3.PL
'The girl, who I respect' is tall.'

To complete the picture, we show how demonstratives display number and obliqueness, something we touched upon in footnote 2 and example (6). (15) shows that the number-neutral demonstrative *vo* and the plural *ve* are both direct forms. *us* (singular) and *un* (plural) are the oblique forms.

(15) DISTAL DEMONSTRATIVE + MASCULINE NOUN

	DIRECT	OBLIQUE	HON.DIRECT	HON.OBLIQUE
SG	vo laṛka:	us laṛke P	vo/ve laṛke ji:	un laṛke ji: P
PL	vo/ve laṛke	un laṛkõ P	NA	NA

As seen in (16), the demonstrative of a *ji:*-marked NP, in contrast to the head noun, cannot appear in the oblique form when it is not in an environment that would otherwise trigger obliqueness, such as in an NP appearing before a postposition.

(16) vo/ve/*un/*us laṛke-ji: lambe hɛ̃
DEM boy.M.SG.OBL-HON tall.M.PL be.PRS.3PL
'That boy, who I respect, is tall.'

This leads us to the following picture: in honored NPs, the morpheme Hon splits the NP in two, such that the head noun is singular and oblique, while the demonstrative is plural and direct:

$$\text{Dem.PL} \Leftarrow \text{Hon} \Rightarrow \text{N.SG.OBL}$$

[4]Sinha (this volume) gives an alternative explanation, according to which only 'portmanteau' plurality (M.PL) can appear below Hon, while segmentally-expressed plurality (F.PL) cannot. The apparent plurality is conditioned by a higher PL and does not correspond to semantic plurality. In this last point, our analyses coincide.

We argue that this is due to Hon selecting a *singular oblique* N complement, and projecting a *plural* feature to the higher NP. Obliqueness is not a feature of Hon, but rather a feature required of its complement, and is not projected. The NP thus "defaults" to the direct form, which is reflected in the morphology of the demonstrative. If the entire NP is *itself* the complement of a higher postposition, then the demonstrative will appear with oblique morphology, due not to Hon but to the postposition selecting the entire NP.

3.3 Additional NP structure

We have shown that Dem behaves differently from N, and that Hon marks the boundary of the two zones. Where do numerals and adjectives fall with respect to this boundary? Unfortunately we cannot tell just on the basis of the forms of adjectives in Hindi-Urdu. To see why, let us remind ourselves of the crucial piece of data that argued for the noun being in a different zone from the demonstrative: this involved feminine nouns which appeared in their singular form. The inflection of adjectives in Hindi-Urdu makes this crucial datum unavailable for determining the structural location of the adjective. The full paradigm of adjectival inflection is presented below.

(17) Adjective Inflection Paradigm, 'tall girl'

	DIRECT	OBLIQUE
F.SG	lambi: laṛki:	lambi: laṛki:
F.PL	lambi: laṛkiyã:	lambi: laṛkiyõ
M.SG	lamba: laṛka:	lambe laṛke
M.PL	lambe laṛke	lambe laṛkõ

Adjectives inflect for number, gender, and obliqueness, but a peculiarity of the inflection makes the feminine part of the paradigm uninformative. Unlike feminine nouns, where number distinctions are overtly realized, the adjectival inflection neutralizes number information in the context of feminine features. The masculine paradigm was already uninformative due to the M.PL.DIR/M.SG.OBL syncretism. So now there is no way to tell whether the adjective is in the higher (plural direct) part of the tree or the lower (singular oblique) part of the tree. Numerals in Hindi-Urdu do not inflect for number or obliqueness, so examining their form is not helpful either. The closely related language Punjabi does not neutralize number information in the context of feminine features and the data there suggests that adjectives are lower than Hon ([Dem[*u*PL] [Hon[PL] [A[*u*PL,*u*GENDER] [[Num[SG] [N[GENDER$_1$]]]]]]]). For Hindi-Urdu, however, the data does not determine the analysis.

4 Analysis: One PL, two meanings

Our core claim is that there is one PL feature that is associated with one of two meanings: a meaning associated with pluralization and a meaning associated with honorification. We first offer a treatment of how the association with the two meanings comes about in terms of contextual allosemy, and then consider an alternative ambiguity proposal.

Under the contextual allosemy proposal, the PL feature can appear under a Hon head or a Num head. Its interpretation depends upon its location – under Hon, [PL] is associated with honorific semantics and under Num, [PL] is associated with 'normal' number semantics. The Num head can be specified singular SG or plural PL. The Hon head, however, comes lexically specified with a PL feature, and selects a singular and oblique complement. So the PL feature can appear in a nominal in the following two configurations.

(18) a. "Regular" PL under Num:
[Dem[*u*PL] [Num[PL] [N[GENDER]]]]
→ [Dem[PL] [Num[PL] [N[GENDER]]]]

b. Honorific PL under Hon:
[Dem[*u*PL] [[Hon[PL] [[Num[SG] [N[GENDER]]]]]]]
→ [Dem[PL] [[Hon[PL] [[Num[SG] [N[GENDER, OBLIQUE]]]]]]]

The agreement system is oblivious to honorificity. There are no phi-features specifically associated with honorificity and we do not need to adjust the agreement algorithm to handle honorificity. T probes for various phi-features including [PL]. The [PL] feature can come from Hon or Num. What is new is that the interpretation of [PL] is subject to contextual allosemy: Num-[PL] contributes plural meaning and Hon-[PL] contributes the semantics of honorification. Honorific plural *agreement* is never interpreted, any more than 'regular' plural agreement is interpreted. What receives interpretation is Hon-[PL] or Num-[PL].

The contextual allosemy proposal needs to stipulate that Hon selects a singular complement. We need this to block **laṛkiyā-ji:* 'girls-Hon'. This stipulation, however, seems to miss a generalization, namely that instead of the formative that would have pluralized the nominal, we have a formative that honorificizes it, and thereby blocks the possibility of pluralizing it. We explore this intuition in what we will call the ambiguity proposal. Under this proposal, we have two distinct formatives, $*$ and Hon, which share the following properties: (i) their complement appears in the oblique form, (ii) they are generated under the Num head, and (iii) they have the same phi-features, those conventionally associated with plural NPs. They differ in their semantics, with $*$ delivering plurality and Hon honorification. They also differ in their realization. For starters, only Hon can be realized as *-ji:*. Let's start with the following honorific structures, where Hon is realized as *-ji:*.

(19) a. [$_{NumP}$ [$_{NP}$ boy.OBL] Num[Hon]]
laṛke/*laṛka: ji:
boy.OBL/boy.DIR HON
'The boy (who I respect)'

b. [$_{NumP}$ [$_{NP}$ girl.OBL] Num[Hon]]
laṛki:/*laṛkiyã:/*laṛkiyõ: ji:
girl.OBL/*girl.PL.DIR/girl.PL.OBL HON
'The girl (who I respect)'

In both cases, the head noun needs to be in the oblique. This is clearly so in the masculine where we get the oblique form (syncretic with the direct plural, but distinct from the direct singular) and the direct form is not possible. In the feminine, obliqueness is not overtly expressed in the singular. What is striking, though, is that the absence of plural morphology in (19b) follows straightforwardly – there is just no plural formative to deliver plural morphology to us. We thus derive the ungrammaticality of **laṛkiyã-ji:* 'girls-Hon' without stipulation, since the plural formative $*$ that would be required here is blocked by the presence of Hon, since by hypothesis both formatives appear under Num, and are thus in complementary distribution.

We now turn to the realization of $*$, which under this account also selects for an oblique complement. The structures where $*$ appears are structurally identical to the structures where Hon appears – as noted above, both appear under Num, take an oblique complement, and have the same phi-features (relevant for the agreement system). But they differ in their semantics and in their realization. Let's consider the following structures with $*$.

(20) [$_{NumP}$ [$_{NP}$ boy.OBL] Num[$*$]]
laṛke
boy.OBL
'boys'

(21) [$_{NumP}$ [$_{NP}$ girl.OBL] Num[$*$]]
laṛki-yã:
girl.OBL-PL
'girls'

In (20), $*$ has a zero realization and in (21), it is realized as *-yã:*. In both cases, $*$ requires the obliqueness of its complement but is itself in the direct form. In (22) and (23), there is an additional source of obliqueness, *ko*, the dative postposition. As a result obliqueness appears twice, on the head noun (from $*$) and on $*$ itself (from the dative postposition). As a result $*$ surfaces in its oblique form *-õ*.

(22) [[$_{NumP}$ [$_{NP}$ boy.OBL] Num[Pl, OBL]] K]
laṛk-õ ko
boy.OBL-PL.OBL DAT
'to the boys'

(23) [[$_{NumP}$ [$_{NP}$ girl.OBL] Num[Pl, OBL]] K]
laṛki-õ: ko
girl.OBL-PL.OBL DAT
'to the girls'

We will need the following realization rules.

(24) a. [∗, OBL] ↔ *-õ*
b. [∗] ↔ ∅ / __ [M]
c. [∗] ↔ *-yã:* / __ [F]

This setup delivers to us the syncretism found between oblique masculine nouns and direct plurals. In our system, direct plurals are oblique![5]

5 Hon without *ji:*

A complication to the picture developed above is that plural agreement can signal honorification of a third person singular subject even in the absence of the honorific suffix *ji:*, as seen in (25).

(25) a. Ra:m lambe hɛ̃
Ram.M tall.M.PL be.PRS.3.PL
'Ram, who I respect, is tall.'
b. Mi:na: lambi: hɛ̃
Mina.F. tall.F be.PRS.3.PL
'Mina, who I respect, is tall.'

This shows that *ji:* is not necessary for honorification; plural agreement with a singular subject is (sometimes) enough to contribute the meaning of Hon. This state of affairs can be interpreted in two ways: either there is in these cases a covert Hon formative in the subject NP, or the plural agreement morphology is itself interpreted. In the latter case, we could conclude that the PL *agreement* feature (as opposed to the PL feature found under Num within the NP) is semantically ambiguous. Both approaches are plausible, but the fact that there can be multiple instances of honorific agreement (e.g. on an adjective, a participle, and a finite auxiliary) makes the covert Hon idea easier to implement in the Hindi-Urdu context. For simplicity and concreteness, this is the path we take.

The examples in (25) show that plural agreement is sufficient to signal the Hon meaning, without the use of *ji:*, in the case of proper nouns. With some common nouns as well, it is possible to get honorific meaning by agreement alone, without an overt honorific marker:

(26) a. *sampa:dak* 'editor.M'
sampa:dak lambe hɛ̃
editor(s).M tall.M.PL be.PRS.3.PL

[5]Things are slightly more complicated once we consider masculine plural obliques of the inflecting *-a:* class, see (22). Our system would predict *laṛk*-**e**-*õ ko*. To make things work, we will need an additional rule to delete the offending *-e-* in this context. Exactly such a rule has been proposed in Sinha (2018), also see Sinha (this volume, pgs. 11-12). The identification of direct plurals with obliques works well for Hindi-Urdu and other languages that have the oblique/plural syncretism. Sinha (this volume) points out that it does not extend to Marathi, which lacks this syncretism.

1. 'The editors are tall.'
2. 'The editor, who I respect, is tall.'
(note: *sampa:dak* is ambiguous between 'editor' and 'editors')

b. *sampa:dika:* 'editor.F.SG'

sampa:dika: lambi: hɛ̃
editor.F.SG tall.F be.PRS.3.PL

'The female editor, who I respect, is tall.'
(note: *sampa:dika:* only means singular 'female editor')

We assume that there is a silent Hon formative in these cases that brings in the semantics of honorification, makes its sister oblique, and introduces the formal feature that triggers PL agreement. This silent Hon seems to be unavailable with more garden variety nouns like *laṛka:* 'boy' and *laṛki:* 'girl':

(27) a. *laṛke* 'boy.M.PL.DIR'/'boy.M.SG.OBL'

laṛke lambe hɛ̃
boy.M.PL tall.M.PL be.PRS.3.PL

'The boys are tall.'
unavailable: 'The boy, who I respect is tall.'

b. *laṛki:* 'girl.F.SG' (DIR or OBL)

* laṛki: lambi: hɛ̃
girl.F.SG tall.F be.PRS.3.PL

intended: 'The girl, who I respect, is tall.'

At this point we don't understand why this kind of covert honorification isn't freely available – i.e. why the examples in (27) lack honorific readings, though we will offer some speculations at the end of this section.

We note that some nouns such as *daddy/mummy/papa/uncle/auntie/sir/ma'am* don't need *-ji:* and are yet almost always used as honorifics, i.e. with plural agreement and singular reference. Also there are, in addition to *ji:*, other overt morphemes that, like *ji:*, signal honorification of a singular referent and trigger plural agreement morphology.

(28) a. daroga: sa:b lambe hɛ̃
inspector.M HON tall.M.PL be.PRS.3.PL

'The inspector, who I respect, is tall.'

b. mantri: mahoday lambe hɛ̃
minister.M HON tall.M.PL be.PRS.3.PL

'The minister, who I respect, is tall.'

Note that *daroga:*/*mantri:* are unmarked for number and do not inflect for obliqueness. In the absence of *sa:b*/*mahoday*, these examples could also mean 'The inspectors/ministers are tall.' Other elements in the *sa:b*/*mahoday* class include *sir* and *ma'am*.

(29) Ayesha ma'am
Ayesha.F ma'am
'The honorable Ayesha'

(30) Tanmoy sir
Tanmoy.M sir
'The honorable Tanmoy'

Like the other lexicalized Hon bearers, the English-derived *sir* and *ma'am* also trigger plural agreement, reflecting their honorific semantic function, which in the Hindi-Urdu context has led to grammaticalization of an associated [PL] feature, triggering plural agreement in one of the two ways described in the previous section.

There is a degree of selection between the specialized markers of honorificity and the nomimals they combine with. For example, *driver* goes with *-sa:b*. *driver mahoday* feels very odd. And *ma'am*/*sir* select for the gender specification of their complement. Like *-ji:*, these specialized markers of honorificity require obliqueness (visible on masculine nominals) and singular form (visible on feminine nominals).

(31) a. lakaṛha:re/*lakaṛha:ra: sir
woodcutter.OBL/woodcutter.SG.DIR sir
'The woodcutter, who I respect'

b. ṭhelewa:li:/*ṭhelewa:liyã:/*ṭhelewa:liõ ma'am
cart.lady/cart.lady.PL.DIR/cart.lady.PL.OBL ma'am
'The cart lady, who I respect'

Therefore we assume that these other overt honorific markers are generated in Num/Hon, in the same location as *-ji:*. There is, however, one significant difference between *-ji:* and these other specialized markers; the specialized markers can also function as free standing nominals. This is not an option for *-ji:*.

(32) a. saab/sir/ma'am/?mahoday kahã: hɛ̃?
HON/sir/ma'am/HON where be.PRS.3.PL
'Where is the respected person?'

b. *ji: kahã: hɛ̃?
HON where be.PRS.3.PL
Intended: 'where is the respected person?'

When these specialized markers function as free standing nominals, they are obligatorily interpreted as honorific and accordingly they trigger plural agreement despite having singular reference.

(33) saab/sir/ma'am/?mahoday kahã: hɛ̃/*hɛ?
HON/sir/ma'am/HON where be.PRS.3.PL/be.PRS.3.SG
'Where is the respected person?'

We now return to the question of the differential availability of covert Hon – we've seen that covert Hon is freely available with proper names and is in fact obligatory with some nouns. With other nouns, covert Hon is unavailable. While we do not have a full

handle on this question, we have two observations to offer. The first observation is that for some speakers, even an overt Hon is disfavored with the nouns that do not allow a covert Hon (e.g. (27)). Perhaps then the unavailability of covert Hon with these nouns is a kind of selection. The second observation concerns the role of recoverability. We find that nominals that optionally allow for covert Hon only do so when the presence of the covert Hon can be detected from agreement (e.g. *Mi:na:* in (25b) and *sampa:dika:* 'female editor' in (26b)). If we put such nominals in a location where they cannot trigger agreement, the honorific meaning disappears. To get an honorific meaning, we need an overt Hon.

(34) a. Mina/sampa:dika: ko bulaa-o
Mina.F/editor.F DAT call-IMP
'Call Mina/the female editor!' (no honorific meaning is available)

b. Mina/sampa:dika: ji: ko bulaa-o
Mina.F/editor.F HON DAT call-IMP
'Call Mina/the female editor, who I respect!'

Recoverability seems to also play a role in number agreement. Consider the noun *electrician*. This is a borrowing from English, which would fall in the 'other masculine nouns' class (see (12)) with the exception that it lacks an oblique plural form – the expected **electrician-õ* is not well formed. We find that in an agreeing context, *electrician* can deliver both a plural and a honorific meaning (35a). But in a non-agreeing context (35b), only a singular non-honorific meaning is available.

(35) a. electrician kahã: hɛ̃?
electrician where be.PRS.3PL
'Where are the electricians?'
'Where is the electrician, who I respect?' (with covert HON)

b. electrician ko bulaa-o
electrician DAT call-IMP
'Call the electrician!' (no honorific meaning is available, no plural meaning)

(36) a. electrician saab ko bulaa-o
electrician HON DAT call-IMP
'Call the electrician, who I respect!'

b. electricians ko bulaa-o
electricians DAT call-IMP
'Call the electricians!' (no honorific meaning is available)

To get the honorific meaning in a non-agreeing context, an overt honorific is needed, as in (36a). The specialized honorific *sa:b* feels more natural than *-ji:* here. Curiously, as shown in (36b), there is no way to get the plural meaning in this context without making recourse to English plural morphology![6]

[6]There is at least one environment where plural interpretation is available even though the silent plural

6 Second person subjects

We turn now to honorification in the context of second person. Here for space reasons, we will not present a full analysis but just limit ourselves to a presentation of the data that such an analysis would need to capture. Hindi-Urdu has three pronominal forms used for singular second person reference:

(37) (addressee is male)

a. tu: lamba: hɛ
2.SG.**RUDE** tall.M.SG be.PRS.2.SG
'You are tall.' (speaker is being rude to a single addressee)

b. tum lambe: ho
2 tall.M.PL be.PRS.2.PL
'You are tall.' (single addressee)

c. a:p lambe: hɛ̃
2.**HON** tall.M.PL be.PRS.3.PL
'You are tall.' (speaker is being polite to a single addressee)

Semantically, the three second person pronouns are honorifically distinguished: *tu:* is rude/familiar, *tum* is neutral, and *a:p* is honorific. None of these pronouns can be used on their own to refer to a plural group of speakers; that is, they are all semantically singular. Looking at the agreement patterns, however, shows that while the rude/familiar pronoun *tu:* triggers singular agreement, the other two semantically singular pronouns trigger plural agreement. The honorific *a:p* is moreover formally *third person*, in terms of its agreement profile, despite being semantically second person.

We stress that, despite the plural number morphology, *tum* and *a:p* can on their own only be used with singular reference. To achieve plural reference, we need an additional marker of plurality such as *sab* 'all', *log* 'people', or a plural NP. These can be combined with *tum* or *a:p* but not with the inherently singular *tu:*, as seen below:

(38) (addressees are male)

a. * tu: log/sab/laṛke lamba: hɛ
2.SG people/all/boys tall.M.SG be.PRS.2.SG
'You people/all/boys are tall.' (speaker is being rude/asserting higher status)

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is technically not recoverable. In (i), *peṛ* 'tree' in the direct form is unmarked for number and it is not in a position where it controls agreement; agreement goes with the subject.

i. laṛkiyã: peṛ ka:ṭ rahi: hɛ̃
girl.PL tree.M cut PROG.F be.PRS.3.PL
'The girls are cutting a tree/trees.'

But a plural interpretation is possible for the object. It should be noted though that this is a pseudo-incorporation environment and the putative plural interpretation might have a source distinct from an interpreted Pl on the nominal. See Dayal (2011).

b. tum log/sab/laṛke lambe: ho
2 people/all/boys tall.M.PL be.PRS.2.PL
'You all/people/boys are tall.' (neutral with respect to honorificity)

c. a:p log/sab/laṛke lambe: hɛ̃
2.HON tall.M.PL be.PRS.3.PL
'You all/people/boys are tall.' (speaker is being polite)

This is why we choose to gloss *tum* and *a:p* as unspecified for number – they are compatible with plural reference but not on their own. *tu:*, however, is incompatible with plural reference and hence cannot combine with plural noun phrases. The combination of semantic and formal features is summarized in the following table:

(39) Semantic and formal features of second person pronouns

	SEMANTICS	FEATURES
tu:	2.SG.RUDE	2.SG
tum	2	2.PL
a:p	2.HON	3.PL (2.PL)

We will see that it is important to keep the semantic features of these pronouns separate from their agreement features. First of all there is a mismatch but in addition, we will see that the formal number feature of *tum* isn't quite PL and that *a:p* can also be associated with 2.PL features. The existence of mismatch is something we have seen before – honorificized singular third person nominals triggered plural agreement. Our analysis was that the plural agreement features originated in a Hon head and not from the plural semantics contributing $*$ head. Let's examine *tum* and *a:p* from this perspective.

6.1 The case of *tum*

We have seen that the plural feature on *tum* and *a:p* is not associated with plurality. In the case of *a:p*, this feature is plausibly associated with honorificity as was the case with third person nominals. But the plural feature associated with *tum* does not mark honorification; *tum* is neutral with respect to honorification. In order to get an honorific interpretation similar to that signaled by *ji:*, one must use *a:p*. So if *tum*'s PL feature is encoding neither number nor honor, what is it doing?

A closer examination shows that this plural feature that contributes neither plurality nor honorification triggers different agreement patterns than its semantically contentful counterparts (i.e. semantically plural NPs and honorificized NPs). The table in (40) shows forms of the adjective 'tall' and the past auxiliary verb, crossing number and gender.

(40) Number $\times$ gender agreement

Participle/Adjective

	M	F
SG	lamba:	lambi:
PL	lambe	lambi:

Past Auxiliary

	M	F
SG	tha:	thi:
PL	the	thĩ:

Notice first that the feminine form of 'tall' shows syncretism for number, with *lambi:* for both singular and plural forms. The feminine past auxiliary, on the other hand, shows a gender distinction, singular *thi:* and plural *thĩ:*. Comparing these forms, it can be seen that nasalization is an exponent of PL. That is, plural agreement is expressed transparently, by adding nasalization to the vowel. The masculine adjective and past auxiliary both show a singular/plural contrast, but unlike the feminine past auxiliary, the morphology here is opaque; the singular forms are signaled by a final *a:*, while the plural forms are signaled by a final *e*. These final vowels do not exclusively signal number agreement, but are also part of the gender marking. That is, the final *a:* is a portmanteau signaling masculine singular, while final *e* signals masculine plural. Comparing this to the feminine past auxiliary, the final *i:* signals feminine (since this is constant across both forms). Singular is unmarked, with plural agreement signaled by the nasal feature.

Plural agreement with bare *tum* is sensitive to the realization of plural agreement (portmanteau versus separate exponent). Note that bare *tum* is semantically singular and is not honorific. Plural agreement is expressed only if it would be realized as a portmanteau as in (41a) but not where it would be expressed by a separate exponent (nasalization) as in (41b). Let's call this **split** agreement (for an initial description see Bhatt & Keine (2018) and for an analysis Sinha (2021)).

(41) a. male addressee:
tum lambe ***tha:/the**
2 tall.M.PL be.PST.M.PL
'You were tall.'

b. female addressee:
tum lambi: **thi:/*thĩ:**
2 tall.F be.PST.F.SG/be.PST.F.PL
'You were tall.'

In agreeing like this, bare *tum* does not pattern with semantically plural NPs or honorificized NPs.

(42) Singular honorificized/plural third person

a. Mahesh-ji:/sab laṛke lambe the
Mahesh-HON/all boy.M.PL.DIR tall.M.PL be.PST.M.PL
'The honorable Mahesh/all the boys were tall.'

b. Mi:na:-ji:/sab laṛkiyã: lambi: thĩ:
Mina-HON/all girl.F.PL.DIR tall.F be.PST.F.PL
'The honorable Mina/all the girls were tall.'

Semantically plural NPs and honorificized NPs display plural agreement throughout the paradigm.[7] Nor does bare *tum* pattern with singular non-honorificized NPs, which display singular agreement throughout. When *tum* combines with a plural NP, it can have plural reference though it is still neutral with respect to honorificity. Once plural reference is there though, the agreement is no longer split. We get plural agreement throughout.

(43) a. male addressees:

tum laṛke lambe ***tha/the**
2 boy.M.PL.DIR tall.M.PL be.PST.M.PL
'You boys were tall.'

b. female addressees:

tum laṛkiyã: lambi: ***thi:/thĩ:**
2 girls.F.PL tall.F be.PST.F.SG/be.PST.F.PL
'You girls were tall.'

The split agreement that we find with bare *tum* shows that the plural features on bare *tum* are to be distinguished from the plural features associated with plural/honorific semantics. We notate this as PL̶, the defective counterpart of PL. Unlike PL, PL̶ is not associated with either plural or honorific semantics. PL̶ and PL are also distinct in their morphological realization.

(44) a. /PL/ $\leftrightarrow$ ˜ (freestanding nasal segment)

b. PL̶ does not have an independent freestanding realization (alternatively: is deleted by a late impoverishment rule that applies after it has conditioned the realization of M)

There are a number of environments, however, where PL does not have a freestanding realization but its presence conditions the realization of other features, and in **all** such environments, PL̶ and PL have the same behavior. In the tables below, the independent cases are **in bold** and the conditioned cases are *in italics*. Note that number is neutralized on adjectives in the context of the feminine F.

(45) **Independent** and *conditioned* expression of PL agreement

Participle/Adjective

	M	F
SG	lamba:	lambi:
PL	*lambe*	lambi:

Past Auxiliary

	M	F
SG	tha:	thi:
PL	*the*	**thĩ:**

Present Auxiliary

	1	2	3
SG	hũ:	hɛ	hɛ
PL	**hɛ̃**	*ho$_{tum}$*	**hɛ̃**

From a diachronic perspective, Annie Montaut (p.c.) has told us that singular *tum* did in fact trigger full plural agreement in Hindi around the turn of the 20th century. Reasoning backwards, we speculate that perhaps the loss of number/honor features is a recent one.

[7] *a:p* also displays plural agreement throughout.

What we have reported here is contemporary spoken Hindi. However, even today, written usage occasionally reflects the older pattern, particularly in poetic contexts. It is possible that the use of *a:p* as the general 2nd person honorific led to the loss of the honorific meaning associated with *tum*, which made its PL feature atavistic.

6.2 A final puzzle: Person (mis)agreement with *a:p*

We have treated *a:p* as having 3.PL features, due to the agreement patterns shown in (46).

(46) a. male addressee, unmodified *a:p* only has singular reference

us din a:p thake hue **the/*tha:**
that day 2HON tired.M.PL be.PART.M.PL be.PST.M.PL/be.PST.M.SG

'That day, you were tired.' (speaker expresses respect towards addressee)

b. female addressee, unmodified singular *a:p*

us din a:p thaki: hui: **thĩ:/*thi:**
that day 2.SG.HON tired.F be.PART.F be.PST.F.PL/be.PST.F.SG

'That day, you were tired.' (speaker expresses respect towards addressee)

However *a:p* can also agree with 2.PL features.

(47) a:p lambe: hɛ̃/ho
2.HON tall.M.PL be.PRS.**3**.PL/be.PRS.**2**.PL

'You are tall.' (speaker is being polite)

Use of *ho* here is widely accepted. Pragmatically, it seems that *a:p* with 2.PL agreement is still respectful but perhaps a shade lower than when it has 3.PL agreement. It feels playful; one would use it with someone one respects but with whom one could take some liberties. In strictly formal settings, using *ho* with *a:p* would be off. Note that despite this usage, *a:p* does not display the split agreeing pattern of *tum*.

(48) female addressee, unmodified *a:p* only has singular reference

us din a:p thaki: hui: **thĩ:/*thi:**
that day 2.HON tired.F be.PART.F be.PST.F.PL/be.PST.F.SG

'That day, you were tired.' (speaker expresses respect towards addressee)

Honorification with *a:p* differs from honorification of third persons in that honorification of plurals is possible with *a:p*.

(49) a. male addressees, *log/laṛke:* 'people/boys' forces plural reference

us din a:p log/laṛke thake hue
that day 2 people/boys.M.PL tired.M.PL be.PART.M.PL
the/*tha:
be.PST.M.PL/be.PST.M.PL

'That day, you people/boys were tired.' (speaker expresses respect towards addressees)

b. female addressees, *laṛkiyã:* 'girls' forces plural reference

us din a:p laṛkiyã: thaki: hui: **thĩ:/*thi:**
that day 2.HON girls.F.PL tired.F be.PART.F be.PST.F.PL/be.PST.F.SG

'That day, you girls were tired.' (speaker expresses respect towards addressees)

The reader will recall that with third persons, plurality and honorification were in complementary distribution. We take this to show that the honorific meaning of *a:p* is at least partly encoded in the lexical meaning of *a:p*.

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Acquisition of Hindi's laryngeal contrast by Meiteilon speakers

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ABSTRACT

Though Meeteilon does not have phonemic contrast in voicing, native speakers can accurately recognize voiced stops and aspirated voiced stops in word-initial positions and categorically distinguish these from voiceless stops and aspirated voiceless stops. However, they are unable to perceive any of these laryngeal contrasts in word-final position. We explain these facts by proposing that tone and aspiration being phonemic in Meeteilon, these cues from L1 can be re-recruited by native speakers for learning laryngeal contrasts in a second language like Hindi. Since these cues from L1 cannot be used to perceive laryngeal contrasts in word-final position, the contrasts are not perceived in these positions.

1 Introduction

In this paper, we explore how a phonological contrast is perceived in a second language scenario by adult native speakers of a first language lacking the contrast. In this second language interaction, we use two phonological contrasts where one of them is present in both L1 and L2 of the speakers and the second one is present in L2 but not L1. The two languages we have selected for this setup are Meiteilon and Hindi.

Hindi has four types of laryngeally specified stops whereas Meiteilon has a two-way distinction. The participants in our study are all native speakers of Meiteilon who are well exposed to Hindi as a second language.

	L1 Meiteilon	**L2 Hindi**	
		Voiceless	Voiced
Unaspirated	T	T	D
Aspirated	TH	TH	DH

Table 1: Laryngeal Contrasts in Meiteilon and Hindi

In Hindi, this four-way laryngeal contrast is attested in both word-initial and word-final positions. In contrast, in Meiteilon the aspiration contrast is restricted to the word-initial position. These differences are shown in table 2.

Meiteilon has a proper subset of laryngeal contrasts present in Hindi and these too are restricted to a subset of positions where the same features are licensed in Hindi. In this scenario, we have two distinct questions in this study.

Position	Feature	Phoneme Class	Hindi	Meiteilon
Initial	Voiceless stop	T	pal ‘foster’	pa ‘eyelash’
	Voiced stop	D	bal ‘hair’	
	Voiceless aspirated stop	TH	p^hal ‘steps’	p^ha ‘catch’
	Voiced aspirated stop	DH	b^hal ‘forehead’	
Final	Voiceless stop	T	$\widehat{dʒ}$ap ‘recital’	pa ‘eyelash’
	Voiced stop	D	d̪ab ‘pressure’	
	Voiceless aspirated stop	TH	sap^h ‘clean’	
	Voiced aspirated stop	DH	lab^h ‘profit’	

Table 2: Positional distribution of Hindi and Meiteilon laryngeal contrasts

a. Would Meiteilon speakers with Hindi L2 differ in their accurate perception of aspiration, a phonological feature present in their L1, and a new phonological contrast of voicing?

b. With respect to aspiration, would they show a difference in their perception of aspiration in the word-final and word-initial positions?

The paper is divided into five sections. Section 1 introduces theoretical concepts used to analyse phonological contrasts in general and laryngeal contrasts specifically. In section 2, we present the predictions based on the theoretical discussion of section 1. Section 3 discusses the details of the experimental design and its implementation, followed by the discussion of the results in section 4. This is followed by the concluding discussion of the study in section 5.

1.1 Phonology of laryngeal contrasts

Plosives in natural languages can exhibit voicing and aspiration contrasts. Phonologically, there are two ways to characterise these contrasts in terms of distinctive features.

a. With respect to Privative Feature Theory (Jacobson 1942), a feature is a mark that is either present or absent. While the absence of the mark does not form a natural set, the presence of the mark constitutes a natural set of sounds that may participate in phonological processes.

b. With respect to Binary Feature Theory (Chomsky and Halle 1968), a feature constitutes of positive and negatively marked counterparts that appear in the specification of sounds. Both positive and negative feature specifications are equipollent and either of them can describe a natural set.

In the privative feature theory, voiced segments are more complex than their voiceless counterparts. This is because the privative feature [voice] is present in D, while the voiceless

counterpart T has a null [ø]. Therefore, D will be more marked than T since it has a more complex phonological representation. In the same way, [spread glottis] feature of TH will make it more marked than T with null [ø] specification.

In the binary feature system T and D are equally complex with [-voice] and [+voice] specifications respectively. Therefore, no markedness prediction emerges out from the structural complexity parameter.

Typologically, there are five kinds of phonemic systems in natural languages with respect to the laryngeal feature specifications.

Laryngeal system	**Voicing**	**Aspiration**	**Phoneme Class**	**Example languages**
No contrast	no	no	T	Hawaiian
Voicing	yes	no	T, D	Russian, Turkish
Aspiration	no	yes	T, TH	Mandarin, Meiteilon
Three-way contrast	yes	yes	T, D, TH	Vietnamese, Khmer
Two-way contrast	yes	yes	T, D, TH, DH	Hindi, Gujarati

Table 3: Typology of laryngeal contrasts in languages

Table 3 shows a series of implicational relations between the marked segments and their unmarked counterparts. If the marked phonemes D or TH is present in the phonemic inventory of a language, it will also contain the unmarked counterpart T. Similarly, the presence of the doubly marked DH in Indo-Aryan languages is accompanied by the presence of the relatively unmarked TH. The privative feature theory predicts that no language with DH in their phonemic inventory will lack TH or D. These predictions which follow from the privative feature theory, will not follow from the structural specifications of binary features. In this paper, we use privative features to theoretically characterize the phonemic contrasts of Meiteilon and Hindi, as shown in table 4.

Position	**Feature**	**Phoneme class**	**Hindi**	**Meiteilon**
Initial	[ø]	T	pal ‘foster’	pa ‘eyelash’
	[voice]	D	bal ‘hair’	
	[spread glottis]	TH	p^hal ‘steps’	p^ha ‘catch’
	[voice] ∧ [spread glottis]	DH	b^hal ‘forehead’	
Final	[ø]	T	d͡ʒap ‘recital’	tʃak ‘rice’
	[voice]	D	d̪ab ‘pressure’	
	[spread glottis]	TH	sap^h ‘clean’	
	[voice] ∧ [spread glottis]	DH	lab^h ‘profit’	

Table 4: Privative feature distribution in Hindi and Meiteilon phonemes

The two-way contrast languages are typologically divided into true voicing and aspirating languages, depending on whether the stops are produced with a voicing lead or a voicing

lag (Iverson and Salmons 1995, Beckmen et al. 2013). The true voicing and aspirating languages employ different dimensions of laryngeal articulation. According to Laryngeal Realism in Honeybone (2005), since the true voicing languages exhibit active (effortful) voicing, they make use of the [voice] feature. In contrast, since the aspirating languages exhibit prominent aspiration, they use the [spread glottis] feature.

Some laryngeal inventories use both the [voice] and [spread glottis] feature. However, many of these systems do not use both the feature specifications simultaneously on the same phonological segment. All Indo-Aryan languages have the four-way laryngeal contrast, like Hindi, where the [voice] and [spread glottis] features can co-occur on individual plosive segments (Pandey 2014).

The characterization of DH with a doubly marked [voice] and [spread glottis] feature, is asynchronous with the phonetic characterizations of [spread glottis] feature, by Kim (1970) and Keating (1984), with the articulatory gesture of vocal folds spread wide apart during the oral occlusion. Consequently, they have been phonetically characterized as breathy voiced segments. However, if the phonological features of DH are different rather than more complex than D and TH, we should expect to see languages with the inventories of [T, D, DH] and [T, TH, DH] as well. The absence of such cases suggests that phonologically DH corresponds to the doubly marked laryngeal specification.

Meiteilon is an aspirating language, just like many other Tibeto-Burman languages. The unaspirated stops are produced with near zero VOT suggesting that the segment is unspecified for any laryngeal feature. The aspirated stops on the other hand are produced with significant VOT indicating the existence of a prominent distinctive cue represented with the feature [spread glottis] (Ashem 2018). Of these two segments, the aspirated stop does not occur word finally. Word initially, both the segments form a contrastive pair.

Between Hindi and Meiteilon, both languages use [spread glottis] as a contrastive phonological feature, but only Hindi uses [voice] as a contrast. This theoretical characterization of their laryngeal inventory leads to two direct implications:

a. While [spread glottis] feature can occur in both Meiteilon and Hindi word-initially, in word-final position it can be present only in Hindi and not in Meiteilon.

b. [voice] feature can occur in Hindi in all positions, in Meiteilon the contrast does not exist in any position.

Alternatively, segmental property is theoretically represented with respect to primes in Government Phonology (Kaye 1987, Kaye et al. 1990). In this theory, each phoneme, known as an element, is represented using a combination of primes where a particular prime could be the either a head or an operator. For stop sounds the head is the stricture-based prime |?| that another location gesture may accompany. Table 5 shows side by side comparison of these two characterizations.

In both the feature-based and prime-based perspectives, the DH is more complex than D and TH, which are more complex than T. Further, there are two ways in which the Meiteilon repertoire segmentally differs from Hindi.

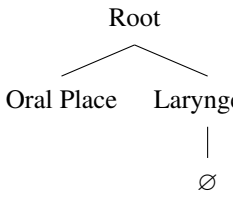
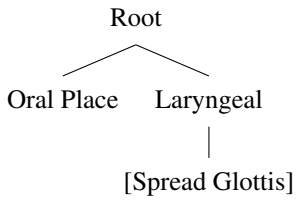
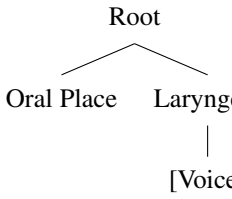
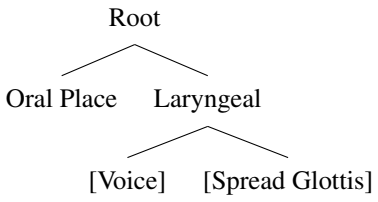
Phoneme	Feature-based	Prime-based
T		| ʔ |
TH		| ʔh |
D		| ʔA |
DH		| ʔAh |

Table 5: Prime-based versus feature-based contrasts

a. The Laryngeal node in Meiteilon does not dominate the feature [voice]. In terms of element theory, the operator |A| does not co-occur with the head |ʔ|.

b. The features [voice] and [spread glottis] do not co-occur.

In section 3 we discuss what these differences in Hindi and Meiteilon specifically predict for the phonemic recognition of Hindi's laryngeal contrast by the native Meiteilon speakers. In the next subsection we discuss the basis of the feature specification and how this may influence phonemic recognition.

1.2 Articulatory basis of laryngeal phonology

Feature-based representation of phonological contrast in SPE (Chomsky and Halle 1968) is rooted in the articulatory implementation. The range of complexity in laryngeal stricture during plosive articulation is directly represented as features. These direct correlations between phonetic execution and phonological features are reinforced in approaches such as Laryngeal Realism (Honeybone 2005). For example, phonetically, with respect to articulatory gestures English has four types of stops. Of these, only aspiration is produced with consistent effort. Consequently, the phonological laryngeal contrast is reduced to "aspirated" and "unaspirated":

Phonetic contrast	**Phonological contrast**
[T]: voiceless unaspirated [TH]: voiceless aspirated	[T], [TH] aspirated
[D̥]: modal voiced [D]: voiced	[D̥], [D] unaspirated

Table 6: Collapsing gradient phonetic contrasts to categorical phonological contrasts

Extending the analysis in table 6 to the context of our study, we expect that both voicing and aspiration will be actively maintained in Hindi in order to facilitate a four-way phonological contrast, while Meiteilon would need a single active feature of aspiration to be consistently maintained. Ladefoged and Maddieson (1996) shows that the four-way laryngeal system subsumes the laryngeal systems of the two-way voicing and aspirating languages. While the degree of strictures and oral settings may vary from language to language, the general pattern is the same. Based on Ladefoged and Maddieson (1996), a schematic of the laryngeal aperture plotted against oral release is presented in figure 1. It has been slightly modified to reflect Hindi's stops /p/, /p^h/, /b/, /b^h/.

Laryngeal distinctions can also be positionally restricted in natural languages. For example, although stops are attested in both onset and coda positions in Meiteilon, the aspirated-unaspirated distinction is restricted to onset positions. With respect to articulation, as the subglottal pressure diminishes over time due to exhalation, less air is available for breathy articulations. This could be one of the factors that are responsible for the loss

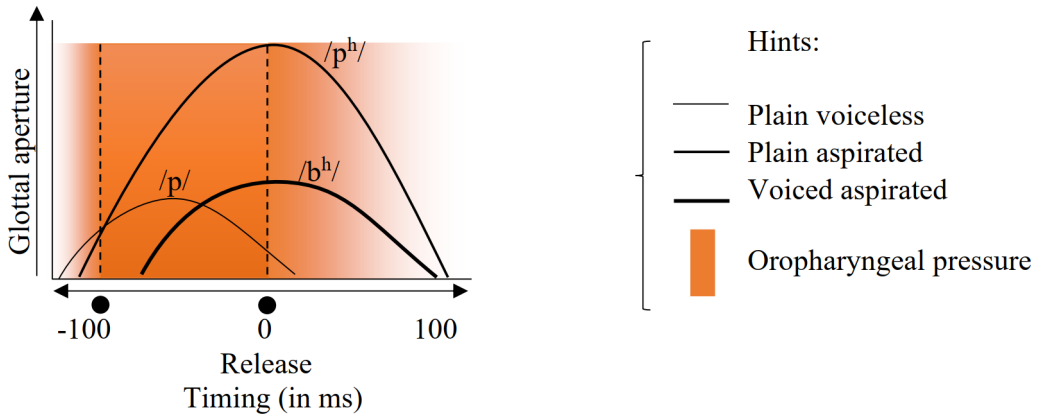


Figure 1: Glottal aperture with oral occlusion in Hindi stops

of laryngeal contrast in syllable and word final positions. The word initial position is generally the position unadulterated by this factor which could be the reason why phonologists generally use this position as evidence for characterizing the featural matrix of a laryngeal contrast.

Similarly, some articulatory strictures are more compatible with certain phonological positions. For example, lead voice onset (pre-voicing) is effectively produced in the word medial and final position since the air has to pass from the vocal folds in order to vibrate them for voicing. Due to the lack of free air passage, this can become a problem in word initial problem and language users have to resort to other strategies to produce voicing such as resorting to lowering of the larynx or expanding the oropharyngeal cavity (Ladefoged and Maddieson, 1996). Similarly, word-final stops may remain unreleased and give the impression that the aspiration is unavailable as a contrast word finally. These limitations are universal, however, languages may find alternative routes to compensate for these limitations. For example, Dixit (1980) hypothesizes that in the native Hindi speakers can actively lower their larynx to induce voicing when subglottal pressure is low and voicing induction is necessary. Meiteilon on the other hand does not contain phonemic voicing and therefore need not employ strategies to maintain the voicing contrast. Further, Hindi speakers produce aspiration word-finally but Meiteilon speakers do not. Can the Meiteilon speakers switch to some other cue while recognising aspiration in word final position through acoustic cues alternative to VOT? In the next subsection we discuss the acoustic cues to the laryngeal articulation and how it may influence phonemic recognition.

1.3 Acoustic cues to phonological knowledge

Native speakers may associate certain acoustic cues to certain laryngeal contrasts. These may vary from language to language and sometimes even person to person. Researchers have identified several cues that can be used to detect phonetic differences between a pair of segments (Haggard et al. 1975, Abram and Lisker 1985, Jensen 2004 among others).

Pinget (2022) discusses that laryngeal contrasts can be perceived through the help of one or more cues from the following acoustic cues:

i. VOT: it is a temporal continuum of voicing induction in relation to the oral occlusion. Active voicing is realized acoustically as negative VOT, i.e., occurrence of voicing before the release of the stop and aspiration is known to be induced by the wide glottal aperture during oral release, resulting in sizeable glottal friction (Lisker & Abramson 1964). Extensive research has shown that VOT is indeed a reliable cue for perceiving laryngeal distinctions. However, voiced aspirates have been outside the scope of VOT based analysis since a unary voicing continuum cannot account for voicing and aspiration overlap.

ii. Previous vowel length: generally, the same vowels preceding voiced segments surface as shorter than vowels preceding voiceless segments. Therefore, languages may take cognizance of this regularity and use it as a reliable predictor of the voicing contrast (Raphael 1972).

iii. f0 perturbation: the glottal setting during the oral articulation "perturbs" the f0 of the following vowel. Generally, voiceless segments induce higher f0 at the onset of the following vowel while voiced segments lower the f0 (Kirby & Ladd 2018). Recent research has shown that f0 can indeed be used as an independent phonetic cue for perceiving laryngeal contrasts despite other so called dominant cues being available such as VOT (Ladd & Schmidt 2018). Hindi also shows this perturbation (Dixit 1980).

iv. Closure duration: the duration of closure of stops may vary according to the type of voicing the stop has. Voiceless stops tend to have larger closures compared to the voiced stops (Lisker 1957, Port 1979). Language users may use this cue to identify the laryngeal contrast, however, these cues tend to be dominated by the presence of closure voicing and aspiration (Price & Lisker 1979, Wardrip-Fruin 1982).

In much of the research on laryngeal phonetics, however, VOT has been a dominant paradigm for characterising laryngeal contrasts. While being sophisticated in its predictions, VOT is not an appropriate paradigm for analysing a four-way laryngeal contrast: Since VOT is a temporal continuum, it does not allow for an overlap of voicing and voicelessness which is a necessary condition in voiced aspirates. In their extensive review of VOT based research, Cho et al. (2018) discusses this limitation and suggest that a richer manifestation of VOT is needed to account for the four-way laryngeal systems.

Research has also shown that VOT may not always be the determinant of laryngeal contrasts despite it being present in the language. For example, multiple studies have shown that the fundamental frequency of the vowel following the stop may consistently vary in languages (Hanson 2009, Kohler 1982; Kingston 2007, Löfqvist, Baer, McGarr & Story 1989) and may be used as a reliable contrastive cue for laryngeal distinction (Ladd & Schmid 2018, Kirby & Ladd 2018). Interestingly, languages that use lexical tones are more

prone to using the fundamental frequency as the primary cue for laryngeal contrast (Kirby 2018). Since in tonal languages the tonal and consonantal gestures overlap and compete for the control of f0, the phonemic status for the f0 perturbation may make it worthy of greater perceptual "attention". As a result, it could be that the native speakers of tonal languages are more sensitive to even the minor perturbations in f0 and therefore can effectively deploy it as one of the primary cues for laryngeal distinction.

Hindi is non tonal language exhibiting an exhaustive four-way laryngeal contrast with all the contrasts present in word initial as well as final position. Hindi also has released stops therefore word final aspiration is produced, albeit with poorer quality. It is then likely that Hindi uses prominent voicing cues such as VOT to distinguish segments. If f0 was the primary cue, then word final segments would not be distinguishable as there is no following vowel to carry the pitch. On the other hand, Meiteilon is tonal language with no final aspiration therefore it is possible that Meiteilon either does not use VOT in word final position or does not use VOT as a cue altogether since it is a tonal language. We can expect an interplay of the alternative cues to laryngeal distinction when Meiteilon speakers perceive the laryngeal distinctions of Hindi, especially voicing. In an event where the cues mismatch, can Meiteilon speakers pay attention to supplementary acoustic cues when the primary cues are not available? In the next section we explore the interaction between the laryngeal systems of Hindi and Meiteilon and generate a few hypotheses based on the factors we elaborated above.

2 Interaction between the laryngeal systems of Hindi and Meiteilon

Since Meiteilon does not have voicing distinction in its native repertoire, we predict the following correlations between laryngeal gesture and phonological category in L1.

Phonetic Contrast	**Phonological Contrast in Onset**	**Phonological Contrast in Coda**
[T] voiceless unaspirated [D̥] modal voiced	[D̥], [T] unaspirated	[D̥], [T], [TH] No Contrast
[TH]voiceless aspirated	[TH] aspirated	

Table 7: Laryngeal contrast in Meiteilon

In case of the Hindi, the correspondence between phonetic and phonological contrasts in the laryngeal system for L1 speakers could be either of the options in Table 8.

While two of the phonological contrasts in option (1) matches with the L1 phonological contrasts of Meiteilon in the onset position, only one of the representations of option (2) [TH] finds a correspondent in the laryngeal system of Meiteilon. Either way, based on this characterization, we would predict that the Meiteilon speakers would perform as well as native Hindi speakers in accurately identifying voiceless aspirates in the word-initial position.

Phonetic Contrast	Phonological Contrast 1	Phonological Contrast 2
[T] voiceless unaspirated	[D̥], [T] unaspirated	[T] voiceless
[D̥] modal voiced		[D̥], [D] Voiced
[D]Voiced	[D] Voiced	
[TH]voiceless aspirated	[TH] aspirated	[TH] aspirated
[DH] breathy voiced	[DH] voiced aspirated	[DH] voiced aspirated

Table 8: Laryngeal contrast in Hindi

Although voiceless unaspirated stops corresponding to the phonetic contrasts [T] and [D̥] might match between native Meiteilon and Hindi, it is possible that in Meiteilon data this feature is recognized by the lack of [spread glottis] rather than the presence of an active articulatory gesture. In such a scenario it is possible that the Meiteilon speaking participants fail to categorically distinguish between voiced and voiceless unaspirated plosives to the same extent as Hindi speakers.

With respect to the voiced plosives of Hindi, [D] and [DH], it is an open question how they perform in the phonological categorization task in comparison to the Hindi control group. If they have successfully correlated a phonetic cue to the phonological feature of voicing through their exposure to Indo-Aryan languages with voicing contrast, the Meiteilon speakers will be able to categorically identify [voice] feature in at least word-initial position.

Categorically identifying either [voice] or [spread glottis] in the word-final position will be difficult for all participants, since some of the cues like F0 contour will be absent due to the lack of a following vowel. Further, in some cases the stop might not be released clearly, resulting in degraded VOT information. Despite that it is predicted that Hindi speakers who have the [voice] and [spread glottis] phonological contrast in word-final position, will perform better than Meiteilon speakers whose L1 does not have this contrast.

Features	Position	Hindi	Meiteilon	Prediction
[∅]	Initial	Present in L1	Present in L1	Equal identification
	Final	Present in L1	Present in L1	Equal identification
[vc] D	Initial	Present in L1	Absent in L1	Depends on active cue association
	Final	Present in L1	Absent in L1	Worse than initial
[sg] TH	Initial	Present in L1	Present in L1	Good — active feature recognition
	Final	Present in L1	Absent in L1	Worse than initial
[vc] ∧ [sg] DH	Initial	Present in L1	Absent in L1	Depends on active cue association
	Final	Present in L1	Absent in L1	Worse than initial

Table 9: Meiteilon group's predicted difficulties due to featural mismatch

The **segmental perception** accuracy will inform us how accurately our predictions follow.

Unlike featural specifications, there could be multiple acoustic cues to convey the laryngeal contrast, as discussed in section 1.3. Due to multiple cues being simultaneously available, it is possible that the L2 listener recruits a phonetic cue other than the primary cue used by L1 speakers in encoding a phonological feature. In the context of Hindi and Meiteilon, the acoustic cues of VOT and f0 are likely to be interchanged. Suppose Hindi uses VOT as the primary cue to identify [voice] contrast and L2 Meiteilon speakers of Hindi use f0 as the primary laryngeal cue. Since both positive VOT and f0 perturbations are available word initially, we will not see much difference in their categorical perception results. However, in the word final position VOT cue is weak and f0 perturbation is not available at all. If Meiteilon speakers fail to identify word final aspiration, we can say that VOT is not the primary cue used word finally in Meiteilon.

Contrast	**Position**	**If cues**	**Prediction**
Voicing	Initial	VOT	Good identification
		F0	Good identification
	Final	VOT	Weak identification
		F0	No identification
Aspiration	Initial	VOT	Good identification
		F0	Good identification
	Final	VOT	Weak identification
		F0	No identification

Table 10: Meiteilon group's predicted difficulty due to cue mismatch

The **feature perception** accuracy will inform us how accurately our predictions follow.

3 The experiment

The aim to this experiment is to study the points of variance in the categorial perception of the same phonetic signal between Hindi and Meiteilon speakers. Some of the specific questions we seek to answer are:

a. Can the Meiteilon speakers, who have some exposure to Hindi, consistently identify the voice feature in Hindi despite it being absent in their L1 (i.e., D and DH)?

b. We have theoretically predicted that Meiteilon speakers will identify the voiceless aspirates [TH] accurately based on their L1 exposure. However, given that this contrast is absent in the final position in their L1, would their L1 phonetic cue identification for aspiration help them categorically recognize it in word-final position?

Hindi being a common lingua franca in India, and part of the school curriculum in many areas, it is common for native speakers of other languages (including Meiteilon) to have

some degree of exposure to spoken Hindi and its phonemic contrasts. Therefore, a perception experiment designed to differentiate a pair of samples (such as AX or AXB tasks) is expected to show no significant divergence from the control Hindi native speaker group. The question we are interested in is not whether Meiteilon speakers can perceive the phonetic difference between Hindi samples but what would they perceive them as. So, our evaluation of the task is not quantitatively based on how many samples were accurately classified but on what did they classify them as. Therefore, an identification task rather than a discrimination task is better suited for our research objective.

3.1 Design

The design of this study uses two factors.

i. Laryngeal contrast: Four laryngeal contrasts [T, D, TH and DH]

ii. Prosodic Position: Two prosodic positions [word-initial and word-final]

After crossing these factors, we get 8 conditions. For each condition, we used PoA factor with labial and velar as its levels, to counterbalance the inherent biases for shorter VOT lag in labial sounds (Cho and Ladefoged, 1999; Lisker and Abramson, 1964; Volaitis and Miller, 1992).

3.1.1 Items

The target sounds were placed in the [# _ an] and [a _ #] templates for initial and final positions, respectively. They yielded 16 target nonce words. For constructing the stimuli, these nonce words were placed in grammatical Hindi sentences in preverbal positions to eliminate the list effect while providing a uniform prominence to the target words. Two native Hindi speakers (male and female) produced the sentences 3 times each. Equal number of fillers were also recorded to mask the target items. The sentences were recorded on a studio-grade (Maono) unidirectional microphone in a sound-treated room. The recorded stimuli were spliced out keeping all the cues intact and were normalized for loudness.

Nonce words have been deliberately used in the experiment to counter the effect of lexical familiarity or non-familiarity in non-native speaker population. Further, not all the words created in the [# _ an] and [a _ #] template, turned out to be nonce in Hindi. In such a scenario we had to either trade-off on the template or the nonce paradigm. In this study, we chose to apply the template consistently even if it included a couple of lexical words.

3.1.2 Method

The experiment had three phases.

i. **The Selection phase:** In this phase participants were shortlisted based on their linguistic profile. Only those Meiteilon speakers were selected as participants who had

no prior exposure to languages which uses four-way laryngeal contrast other than Hindi. Further, participants with hearing difficulties and knowledge of linguistics were not selected.

ii. **The Familiarization phase:** The recruited participants were given instructions about the experimental procedure. This includes familiarization with the script we have used and how to correlate them with Hindi sounds. Although the participants were aware of the four-way laryngeal contrast in Hindi, it was made clear to them which symbol on the screen corresponded to which sound. They were informed that the data will be presented in four blocks and that they could take a break between each block.

iii. **Implementation phase:** We employed a self-paced forced-choice phonemic recognition task. In this task, an aural stimulus was presented immediately followed by four options as buttons. Each button with orthographic (Roman script) text written on it corresponds to one of the 4-way laryngeal contrast [T, D, TH and DH]. The participant listens to the aural stimulus and selects a button as soon as possible that best matches the aural stimuli heard. Before the actual trials, dummy trials were used to effectively familiarize them with the paradigm. The experiment was conducted on PCIbex PennController 2.0 (Zehr and Schwarz 2018) web-based interface. We obtained three dependent measures through this task: accuracy, response time and error type. In this paper we focus on accuracy.

4 Results

We present the results of the experiment in two ways:

a. Accuracy in segment identification

b. Accuracy with respect to individual feature recognition for [voice] and [spread glottis]

The accuracy data is shown in percentages.

4.1 Accuracy in segment identification

With respect to the accuracy of segment identification we started with the following predictions:

a. For both Hindi and Meiteilon speakers the accuracy of segmental identification in the word-initial position will be higher than their corresponding accuracy in word-final position.

b. While both Meiteilon and Hindi speakers will do equally good with categorically recognising [TH], Meiteilon speakers might be worse at recognising [T].

c. Overall, the recognition of [D] and [DH] will be worse for Meiteilon speakers than the Hindi group.

Features	Position	Hindi	Meiteilon	Significance	Prediction
[∅] T	Initial	97.5	96.67	$p > .05$	holds
	Final	69	50	$p < .001$**	does not hold
[vc] D	Initial	95.83	85.41	$p < .01$*	holds
	Final	71.66	40	$p < .0001$**	holds
[sg] TH	Initial	93.6	97.08	$p > .05$	holds
	Final	87.67	56.17	$p < .001$**	holds
[{vc} {sg}] T	Initial	97.5	88.75	$p < .001$**	holds
	Final	86.33	53.39	$p < .0001$***	holds

Table 11: Accuracy based on features for the four-way laryngeal contrast

* Kruskal-Wallis rank sum test is used for comparison as the data is heavily skewed rightward.

The results show that there is no significant difference in the recognition of [T] and [TH] in the word-initial position. Both groups performed quite well with the Meiteilon group marginally even performing better than the Hindi control group in the recognition of [TH]. However, the recognition of [T] and [TH] in word-final position is significantly worse than the Hindi group. While the accuracy of both groups is lower in the word-final position, in comparison to the word-initial one, as predicted, both groups perform better at recognising [TH] than [T] in the word-final position.

As predicted the overall accuracy of the voiced segments [D] and [DH] is significantly lower for Meiteilon group than the Hindi group, the results clearly indicate that the most significant difference in accuracy is in the recognition of these segments word-finally.

4.2 Accuracy with respect to individual feature recognition

In this section we have analysed the accuracy of recognizing a particular feature. We have done the response coding as indicated in Table 12.

With respect to individual features, we started out with the following predictions:

a. [voice] feature being absent in Meiteilon, featural recognition of [voice] will be worse in Meiteilon group than the Hindi group.

b. [spread glottis] feature being present in initial position in Meiteilon, its recognition in the initial position will be significantly better than the final position. Word-finally Hindi group is also expected to have higher accuracy.

Input segment	Choice of option	Accuracy coding
[T]	[T] or [TH]	Accurate [voice] identification
[TH]	[T] or [TH]	Accurate [voice] identification
[D]	[D] or [DH]	Accurate [voice] identification
[DH]	[D] or [DH]	Accurate [voice] identification
[T]	[T] or [D]	Accurate [spread glottis] identification
[TH]	[T] or [D]	Accurate [spread glottis] identification
[D]	[TH] or [DH]	Accurate [spread glottis] identification
[DH]	[TH] or [DH]	Accurate [spread glottis] identification

Table 12: Response coding for featural accuracy

Input	Position	Accuracy of [Voice]		Accuracy of [spread glottis]	
		Hindi	Meiteilon	Hindi	Meiteilon
T	Initial	98.8	98.3	98.3	97.9
T	Final	92.7	70.6	74.7	66.9
D	Initial	96.7	99.6	97.1	86.2
D	Final	97.7	71.5	72.6	57.9
TH	Initial	97.1	97.9	98.3	98.3
TH	Final	97.7	74.6	89.7	70.6
DH	Initial	98.8	98.3	98.3	90.8
DH	Final	96.0	72.4	89.7	66.9

Table 13: Overall accuracy results for Hindi and Meiteilon

The results in Table 13 show that the [voice] feature is recognized at par with Hindi by Meiteilon speakers in word-initial position, but it is significantly worse in the word-final position. Hindi speakers show no significant deviation is the accuracy of recognizing [voice] feature in initial and final positions. This suggests that the primary phonetic cue used by native Hindi speakers to recognise [voice] is consistently available at both initial and final position while the cue associated by some people from the Meiteilon group fails to be distinctively identifiable in word-final position.

With respect to [spread glottis] feature, both groups show lower accuracy in recognizing the feature in word-final position. However, unlike [voice] recognition accuracy which was at par with Hindi for the initial position, the [spread glottis] recognition accuracy of Meiteilon is consistently lower than Hindi in all positions except initial [TH]. The presence [voice] gesture reduces the accuracy in recognising [spread glottis] feature.

5 Discussion

The results of the experiment clearly point to the successful segmental recognition of [T] and [TH] segments that are present in both Meiteilon and Hindi. This shows that Meiteilon speakers recognize those segments better in L2 which are already present in their L1. For the segments absent in their L1, a feature-based analysis of accuracy reveals the following.

Segment absent in L1	**Phonetic cue to recognize**	
	[Voice]	[Spread Glottis]
[D]	Presence of active voicing cue	Absence of aspiration cue
[DH]	Presence of active voicing cue	Presence of active aspiration cue

Table 14: Featural recognition accuracy for Meiteilon speakers

The presence of active voicing cue was accurately detected in initial positions, but not final positions. These results indicate that the Meiteilon group has indeed learnt to distinguish the [voice] contrast in initial position but not in final position. Phonetically this suggests that the phonetic cue they have associated with voicing is perhaps unavailable word-finally resulting in the loss of voice distinction in this position.

Feature	**Position**	**Language**	**Accuracy**	**Phonetic Cue**
[voice]	Initial	Hindi	97.85	Primary VOT + Secondary f0
		Meiteilon	98.52	Primary f0 + Secondary VOT
	Final	Hindi	96.02	Primary VOT (no f0 cue)
		Meiteilon	72.25	Secondary VOT (no f0 cue)

Table 15: [voice] recognition accuracy for Hindi and Meiteilon speakers

Phonologically, this indicates that the mental grammar of Meiteilon speakers that did not tolerate voiced plosives has developed a second L2 grammar for Hindi that tolerates voiced plosives in prosodically strong positions like onsets and word-initial position. This development can be represented theoretically by showing the change in the ranking between the markedness and faithfulness constraints (Boersma & Hamman 2009, Hancin-Bhatt 2008), as shown in table 16.

Markedness constraint	**Faithfulness constraint**
*OBSTRUENT[VOICE]	IDENT[VOICE] IDENT[VOICE]-ONSET

Table 16: Interacting constraints in voicing contrast

In L1 Meiteilon grammar the markedness constraint is ranked higher than faithfulness resulting in no toleration for the voiced obstruent in either initial or final position. To demonstrate this, we have considered the nonce inputs [ban] and [nab] and predicted their corresponding outputs.

(1) L1 grammar of Meiteilon

a.

[ban]	*OBS[VOI]	ID[VOI]-ONS	ID[VOI]
a. ban	∗!		
☞ b. pan		∗	∗

b.

[nab]	*OBS[VOI]	ID[VOI]-ONS	ID[VOI]
a. nab	∗!		
☞ b. nap			∗

The L2 Hindi grammar of Meiteilon speakers shows a re-ranking between the positional faithfulness constraint and the markedness constraint.

(2) Hindi L2 grammar of Meiteilon

a.

[ban]	ID[VOI]-ONS	*OBS[VOI]	ID[VOI]
☞ a. ban		∗	
b. pan	∗!		∗

b.

[nab]	ID[VOI]-ONS	*OBS[VOI]	ID[VOI]
a. nab		∗!	
☞ b. nap			∗

This grammar is in turn distinct from the L1 grammar of Hindi speakers where even the general faithfulness constraint is ranked higher than the markedness constraint.

(3) L1 grammar of Hindi

a.

[ban]	ID[VOI]-ONS	ID[VOI]	*OBS[VOI]
☞ a. ban			*
b. pan	*!	*	

b.

[nab]	ID[VOI]-ONS	ID[VOI]	*OBS[VOI]
☞ a. nab			*
b. nap		*!	

The [spread glottis] contrast though present in Meiteilon is not accurately detected in voiced inputs. Phonetically this suggests that again f0 rather than VOT is perhaps the primary cue associated with [spread glottis] in Meiteilon. The absence of f0 cue in the word-final position will explain why this contrast is restricted to the onset position in the L1 grammar of Meiteilon.

Feature	**Position**	**Language**	**Accuracy**	**Phonetic Cue**
[spread glottis]	Initial	Hindi	98.0	Primary VOT + Secondary f0
		Meiteilon	93.3	Primary f0 + Secondary VOT
	Final	Hindi	81.67	Primary VOT (no f0 cue)
		Meiteilon	65.57	Secondary VOT (no f0 cue)

Table 17: [spread glottis] recognition accuracy for Hindi and Meiteilon speakers

Similar to the [voice] feature, the phonological representation of [spread glottis] distribution in L1 Meiteilon, L2 Hindi for Meiteilon speakers and L1 Hindi grammar can be shown through the interaction of the following constraints.

Markedness constraint	**Faithfulness constraint**
*OBSTRUENT[SPREAD GLOTTIS]	IDENT[SPREAD GLOTTIS]
	IDENT[SPREAD GLOTTIS]-ONSET

Table 18: Interacting constraints in aspiration contrast

In L1 Meiteilon the markedness constraint is ranked lower than the positional faithfulness constraint, but higher than the general faithfulness constraint. This results in contrast neutralization in prosodically weak positions.

(4) L1 grammar of Meiteilon

a.

[p^han]	ID[SG]-ONS	*OBS[SG]	ID[SG]
☞ a. p^han		*	
b. pan	*!		*

b.

[nap^h]	ID[SG]-ONS	*OBS[SG]	ID[SG]
a. nap^h		∗!	
☞ b. nap			∗

This same constraint ranking continues in the L2 Hindi grammar of Meiteilon speakers. In contrast, the L1 Hindi grammar has both faithfulness constraints ranked higher than markedness once again resulting in the toleration of the aspiration contrast in both the initial and final position.

(5) L1 grammar of Hindi

a.

[p^{h}an]	ID[SG]-ONS	ID[SG]	*OBS[SG]
☞ a. p^{h}an			∗
b. pan	∗!	∗	

b.

[nap^h]	ID[SG]-ONS	ID[SG]	*OBS[SG]
☞ a. nap^h			∗
b. nap		∗!	

Since L1 Hindi grammar has both the markedness constraints *obstruent[voice] and *obstruent [spread glottis] ranked lower than the faithfulness constraints, the language tolerates outputs with both features simultaneously occurring in initial and final positions. However, given our analysis of the Hindi L2 grammar of Meiteilon speakers, we predict the following two outcomes for the inputs [b^{h}an] and [nab^h]

(6) L2 Hindi grammar of Meiteilon speakers

a.

[b^{h}an]	ID-ONS	*OBS[VOI]	*OBS[SG]	ID
☞ a. b^{h}an		∗	∗	
b. ban	∗!	∗		∗
c. p^{h}an	∗!			
d. ban	∗!∗			

b.

[nab^h]	ID-ONS	*OBS[VOI]	*OBS[SG]	ID
a. nab^h		∗!	∗	
b. nab		∗!		∗
c. nap^h			∗!	∗
☞ d. nap				∗∗

In conclusion the results of the experimental study of the L2 acquisition of Hindi contrast by speakers of Meiteilon reveals the constraint ranking given in table 19.

L1 Meiteilon Grammar	L2 Hindi Grammar of Meiteilon speakers	L1 Hindi Grammar
*OBS[VOICE]	POSITIONAL	POSITIONAL
≫	FAITHFULNESS	FAITHFULNESS
POSITIONAL	≫	≫
FAITHFULNESS	*OBS[VOICE]	FAITHFULNESS
≫	≫	≫
*OBS[SPREAD GLOTTIS]	*OBS[SPREAD GLOTTIS]	*OBS[VOICE]
≫	≫	≫
FAITHFULNESS	FAITHFULNESS	*OBS[SPREAD GLOTTIS]

Table 19: Ranking difference between L1 Meiteilon, L2 Hindi of Meiteilon and L1 Hindi

6 Conclusion

In this paper, we show that laryngeal systems interact at phonological as well as phonetic levels in a second language scenario. At both levels, existing knowledge of L1 interfaces with L2 segmental recognition. This is reflected in our results where the Meiteilon speakers can identify the existing T-TH contrast more accurately than the absent contrasts D-DH. Further, Meiteilon speakers may recruit L1 specific f0 cue to perceive the VOT based L2 voicing contrast. These perceptual adjustments, nonetheless, lead to the acquisition of new laryngeal contrasts, which we formalized in constraint-based Optimality Theoretic models of acquisition.

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Coordinated on the context: the many uses of Marathi =ʦ

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ABSTRACT

Several Indo-Aryan languages, including Bangla, Gujarati, Hindi, and Marathi contain a discourse clitic whose uses overlap with those of English particles like exclusives *only/just*, anaphoric *indeed/that very*, intensifiers *really/totally*, precisifiers *right/exactly/absolutely*, and scalar additive *even* without corresponding perfectly to any of them. This paper focuses on the Marathi variant *=ʦ* and offers a detailed empirical picture of a subset of its uses – uses involving discourse salience and noteworthiness or unexpectedness. I put forward the hypothesis that *=ʦ* conventionally signals that interlocutors are in mutual agreement that the proposition denoted by the prejacent is uniquely salient among alternatives in the current question. That is, *=ʦ* conveys that the proposition expressed by the prejacent offers a **schelling point** (or focal point) for the interlocutors to coordinate on.

1 Introduction

Marathi contains a chameleon-like enclitic discourse particle *=ʦ* (with an allomorph *=əʦ* in post-consonantal contexts). Depending on contextual conditions, the presence of *=ʦ* in declarative clauses may give rise to a range of inferences that include those associated with exclusives (1a, 1b), precisifiers, (1c), intensifiers (1d), mirativity marking (1e), clefts, expectation confirmation (1f) and scalar additives (1g).

(1) a. CONTEXT: Last week, 20 girls attended the meeting Sp had organized but yesterday...
dəha=ʦ mulī mīʈiŋg=la a-lyat
ten=*c* girl.F.PL.NOM meeting=DAT/ACC come-PERF.3.F.PL
Yesterday, *only/just* ten girls came to the meeting.
⇝ *No more than ten girls came to the meeting.*

b. CONTEXT: Sp told Anu to visit the cities of both Pune and Mumbai. But...
Anu **puɳya=la=ʦ** ge-lī
Anu.F.SG.NOM Pune.OBL=DAT/ACC=*c* go-PERF.F.SG
She went *only/just* to Pune.
⇝ *Anu went nowhere other than Pune.*

c. CONTEXT: Sp tells Ad about the power situation after an earthquake.
səgɭya=ʦ bʰag-at-lī vīʤ ge-lī
every.OBL=*c* area-LOC-F.SG power.F.SG.NOM go-PERF.F.SG
They lost power in *absolutely* every neighborhood.
⇝ *The claim does not exclude any neighborhood in the context.*

d. CONTEXT: Sp tells Ad about a new restaurant.
   tit^{h}lə ʤevəɳ **p^{h}ar=əts** tsəvdar ah-e
   there.from food.N.SG.NOM very=*c* tasty be-PRES.3.SG
   The food there is *really* very tasty.
   ⇝ *The standard for tastiness is boosted at the context.*

e. CONTEXT: Sp tells Ad about how angry their friend got about a sexist remark from a colleague.
   ti=ne tya=la **t^{h}əppəɖ=əts** mar-lī
   she=ERG he.OBL=DAT/ACC slap.F.SG.NOM=*c* strike-PERF.F.SG
   She *just* gave him a slap.
   ⇝ *The slapping deviated sharply from what was contextually expected.*

f. CONTEXT: Ad wants to know if Sp has made dinner; they had discussed making pasta beforehand.
   hoy, mi aʤ **pasʈa=ts** bənəv-la ah-e
   Yes I.NOM today pasta.M.SG.NOM=*c* make-PERF.M.SG be-PRES.3.SG
   Yes, I have made pasta *indeed*.
   ⇝ *The pasta making perfectly matches what was contextually expected.*

g. CONTEXT: Sp tells Ad that Bilal did not invite his colleagues to his wedding, not even his assistant, Nita.
   Bilal=ne **Nīta=la=ts** bolav-lə nahī, bakī
   Bilal=ERG Nita=DAT/ACC=*c* invite-PERF.N.SG NEG other
   lokan=tsə soɖ
   people.OBL.PL=N.SG.GEN leave.IMP
   Bilal didn't invite *even* Nītā, let alone other people.
   ⇝ *Nita was most expected to be a wedding invitee in the context.*

To the best of my knowledge, the clustering of effects of the sort associated with *=ts* has not been identified and investigated in unified fashion for any known discourse marker in Germanic, Romance, or any other language. Moreover, genetically related modern languages like Bangla, Gujarati, Hindi, and Punjabi contain functional counterparts which almost perfectly parallel the distribution and interpretation of Marathi *=ts*.[1] The presence of functional cognates across Indo-Aryan points to the possibility that the particular clustering of discourse effects in Marathi *=ts*'s profile is part of an inherited grammatical core from an older proto-system. This stability in the clustering of uses across related languages (and potentially across time) makes it even more likely that it arises from a single core of conventionalized pragmatic meaning in interaction with specific contextual conditions. In this paper, I take a first stab towards analyzing some uses of *=ts*, explicating the interaction between conventional and contextual meaning.

[1]Of these, only the facts of Hindi *=hi* have been described in some detail (Bhatt, 1994; Varma, 2006; Bajaj, 2016) and will be discussed comparatively as appropriate.

I will claim here that the discourse function of Marathi =*ts* in declarative clauses is to indicate that the speaker takes the prejacent's interpretation to correspond to the unique mutually salient propositional alternative in the current question (CQ_c). The mutually perceived salience of the proposition denoted by the prejacent may be rooted in the localized beliefs and expectations of particular interlocutors at a given utterance context, as in (1f). Alternately, it may emerge from some intrinsic property that lends mutually recognizable prominence to the prejacent proposition (for instance, its unexpectedness or noteworthiness), as in (1e) and (1g).[2] In both cases, I suggest that =*ts* signals that interlocutors are in mutual agreement that the proposition denoted by the prejacent is uniquely salient – it stands out among alternative answers. This amounts to a signal that the interlocutors are coordinated with each other with respect to crucial aspects of the structure and content of the current question. For instance, they might be expected to be coordinated on what the addressee "really" wants to know in asking the question (e.g. 1f) or what the scalar structure of the question is (e.g. 1e). From this perspective, =*ts* conveys that the proposition expressed by the prejacent offers a **schelling point** (or focal point) among alternative answers for the interlocutors to coordinate on. As Schelling (1960) notes, the prominence of such a point in any domain is not necessarily a definite solution; it is heavily context-dependent, varying by time, place and the people involved.

> People can often concert their intentions or expectations with others if each knows that the other is trying to do the same. Most situations – perhaps every situation for people who are practiced at this kind of game – provide some clue for coordinating behavior, some focal point for each person's expectation of what the other expects him to expect to be expected to do. Finding the key, or rather finding a key – any key that is mutually recognized as the key becomes the key – may depend on imagination more than on logic; it may depend on analogy, precedent, accidental arrangement, symmetry, aesthetic or geometric configuration, casuistic reasoning, and who the parties are and what they know about each other. (Schelling, 1960, 57)

This type of flexibility means that although Marathi =*ts* (and Hindi =*hi*) presuppose coordination on the salience of a particular propositional alternative in the current question, the "how" and the "why" of its salience is a contextually varying matter. I will focus here on two kinds of salience: (a) salience that arises on the basis of shared interlocutor beliefs, expectations, and preferences; and (b) salience that arises because of the prejacent's position at the end of a scale of relevant alternatives.

In §2, I organize the core set of facts for the discourse salience and noteworthiness-based uses of =*ts*. In §4, I present the analysis together with descriptions of how it accounts

[2] I leave aside for this presentation the third class of uses of =*ts*. In these uses, what is to be resolved is the intended interpretation of the prejacent. This interpretation is under-determined at a given context, requiring interlocutors to coordinate on a shared interpretation. The role of =*ts* is to facilitate such coordination by presupposing a unique mutually salient interpretation. The examples in (1a, 1b, 1c, 1d) are subsumable under this category. However, articulating the full details of how these cases work is beyond the scope of this more concise presentation.

for described uses. §2. In §5, I briefly document further uses and contrasts that are covered by the analysis and conclude.

2 Some empirical facts about =ts

All judgements reported are the author's native judgements corroborated with two other native speakers. In order to ensure that intuitions about the subtle contrasts that I report here are maximally confirmable, I also provide corresponding translations in Hindi (without glosses) so that Hindi speakers can determine for themselves whether they agree with my judgements regarding the (in)felicity of the Hindi clitic *=hi* in those very contexts.

2.1 Mutual salience based on prior knowledge and expectations

In this section I do two things: First, I rule out the possibility that *=ts* is a "focus" marker simpliciter, in other words, a signal that marks the presence of alternatives relevant to the interpretation of linguistic content (Rooth, 1992; Krifka, 2008; Zimmermann & Onea, 2011). Second, I show that *=ts* can cliticize to a focused constituent felicitously only when the alternative offered as the answer is assumed to be already salient to both interlocutors.

Alternatives made available through focus may be employed in different ways, depending on the goals of discourse participants and surrounding discourse context. Following Zimmermann & Onea (2011) (who in turn build on the functional-typological literature), we can observe the pragmatic use of focus alternatives at least in contexts where *new information* is expected (in answers to questions), *correction* is provided, one among a salient previously introduced set of alternatives is *selected*, and when elements of the alternative set are *contrasted* with each other. We examine the felicity of *=ts* in each of these contexts in succession.

2.1.1 New information focus

=ts is infelicitous in an answer to a wh-question unless the answer is mutually recognized as being salient in the context. *=ts* thus does not correspond to new-information focus simpliciter but may be cliticized to the constituent that provides new information in certain circumstances. Consider the contrast between the two contexts in (2), with the relevant Marathi sentence in (2c). *=ts* is perfectly felicitous (though optional) in Context-1, where there is a salient alternative based on commonly shared experience and this alternative is expressed by Bilal's response. *=ts* is infelicitous in Bilal's response given Context-2, where there is no commonly assumed expectation that the prejacent be true. The Hindi counterpart, which has the same felicity profile, is in (2d).

(2) a. $\surd$ CONTEXT-1: Bilal was at work late last night and Anu wants to know how he got back home. It is commonly known that Niśa usually drops Bilal off when they have to stay late at the office.

A: Who drove you home last night?

b. × CONTEXT-2: Bilal was at work late last night and Anu wants to know how he got back home.
A: Who drove you home last night?

c. B: **Niśa=ne=ts** mə=la soɖ-lə
Niśa=ERG=*c* I.OBL=DAT/ACC leave-PERF.N.SG
Niśa dropped me off.

d. Hindi: **Niśa=ne=hi** muʤʰe ʧʰoɖa

2.1.2 Corrective focus

=*ts* is also infelicitous in corrections unless the answer corresponding to the prejacent is mutually recognized as being salient in the context. (3) shows that =*ts* does not correspond to corrective focus but it may be cliticized to the constituent that provides the correction to a previously offered alternative under certain circumstances. In Context-1, given Niśa's status as the default cook, Bilal's correction in (3c) offers an alternative that is already contextually salient – the use of =*ts* is felicitous. In Context-2, Bilal's correction of Anu's claim does not offer an already salient answer, given that there is no common expectation that Niśa be tonight's cook. (3c) is infelicitous in this context.

(3) a. √ CONTEXT-1: Niśa usually cooks for everyone and it is commonly known that she is the default cook. Bilal had told Anu that he would cook dinner tonight. But he got too busy and Niśa ended up cooking as usual. Anu does not know this and tells her friend:
A: You know, Bilal cooked this delicious meal.

b. × CONTEXT-2: Bilal usually cooks for everyone and it is commonly known that he is the default cook. But it was Niśa who cooked tonight. Anu is unaware of this change, assumes that Bilal cooked as usual, and tells her friend:
A: Bilal cooked this delicious meal.

c. B: nahi-nahi, **Niśa=ne=ts** ʤevəɳ bənəv-lə
No-no Niśa=ERG=*c* meal.N.SG.NOM make-PERF.N.SG
No-no, Niśa made the meal.

d. Hindi: **Niśa=ne=hi** kʰana bənaya

2.1.3 Selective focus

=*ʦ* is also infelicitous in contexts where the answer constituent is selected from a restricted set of previously mentioned alternatives, unless the answer is mutually recognized as being independently salient in the context. At Context-1, given the discussion between Anu and Bilal, Anu's answer can be understood as offering a priorly salient alternative – (4c) is felicitous at this context. At Context-2, Anu's answer is expected to be either Nagpur or Mumbai but there is no commonly known preference for either answer – (4c) is infelicitous here.

(4) a. $\surd$ CONTEXT-1: Anu had told Bilal that she offered to pay for a trip for Anu's daughter to any city in Maharashtra. Her daughter was debating between Nagpur and Mumbai. Anu and Bilal have had a prior discussion about why Nagpur would be more interesting for her given its location.
B: So which of the two did she finally decide on?

b. $\times$ CONTEXT-2: Anu had told Bilal that she offered to pay for a trip for Anu's daughter to any city in the state of Maharashtra. Her daughter had been debating between Nagpur and Mumbai.
B: So which of the two did she finally decide on?

c. A: ti=ne **nagpur=la=ʦ** ʤa-ytsə ʈʰərəv-lə
She.ERG Nagpur.OBL=DAT/ACC=*c* go-INF.N.SG decide-PERF.N.SG
She decided to go to Nagpur.

d. Hindi: us=ne **nagpur=hi** ʧuna

2.1.4 Contrastive focus

=*ʦ* is also infelicitous in contrastive statements unless the alternative offered by the prejacent is recognized as independently being mutually salient in the context. Relative to Context-1, given common knowledge about Deepa's schedule, Bilal's use of =*ʦ* in (5c) indicates that the true answer to part of Anu's question is the commonly expected answer. At Context-2, Bilal contrasts the location of Niśa and Deepa, but there is no shared knowledge about the location of either, making (5c) infelicitous.

(5) a. $\surd$ CONTEXT-1: Anu and Bilal are visiting Niśa's house but Anu cannot see either Niśa or her cousin Deepa. They both know that Deepa is supposed to be teaching at school around this time but Anu is uncertain.
A: Where are Niśa and Deepa?
B: Niśa is out shopping, and...

b. $\times$ CONTEXT-2: Anu and Bilal are visiting Niśa's house but Anu cannot see either Niśa or her cousin Deepa and has no idea where they are.

A: Where are Niśa and Deepa?
B: Niśa is out shopping, and...

c. Deepa **ʃaḷet=ətsˑ** ah-e
Deepa school.LOC=*c* be-PRES.3.SG
Deepa is at the school.

d. Hindi: Deepa **skul=mẽ=hi** hɛ

2.2 Mutual salience by explicit coordination

In this section, I describe a class of slightly different uses from those in §2.1, in which the speaker draws the addressee's attention to an entity before offering the prejacent with =*tsˑ* as the answer. =*tsˑ* cliticizes to individual-denoting demonstratives in pronominal or complex determiner phrases, and the effect is similar to that associated with *that very NP* or clefts in English. In Context-1, given a shared perceptually accessible context, Anu wants to know which individual satisfies the description *Bilal's sister*. Bilal draws her attention to a specific individual in their shared perceptual field and then asserts that that (now salient) individual is his sister. The sentence with =*tsˑ* in (6c) is felicitous at this context. In Context-2, Anu has exactly the same question but structures her inquiry differently; she asks whether a specific individual wearing the green sari satisfies the description *Bilal's sister*. Bilal corrects her, draws her attention to a different individual who is actually his sister and offers the prejacent as the answer in (6c). Crucially, =*tsˑ* is infelicitous at this context. The difference between (6a) and (6b) is that there is no other salient alternative at the context in (6a), while there is a clear competing alternative answer at the context in (6b), introduced by the polar question asked by Anu.

(6) a. √ CONTEXT-1: Anu has never met Bilal's sister and wants to be introduced to her at a party.
A: Bilal, where/which woman is your sister?
B: Do you see that tall woman in the sky-blue dress?

b. × CONTEXT-2: Anu has never met Bilal's sister and wants to be introduced to her at a party.
A: Bilal, is your sister the one wearing the green sari?
B: [Looks at where she is pointing] No, do you see that tall woman in the sky-blue dress?

c. **tī=tsˑ** maʤʰī bəhīɳ ah-e
She=*c* my.F.SG.NOM sister.F.SG.NOM be-PRES.3.SG
It is that woman that is my sister.

d. Hindi: **və=hi** meri bɛhɛn hɛ

(7) offers similar minimally differing contexts where the referent (Deepa's mother's wedding sari) is in the shared knowledge of the interlocutors but not within their shared perceptual field at the time of utterance. *=ts* is felicitous when there is no competing alternative answer introduced through a prior discourse move (Context-1 in 7a), but infelicitous when a different answer has been highlighted by a polar question (Context-2 in 7b).

(7) a. √ CONTEXT-1: Anu wants to know Deepa's attire at a party the night before and asks her friend Niśa.
A: What was Deepa wearing at the party last night?
N: You have seen her mother's wedding sari, right?

b. × CONTEXT-2: Anu wants to know Deepa's attire at a party the night before and asks her friend Niśa.
A: Did Deepa wear the green sari her sister gave her to the party?
N: No. You have seen her mother's wedding sari, right?

c. ti=ne **ti=ts** saɖi g^{h}at-li hot-i
she=ERG that=*c* sari.F.SG.NOM wear-PERF.F.SG PST-F.SG
She was wearing *that very* sari.

d. Hindi: us=ne **və=hi** sari pɛhɛni t^{h}i

The (in)felicity judgements associated with the context-sentence pairings in (6) and (7) reveal that the felicitous use of *=ts* depends on whether the prejacent can be taken to be the unique mutually salient alternative in the current question. Even if the speaker draws attention to a discourse referent and thereby makes the alternative offered by the prejacent salient, if the preceding discourse contains a competing false alternative, this competitor prevents the prejacent from being construed as uniquely mutually salient.

2.3 Summary

To summarize the data so far, the felicity of *=ts* depends on whether the alternative corresponding to the prejacent is understood to be mutually salient for both interlocutors at the utterance context. The effect of *=ts* is to convey that the answerer is providing that privileged answer that the questioner has reason to expect the answerer to provide. In only the CONTEXT-1 descriptions above, the prejacent is salient because of priorly known shared information about patterns of behavior (2a, 3a, 5a) or priorly known shared interlocutor preferences (4a). This makes the use of *=ts* felicitous, regardless of the pragmatic function of focus at that context. Moreover, in cases where the alternative offered by the speaker is rendered salient by pointing or otherwise drawing attention, the presence of a competing false alternative prevents the prejacent from being construed as uniquely mutually salient.

3 Salience based on noteworthiness or unexpectedness

I focus on two uses of *=ʦ* here: its mirative use and its behavior like a scalar additive in some (not all) negated contexts.

3.1 Mirative uses of =ʦ

In its mirative uses, *=ʦ* is used to convey that the proposition denoted by its prejacent is surprising and deviates sharply from contextual expectations. This is similar to some uses of *just* as can be seen in (8). In (8a), Anu conveys that her daughter inviting the whole class exceeded what she had expected. In (8a), Anu conveys that the colleague's response to problematic behavior exceeded what Anu had expected.[3]

(8) a. CONTEXT: Anu had given her daughter permission to invite a few friends for her birthday party.
B: So how many friends did she invite?
A: It was crazy...
ti=ne akk^{h}ya **vərga=la=ʦ** bolav-lə
she=ERG entire class.N.SG.OBL-DAT=*c* invite-PERF.N.SG
She *just* invited the whole class! (H: *us=ne pure klas=ko=hi bulaya!*)
⇝ *The number of invitees was much higher than contextually expected.*

b. CONTEXT: Anu tells Bilal about how angry their friend got about a sexist remark from a colleague.
A: She was so mad...
ti=ne tya=la **tʰəppəɖ=əʦ** mar-lī
she=ERG he.OBL=DAT/ACC slap.F.SG.NOM=*c* strike-PERF.F.SG
She *just* gave him a slap. (H: *us-ne us=ko ʧãʈa=hi ləgaya!*)
⇝ *The slapping was a more extreme response than contextually expected.*

There are two things that characterize what I am descriptively labeling as mirative uses with *=ʦ*. First, these uses involve deviation from expectations in the upward direction, i.e. the prejacent is understood to describe a state of affairs that is *beyond* what was expected, not *less than* what was expected. Mirativity that involves a "lower-than-expected" inference does also obtain with *=ʦ*, when it gives rise to the exclusive effect as in (1a) and (1b) but I do not discuss it in detail here.
Second, in questions that involve answers that make reference to numerical/quantity scales, *=ʦ* can be used to convey that a number or quantity is surprisingly high *only* when the lexical expression used is independently interpretable as a salient quantity on the relevant scale of values. So with respect to (8a), suppose Anu's daughter's classroom has 50 children.

[3] Although I do not provide the relevant contextual modulations in detail here, it is easily possible to construct contexts where the Marathi sentences in (8a) and (8b) can convey that the prejacent is something that both interlocutors take to be mutually salient on the basis of shared beliefs and expectations/preferences.

Then, at the utterance context, saying that her daughter invited the whole class is equivalent to saying that she invited her 50 classmates. But, crucially, Anu cannot answer Bilal's question saying *"She invited her **50**=**ts** classmates!"* instead of (8a).[4] To the extent that I can see, this has nothing to do with the interpretation of round vs. non-round numerals – round numerals are not seen as more salient locations on the scale of numerical values as the example shows. What is required is a way to construe the prejacent as a natural endpoint on a scale of values. The minimally different formulation in (9a) illustrates this. If the prejacent explicitly conveys that the answer corresponds to a natural scalar endpoint (the maximum number of potential invitees in the context have been actually invited), the use of *=ts* is felicitous. (9b) provides another example to illustrate this empirical pattern. In (9b-i), the reference is to a whole crate and Anu's answer is felicitous with *=ts*. In (9b-ii), the prejacent explicitly uses the expression *sixty mangoes* and *=ts* fails to be felicitous.

(9) a. CONTEXT: Anu had given her daughter permission to invite a few friends for her birthday party.
B: So how many friends did she invite?
A: It was crazy. There are fifty kids in her class.
ti=ne pənnas-ʧya-pənnas **mulan=na=ts** bolav-lə
she=ERG fifty-of-fifty child.N.PL.OBL/DAT=*c* invite-PERF.N.SG
She *just* invited all fifty! (H: *us-ne pəʧas-ke-pəʧas bəʧʧõ=ko=hi bulaya*)

b. CONTEXT: Anu had asked a mango seller to send her 2 dozen mangoes when they came in season. It is commonly known that one crate of mangoes contains sixty mangoes.
B: So has he sent you the mangoes?
A: Oh yes! But I am surprised...

i. tya=ne akk^{h}i **peʈi=ts** paʈ^{h}əv-li
he=ERG whole crate.F.SG.NOM=*c* send-PERF.F.SG
He *just* sent a whole crate! (H: *us-ne puri peʈi=hi b^{h}eʤi*)

ii. #tya=ne **saʈ^{h}=əts** paʈ^{h}əv-let
he=ERG sixty.M.PL.NOM=*c* send-PERF.M.PL
He *just* sent sixty! (H: *#us-ne saʈ^{h}=hi b^{h}eʤe*)

3.2 Scalar additive-like uses of =ts

Bhatt (1994) observes that Hindi *=hi* often has an *only*-like reading in non-negated clauses. However, in negative declaratives, an additional *even*-like reading emerges. This reading is also available with Marathi *=ts*, as illustrated with the examples in (10a) and (10b). In

[4]Such a response would typically lead to the complement exclusion reading (*only 50 classmates*) or be felicitous if Anu and Bilal had discussed their expectations beforehand and it was mutually salient between them based on this discussion that the daughter would end up inviting 50 classmates.

(10a), the proposition that Bilal did not invite Nita is understood to be least likely at the context. In (10b), the proposition that Deepa does not know Hindi at utterance time is understood to be least likely at the context.[5]

(10) a. CONTEXT: Deepa wants to know more about Bilal's recent wedding. It is commonly known that Nita is Bilal's best friend at the office.
D: So did he invite his entire office?
A: No...
Bilal=ne **Nita=la=ʦ** bolav-lə nahi, baki
Bilal=ERG Nita=DAT/ACC=*c* invite-PERF.N.SG NEG other
lokan=ʦə soɖ
people.OBL.PL=N.SG.GEN leave.IMP
Bilal didn't invite *even* Nita, (H: *Bilal=ne Nita=ko=hi nəhi bulaya!*)
let alone other people.
⇝ *Nita was least expected among Bilal's colleagues to not be invited.*

b. CONTEXT: Anu and Bilal are discussing Deepa's plan to do linguistic fieldwork in a remote area where the contact language is Bhojpuri and the target language is Sadari.
A: Does Deepa have the linguistic expertise to do this fieldwork?
B: Not at all...
ti=la əʤun **Hindi=ʦ** ye-t nahī
she.OBL=DAT/ACC yet Hindi=*c* come-IMPF NEG
She doesn't know *even* Hindi yet. (H: *us=ko Hindi=hi nəhi ati!*)
⇝*Not knowing Hindi is less likely than not knowing any of the other languages.*

Two things are to be noted regarding this scalar additive-like effect associated with Marathi =*ʦ*. These also extend to the observations made for Hindi in Bhatt (1994) and Bajaj (2016). First, appropriate context modulation can easily wipe out the *even*-like effect and convey only that the prejacent proposition is something that both interlocutors take to be mutually salient on the basis of shared beliefs and expectations/preferences. In such cases, the felicity of =*ʦ* arises from discourse-based mutual salience constraint given in and not because the answer is particularly noteworthy or unexpected. To make this clear, the relevant minimally different contexts are given in (11).

(11) a. CONTEXT: Deepa wants to know more about Bilal's wedding. She knows that he deliberately didn't invite one of his colleagues but doesn't know which one. Anu and Deepa know that Bilal really does not like Nita.

[5]This is expected if one takes =*ʦ* to make its conventional contribution outside the scope of negation as Karttunen & Peters (1979) suggest for the reverse implication associated with English *even* in negative clauses. Bhatt (1994) suggests that the even-like reading comes about when Hindi =*hi* is in the scope of negation but it is unclear to me that this is the right scopal relation. Intuitively, what Hindi =*hi* and Marathi =*ʦ* seem to comment on is the unexpectedness or unlikelihood of proposition denoted by the negative declarative.

D: So which colleague did he not invite? Nita, I am guessing.
A: Yes, you are right...
Bilal=ne **Nita=la=ts** bolav-lə nahi
Bilal=ERG Nita=DAT/ACC=*c* invite-PERF.N.SG NEG
It was Nita that Bilal didn't invite. (H: *Bilal=ne Nita=ko=hi nəhi bulaya*).
↛ *Nita was least expected among Bilal's colleagues to not be invited.*

b. CONTEXT: Anu and Bilal are discussing Deepa's plan to do comparative ethnographic research in India, Bangladesh, and Nepal. Deepa needs to be fluent in Hindi, Bangla, and Nepali. Anu knows that Deepa has been learning two of the three needed languages.
A: So which language does she not know well yet? It is Hindi, right?
B: Yes, you are correct...
ti=la **Hindi=ts** ye-t nahī
she.OBL=DAT/ACC Hindi=*c* come-IMPF NEG
It is Hindi that she does not know. (H: *us=ko Hindi=hi nəhi ati*)
↛*Not knowing Hindi is less likely than not knowing any of the other languages.*

Second, it is impossible to get the scalar additive-like effect if the alternative propositions are also ordered by entailment. For brevity, I provide only the relevant English context-sentence pairings and the unglossed Hindi translations. In (12a) the alternatives {...Deepa didn't read one paper, Deepa didn't read two papers, Deepa didn't read three papers} are ordered by entailment but neither Marathi *=ts* nor Hindi *=hi* can be used felicitously to convey that the prejacent is less likely than most alternatives. In (12b), the alternatives would be {...The doorway is not 6 feet tall, The doorway is not 7 feet tall, The doorway is not 8 feet tall} and similarly ordered by entailment. English *even* is of course felicitous in both contexts.[6]

(12) a. CONTEXT: Deepa was supposed to read three papers for a class discussion.
A: So how many were you able to read?
D: You know, I was so busy...
I didn't read *even* one. (H: #*mɛ̃=ne ek=hi pepər nəhi pəʈʰa*)

b. CONTEXT: Deepa and Anu are discussing a door-opening for which they need to buy a curtain.
A: So do we need an 8 foot long curtain?
D: That's too long!
The opening isn't *even* six feet. (H: #*dərvaʤa ʧʰe-fuʈ=hi ləmba nəhi hɛ*)

The unavailability of the scalar additive-like effect when entailment-based scales are involved is connected to the constraint on numerical/quantity scales discussed in §3.1. There

[6]In both cases, the dedicated additive clitics (Marathi *=pəɳ* and Hindi *bʰi*) would be needed express the *even*-like meaning.

we saw that in answers that make reference to numerical/quantity scales, =*ts* can be used to convey that a number or quantity is surprisingly high only when the lexical expression used is independently interpretable as a salient quantity on the relevant scale of values. Here we see that numerical/quantity expressions, even when used to construct less and more likely alternatives, do not by themselves provide the sort of salience that =*ts* is sensitive to. More generally, =*ts* does not seem to involve a notion of comparative salience. For =*ts* to be felicitous, it is not sufficient that the prejacent is more unlikely/surprising/noteworthy than some of its alternatives. It appears that =*ts*'s felicity depends on whether the proposition its prejacent is taken to denote is construable as *absolutely uniquely salient* on some scale of values.

4 Analysis

Assume that each context c is associated with a body of information INFO_c characterizing the joint, mutually agreed upon public commitments of all interlocutors at c. INFO_c can be construed as a set of propositions or the set of worlds yielded by their intersection (the context set). Each context c also provides a question CQ_c (i.e. a set of answers) and a contextually determined ranking over the alternative answers $\leq_c$. We assume a set of worlds W, a set of propositions $Prop \subseteq \wp(W)$, and a set of questions $Ques \subseteq \wp(Prop)$, such that the conditions in (13) hold.

(13) a. $\forall \text{Q} \in Ques : \forall p, p' \in \text{Q} : p \subseteq p' \vee p \not\subseteq p'$
The alternatives in any question may be overlapping, disjoint, or one proposition may be contained in another.[7]

b. $\forall \text{Q} \in Ques : \cup\{p \mid p \in \text{Q}\} = \cap \text{INFO}_c$
The alternatives in any question form a cover over the common ground INFO_c at a context c (defined in 14) .

(14) A context is a tuple $\langle \text{INFO}_c, \text{CQ}_c, \leq_c \rangle$, such that

a. $\text{INFO}_c \subseteq W$

b. $\text{CQ}_c \in Ques$

c. $\leq_c$ is a contextually determined ordering on CQ_c s.t.

i. $\forall p \in \text{CQ}_c : p \leq_c p$ (Reflexive)

ii. $\forall p, p', p'' \in \text{CQ}_c : [p \leq_c p' \wedge p' \leq_c p''] \rightarrow p \leq_c p''$ (Transitive)

iii. $\forall p, p' \in \text{CQ}_c : p <_c p' \leftrightarrow [p \leq_c p' \wedge p' \not\leq_c p]$ (Strict ordering)

[7]This is obviously a weak condition that corresponds to the way that alternatives are construed in Beaver & Clark (2008); Coppock & Beaver (2014). This construal of possible answers to a question contrasts with Groenendijk & Stokhof (1984), where a question is formally modeled as a partition that divides a set of worlds into some number of mutually exclusive alternatives. It also contrasts with the view in Inquisitive Semantics (e.g. Ciardelli et al. (2019)), which allows alternatives in an issue to be overlapping or disjoint (sets of information states) but does not allow one alternative to be contained in another.

According to (14c), the alternatives in the CQ_c are ordered from weak to strong by a contextually given ordering. This is taken to be a preorder i.e. a reflexive (14c-i) and transitive (14c-ii) binary relation on the CQ_c.
In work on discourse particles and discourse marking strategies more generally, the "stronger than" ordering $\leq_c$ is often entailment/informativity based where $p \leq_c p'$ indicates that p entails or is informationally stronger than p'. Pragmatically determined orderings corresponding to rank-order, likelihood, or newsworthiness are also invoked in analyses involving exclusive *just* and scalar additive *even*. *=ts* seems to be sensitive to both entailment-based and pragmatically determined orderings. But from the class of cases from §2.1, we see that it may also be licensed by mutual salience based on interlocutor knowledge and expectations/preferences. Therefore, the analysis proposed here takes *mutual salience* (or equivalently Schelling point status) to be the unifying feature of *=ts*'s conventional contribution, deriving inferences about informative strength and high newsworthiness or unlikelihood from it.

4.1 The lexical entry for =ts

=ts makes no at-issue contribution but simply imposes a felicity condition on the contexts in which it occurs. The lexical entry given in (15) specifies that *=ts* is felicitous at a context c iff the contextual interpretation of its prejacent $[\![S]\!]^c$ is a SCHelling point among the alternatives in the CQ_c.

(15) $[\![\text{=ts}(S)]\!]^c$ is defined iff
$\exists! p : p = [\![S]\!]^c \wedge \text{SCH}(p, \text{CQ}_c, \leq_c)$
If defined,
$[\![\text{=ts}(S)]\!]^c = p$

A *=ts*-using speaker presupposes that the alternative p they convey by uttering the prejacent S at c is uniquely mutually salient among the ordered alternatives in the CQ_c. Such a speaker must be confident in the addressee's ability at the context to uniquely recover p given S, using pragmatic reasoning. In utterances where the discourse context does not already provide a mutually salient proposition, the speaker must presuppose that the interlocutors are coordinated on the structure of the ordered CQ_c and specifically the position of p relative to the contextually given ordering $\leq_c$.

In (16) I propose three classes of contextual conditions in which interlocutor coordination on a unique alternative might be expected to obtain: p is construable as a minimal element of the ordered CQ_c; p is construable as a maximal element of the ordered CQ_c; the common ground entails that the speaker and the addressee of c are uniquely attending to p as an answer to CQ_c.[8]

[8] I do not further define the relation ATT here; it is intended to capture the fact that propositional discourse referents may often be the object of joint interlocutor attention. The point here is that being the object of joint interlocutor attention is only one of the ways in which a proposition may emerge as a schelling point. In other cases, the determination of the schelling point alternative requires additional pragmatic reasoning on part of the addressee.

(16) $\text{SCH}(p, \text{CQ}_c, \leq_c) \leftrightarrow$

a. $p \in \textbf{Minimal}(\text{CQ}_c, \leq_c) \wedge \exists p' \in \text{CQ}_c : p' <_c p$ OR
No alternative in the CQ_c is strictly weaker than p on the contextually given ordering $\leq_c$ and CQ_c contains strictly stronger alternatives.

b. $p \in \textbf{Maximal}(\text{CQ}_c, \leq_c) \wedge \exists p' \in \text{CQ}_c : p <_c p'$ OR
No alternative in the CQ_c is strictly stronger than p on the contextually given ordering $\leq_c$ and CQ_c contains strictly weaker alternatives.

c. $\text{INFO}_c \subseteq \lambda w.\text{ATT}(Sp_c, Ad_c, p, \text{CQ}_c)(w)$
INFO_c entails the proposition that the Speaker and the Addressee are jointly attending uniquely to p as an answer to CQ_c.

The conditions in (16) offer salient points of reference in the ordered CQ_c that enable interlocutors to coordinate on the intended interpretation of the prejacent S at c. In other words, if c does not already provide a salient alternative that interlocutors are attending to given their shared expectations/beliefs, (i.e. if (16c) does not hold), the speaker's use of =*ts* guides the addressee towards an interpretation of the prejacent that occupies the lowest or highest position in the ordered question.[9] The idea is that scalar endpoints are salient at any context and can always be recruited in determining the interpretation of an under-specified prejacent. In such cases, the =*ts*-using speaker must also presuppose that the interlocutors are fully coordinated on $\langle \text{CQ}_c, \leq_c \rangle$. It is only against this presupposition that a proposition can be salient by virtue of corresponding to a scalar endpoint of the ordered CQ_c.

4.2 Accounting for =ts's uses

4.2.1 Accounting for discourse-sensitive mutual salience uses

In §2.1 and §2.2 we saw that =*ts* can be used in contexts where the salience of an alternative answer is rooted in the interlocutors' beliefs about each other's beliefs. There were also examples in which the speaker draws on information that is accessible (perceptually or otherwise) to their addressee in order to make their answer mutually salient as long as there is no other contextually salient competing alternative.

The lexical entry proposed in (15), together with the construal of salience as in (16c), straightforwardly accounts for this set of uses. =*ts* is infelicitous if there is no unique alternative in the CQ_c that the interlocutors are jointly attending to in the discourse context. But =*ts* is felicitous whenever there is such a mutually salient alternative – as seen in the contrasting examples in (2), (3), (4) and (5). =*ts* is also infelicitous when the context provides multiple alternatives that compete for salience, as seen in the contrasting felicity of the =*ts* marked answer in response to contrasting contexts in (6) and (7).

[9] Given the space constraints here, I do not discuss cases where () is the condition responsible for achieving mutual salience.

4.2.2 Accounting for mirative uses

In §3.1, we saw that *=ts* can be used to convey that the proposition denoted by its prejacent is surprising and deviates sharply from contextual expectations. Specifically, the prejacent is understood to describe a state of affairs that exceeds (rather than falls short of) contextual expectations. A second observation was that if the set of alternative answers is ordered along a numerical or quantity scale, *=ts* can be used to convey that the quantity referenced in the prejacent exceeds expectations *only if* the quantity expression is independently interpretable as a scalar endpoint (the contrasts in (8) and (9)).

Note that the prejacents in these uses denote context-invariant propositions – there are no variable values to be fixed contextually. *=ts* signals that the speaker takes the prejacent to be uniquely mutually salient for the interlocutors. At such a context, the addressee faces uncertainty with respect to determining why the prejacent proposition is taken to be a schelling point by the speaker. The addressee reasons that the speaker must assume a particular ordering on the CQ_c such that the prejacent stands out among alternatives relative to this contextually given ordering. In other words, *=ts* gives the signal that the interlocutors are coordinated on the structure of the ordered CQ_c, triggering pragmatic reasoning regarding this structure. So, in mirative uses, *=ts* guides the addressee towards construing the prejacent as a maximal element in the CQ_c where the contextually given ordering $\leq_c$ corresponds to noteworthiness or unexpectedness.

If this is on the right track, then we can also make sense of why *=ts* is infelicitous with noteworthiness/unexpectedness orderings that rely on numerical or quantity based scales. *=ts*'s felicity condition requires the contextually relevant scale of values to be closed – otherwise it makes no sense to constrain reference to a salient scalar endpoint. The addressee reasons that the prejacent proposition corresponds to a maximal element on such a closed scale of values. Numerical/quantity scales are open and invoke quantity-based lexical alternatives that do not naturally lend themselves to an ordering with maximal elements. Simply put, it is unclear why *fifty kids* or *sixty mangoes* should be the precise quantities corresponding to maximally noteworthy/unexpected propositions in contrast to higher quantities such as *sixty kids* or *seventy mangoes*. Quantity expressions such as *the whole class* or *a whole crate* on the other hand are more naturally construable on a closed scale with relevant alternative quantities like *half the class* or *a quarter of a crate* being clearly ordered below the maximum.[10]

To summarize, the mirative effect of *=ts* can only arise in contexts where the addressee can effectively reason about the speaker's construal of the CQ_c, such that the prejacent is construed as a schelling point by virtue of being a maximal element of the CQ_c on the contextually given noteworthiness/unexpectedness based ordering $\leq_c$.

[10] In fact, the use of the expression *whole* in the prejacents in (8a) and (9b-i) makes these lower ordered alternatives salient.

4.2.3 Accounting for scalar-additive uses

The scalar additive-like effect of =*ts*, described in §3.2, obtains when =*ts* contains negation in its scope (i.e. when the prejacent is a negative declarative).[11] This is also one of main effects described for Hindi =*hi* by Bhatt (1994) and Bajaj (2016). Remember also from the examples in (12) that it is impossible to get this effect if the alternative propositions are ordered by entailment, a restriction not present with *even*.

We can straightforwardly make sense of the distribution in (10b), for instance, if we take the CQ_c to correspond to the interrogative *Which languages does Deepa not know?* The use of =*ts* triggers reasoning about the ordered CQ_c and guides the addressee towards construing the prejacent as a maximal element where the contextually given ordering $\leq_c$ corresponds to unlikelihood. The addressee reasons that if the speaker has signaled the prejacent to be a schelling point among the alternatives, then they must likely take alternatives in the assumed CQ_c to be ordered by unlikelihood. On this ordering, the proposition that Deepa does not know Hindi is construable as a maximal element, given that it is the least likely proposition among alternatives.

This also allows us to make sense of why =*ts* is infelicitous if some of the alternative propositions are ordered by entailment as in (12). =*ts*'s felicity condition requires that the prejacent be a schelling point among alternatives, which in many cases turns out to be a maximal or minimal element of the ordered CQ_c. In a context like (12a), the prejacent *Deepa did not read one paper* corresponds to neither the minimal nor the maximal element among the alternatives.[12] Similarly, in a context like (12b), it is unclear how the prejacent might be construed as a maximal or minimal element on a likelihood scale – the doorway not being six feet does not uniquely stand out in comparison to, say, the doorway not being five feet or seven feet. More generally, a likelihood-based ordering which is derived from lexical alternatives to numerical/quantity expressions in the prejacent does not lend itself to providing salient scalar endpoints that the speaker and the addressee can easily coordinate on at a context. The infelicity of =*ts* with such uses follows.

5 Extensions and conclusion

The previous section offered an analysis of =*ts* that takes it to signal that its prejacent is a schelling point among the alternatives in the CQ_c. When a propositional alternative is already the object of joint interlocutor attention at the context, =*ts* is felicitous. When a specific alternative is not already mutually salient, the felicity of =*ts* depends on the addressee's ability to reason about the source of the mutual salience of the prejacent proposition. I showed how this reasoning works in service of determining the structure of the

[11] To be clear, there are affirmative clauses in Marathi/Hindi that contain =*ts/hi* which are most naturally translated using *even*. But these are subsumable under the mirative uses accounted for in §4.2.2 and so I do not discuss them separately here.

[12] The maximal (least likely) element would be *Deepa did not read zero papers* and the minimal (most likely) element would be *Deepa did not read three papers*.

ordered CQ_C, recovering the contextually given ordering assumed by the speaker. Mirativity and scalar additivity effects of =*ʦ* arise from this sort of pragmatic reasoning. A range of further empirical facts about the (in)felicity of =*ʦ* can be made sense of once we assume that it uniformly signals that its prejacent denotation is a schelling point among alternatives in the CQ_C. I discuss some of these facts in the domain of declarative clauses here.

5.1 The utterance context can always be coordinated on

There is a strong asymmetry between the acceptability of =*ʦ* in prejacents containing elements that signal proximity/coincidence with the utterance context and those that signal distance. Consider the contrast between (17b) and (17c) uttered at a context where there is no priorly salient expectation about Niśa's location. In (17b), we see that the proximal spatial demonstrative, an indexical that resolves to the utterance location, and other similar expressions are perfectly felicitous without discourse support. In contrast, (17c) shows that the distal demonstrative and expressions conveying distance from the utterance location are infelicitous without discourse support. (17d) and (17e) illustrate the contrast for Hindi.

(17) a. CONTEXT: Anu has no idea where Niśa is and asks Bilal about her.
A: Where is Niśa?

b. B: Niśa **it^{h}e=ʦ / ʤəvəɭ=əʦ/ aspas=əʦ** ah-e
Niśa.NOM here=*c* / nearby=*c* / around.here=*c* be-PRES.3.SG
Niśa is *right* here / *just* close by / *just* around here.

c. #B: Niśa **tit^{h}e=ʦ / dur=əʦ** ah-e
Niśa.NOM there=*c* / far.away=*c* be-PRES.3.SG
Niśa is *right* there / *just* far away.

d. Hindi: Niśa **yəhĩ / nəʤdik=hi / aspas=hi** hɛ

e. Hindi: #Niśa **vəhĩ / dur=hi** hɛ

In (18), the same pattern is found in the temporal domain. =*ʦ* is felicitous with *atta* 'now' without discourse support as in (18b) but infelicitous with *tev^{h}ã* 'then' (18c) without an antecedent. The Hindi counterparts are in (18d) and (18e).

(18) a. CONTEXT: Anu has no idea when Niśa left the house and asks Bilal.
A: When did Niśa leave?

b. B: Niśa **atta=ʦ** ge-li
Niśa.NOM now=*c* go-PERF.F.SG
Niśa left *right* now.

c. #B: Niśa **tev^{h}ã=ts** ge-li
Niśa.NOM then=*c* go-PERF.F.SG
Niśa went *right* then.

d. Hindi: Niśa **əb=hi** gəyi

e. Hindi: #Niśa **təb=hi** gəyi

This distribution falls out naturally from the assumption that =*ts* signals the mutual salience of the alternative denoted by the prejacent. If the value of indexical elements in the answer constituent resolves to entities that are by definition salient to interlocutors – e.g. utterance place and time – the prejacent is rendered mutually salient. But when the resolution of an indexical depends on more specific contextual information, the use of =*ts* is infelicitous in the absence of discourse support.

5.2 =ts in contexts with imperfectly aligned interests

An expression that signals that interlocutors are coordinated with respect to the salience of the prejacent in the CQ$_c$ is well-suited for use in aligned contexts – when cooperative interlocutors have similar interests regarding how the CQ$_c$ is resolved. It is interesting then that =*ts* can be used to "inflict" the mutual salience of the prejacent on a resisting interlocutor. Consider the context in (19a) where Deepa and Anu cannot possibly come to a shared perspective on how the CQ$_c$ *Who started the fight?* is to be resolved. Anu's response to Deepa in (19b) signals that the prejacent *Deepa started the fight* is an answer that *both* interlocutors can coordinate on by virtue of its mutual salience – it is obvious in the discourse context!

(19) a. CONTEXT: Deepa and Anu have gotten into a heated argument and cannot agree on whose fault it is.
D: Anu, you started the fight.
A: Deepa, now don't twist facts...

b. **tu=ts** b^{h}aɳɖəɳ suru ke-lə-s
You.ERG=*c* fight.NOM.N.SG start do-PERF.N.SG-2.SG
It was YOU who started the fight!

c. Hindi: **tum=hi=ne** ləʈai ʃuru ki

The effect of =*ts* in unaligned contexts in general is that the speaker appears to be forcing consensus on the interlocutors in their bid to admit the proposition they convey to the common ground. Working out the precise dynamics of such interactions in context must be left for future research.

5.3 Concluding remarks

I have tried to demonstrate that Marathi *=ts* squarely addresses the issue of interlocutor coordination in discourse. It is a dedicated device to signal coordination with respect to crucial components of the context – the shared common ground, the nature and structure of the question that is taken up at the relevant stage of discourse, and/or the resolution of contextual variables. *=ts* conveys the existence of a schelling point that is available for coordination in the resolution of the salient question.

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Gender and allocutivity

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ABSTRACT

The term 'allocutivity' refers to the grammatical encoding of speech act participants, i.e. speaker and addressee of an utterance, which may also describe the social relations that they share with each other like politeness and familiarity. This paper explores allocutivity and its interaction with gender marking by identifying three types of allocutive languages: plain allocutive languages, addressee allocutive languages, and speaker allocutive languages. In order to account for the presence and absence of gender marking as part of the allocutive expression, we propose an analysis that assumes speaker and addressee to instantiate implicit syntactic arguments (Speas & Tenny, 2003), which trigger gender marking if they are in the vicinity of a gender probe, situated on the speech act head. Locality is achieved via external Merge of the speaker argument and internal Merge of the hearer argument. The latter we derive from drawing parallels to object shift phenomena.

1 Introduction

Languages differ when it comes to the expression of information related to the speaker, the addressee, and the social relations that they share with each other. Since this information is naturally available in any given utterance context, grammaticalization of such information is rare, but there are a handful of languages where it is possible to grammatically encode such information. These languages are referred to as allocutive languages. Magahi, an Indo-Aryan language, expresses allocutive-related information through a dedicated morpheme, where *-o* in (1a) indicates the speaker's intention to be polite towards the addressee, and *-au* in (1b) indicates the speaker's intention to express familiarity with an addressee (Alok, 2021).

(1) **Magahi** (Alok, 2021, 2)

a. *Context: The speaker expresses politeness towards the hearer.*

Haam jaait h-i-o.
1SG go.PROG be-1-ALL.POL
'I'm going.'

b. *Context: The speaker expresses familiarity with the hearer.*

Haam jaait h-i-au.
1SG go.PROG be-1-ALL.FAM
'I'm going.'

In (1), no gender information is encoded that refers either to the speaker or the addressee, as it can be uttered either by a male or female speaker to either a male or female addressee. Therefore, we will refer to Magahi-type languages as plain allocutive languages.

Compared to Magahi, there are languages like Basque that encode gender of the addressee as a part of an allocutive marker, though gender information is encoded only in a familiar context but not in a politeness context (Oyharçabal, 1993; Antonov, 2015; Haddican, 2018). As shown in the politeness context in (2a), the form *-zü* can be used to refer to either a male or female addressee. However, in the familiar context there is a gender distinction, where *-k* refers to a male addressee (2b) and *-n* refers to a female addressee (2c).

(2) **Basque** (Oyharçabal, 1993, 92)

a. *Context: The speaker expresses politeness towards the hearer.*

Pette-k lan egin di-zü.
Peter.ERG work do.PERF 3ERG-ALL.POL
Peter worked'

b. *Context: The speaker expresses familiarity with a male hearer.*

Pette-k lan egin di-k.
Peter.ERG work do.PERF 3ERG-ALL.FAM.M
Peter worked.'

c. *Context: The speaker expresses familiarity with a female hearer.*

Pette-k lan egin di-n.
Peter.ERG work do.PERF 3ERG-ALL.FAM.F
Peter worked'

We will refer to Basque-type languages as addressee allocutive languages, which express gender distinction only in the familiar context.

Furthermore in our typological sample, we identify one more type of language, where the allocutive information is expressed through the gender of the speaker, across familiar/politeness contexts. As shown in the following example from Kũṛux, a Dravidian language, *-i* in (12b) is a portmanteaux of 2SG subject agreement and a male speaker. Similarly *-in* in (3b) is a portmanteu of 2SG subject agreement and a female speaker, see also Ekka (1972). These gender markings are reflected both in politeness and familiarity contexts.

(3) **Kũṛux** *(fieldwork)*

a. *Context: The speaker talks to a male hearer.*

ni:n bar-k-i
2SG come-PST-2SG.ALL.M
'You came.'

b. *Context: The speaker talks to a female hearer.*

ni:n bar-k-in
2SG come-PST-2SG.ALL.F
'You came.'

We will refer to Kũṛux-type languages as speaker allocutive languages, as they express gender of the speaker rather than addressee. Now comparing gender markings in addressee allocutive languages and speaker allocutive languages, we get the following two generalization:

(4) **Addressee generalization**[1]
If languages mark the gender of the addressee (addressee allocutivity), then gender indicates familiarity, not politeness between speaker and addressee.

(5) **Speaker generalization**
If languages mark the gender of the speaker (speaker allocutivity), then gender does not distinguish politeness from familiarity between speaker and addressee.

In order to account for these generalizations, we appeal to an analysis that models gender marking as the result of valuating a gender probe by an implicit speaker or hearer argument, where the speaker argument is merged local to the gender probe, whereas the hearer argument has to undergo movement to enter valuation. Hence, allocutive agreement with the addressee requires *hearer shift*, akin to object shift movement in other discourse related domains.

The paper is divided as follows: In section 2, we discuss cross-linguistic data that justifies the division of plain, addressee and speaker allocutive languages. In section 3, we trace the parallel between allocutivity and object shift phenomena, followed by an analysis that incorporates these insights and maps out the derivation of the three types of allocutive languages and the generalizations. Section 5 concludes the paper.

2 Types of allocutivity

In this section, we discuss three types of allocutive languages in turn to show their cross-linguistic prevalence.

2.1 Plain allocutive language

As already discussed in section 1, plain allocutive languages are those that do not exhibit gender distinction either in politeness or familiarity contexts. Apart from Magahi, there are other languages like e.g., Punjabi, Korean and Japanese, where allocutivity is expressed without any reference to gender. In (6), we present a contrast from Punjabi, where the allocutive marker encodes number of addressees, honoricity (Gurmeet Kaur, p.c.), but not gender information.

[1]See Antonov (2015, 78) for a similar (tentative) observation: " [...] gender seems to be incompatible with the simultaneous expression of 'respect'."

(6) **Punjabi** (Kaur, 2020, 8)

a. *Context: The speaker expresses politeness towards the hearer(s).*

aman kitaab paRh reyaa je
Aman.NOM book read PROG.M.SG ALL.PL
'Aman is reading a book.'

b. *Context: The speaker expresses familiarity with the hearer.*

kiran kitaab paRh rayii aa
Kiran.NOM book read PROG.F.SG ALL.SG
'Kiran is reading a book.'

Korean, which is argued to involve six different speech style particles, exhibits gender distinction in none of them (Martin 1992; Sohn 1999; Pak 2015, a.o.), shown in (7).

(7) **Korean** (Pak, 2015, 138)

a. *Context: The speaker expresses a formal relation to the hearer.*

ecey-ka nay sayngil-i-ess-supnita
yesterday-NOM my birthday-CPL-PST-DECL-ALL.FORMAL
'Yesterday was my birthday'

b. *Context: The speaker expresses politeness towards the hearer.*

ecey-ka nay sayngil-i-ess-eyo
yesterday-NOM my birthday-CPL-PST-DECL-ALL.POL
'Yesterday was my birthday'

c. *Context: The speaker expresses a semi-formal relation to the hearer.*

ecey-ka nay sayngil-i-ess-so
yesterday-NOM my birthday-CPL-PST-DECL-ALL.SMFORMAL
'Yesterday was my birthday'

d. *Context: The speaker expresses bluntness towards the hearer.*

ecey-ka nay sayngil-i-ess-ney
yesterday-NOM my birthday-CPL-PST-DECL-ALL.BLUNT
'Yesterday was my birthday'

e. *Context: The speaker expresses an intimate relation to the hearer.*

ecey-ka nay sayngil-i-ess-e
yesterday-NOM my birthday-CPL-PST-DECL-ALL.INTIMATE
'Yesterday was my birthday'

f. *Context: The speaker expresses no particular relation to the hearer.*

ecey-ka nay sayngil-i-ess-ta
yesterday-NOM my birthday-CPL-PST-DECL-ALL.PLAIN
'Yesterday was my birthday'

Similarly, for Japanese, there is no gender distinction both in politeness and familiarity contexts, see (8).

(8) **Japanese** (Miyagawa, 2012, 86)

a. *Context: The speaker expresses politeness towards the hearer.*

Peter-wa hataraki-mas-i-ta.
Peter-TOP work-ALL.POL-PST
'Peter worked.'

b. *Context: The speaker expresses familiarity with the hearer.*

Peter-wa hataraki-∅-i-ta.
Peter-TOP work-ALL.FAM-PST
'Peter worked.'

In this section, we have provided data from four languages from two different language families that, although marking allocutivity, display gender distinctions neither in politeness nor in familiarity contexts.

2.2 Addressee allocutivity

Addressee allocutive languages are different from plain allocutive languages, as they mark the gender of the addressee in familiar contexts. We have already seen an example from Basque in (2), in which the gender of the addressee was marked in a familiar context. The same observations can be made for Tamil, a Dravidian language, which also encodes allocutivity (Amritavalli, 1991; McFadden, 2020). As shown in (9a), politeness is expressed with *-unge* independent of the addressee's gender. Familiarity, on the other hand, expresses a gender contrast by different morphemes: *-da* encodes a male addressee (9b) and *-di* encodes a female addressee (9c).

(9) **Tamil** *(fieldwork)*

a. *Context: The speaker expresses politeness towards the hearer.*

Mani va-nt-aan-unge
Mani come-PST-3SGM-ALL.POL
'Mani came.'

b. *Context: The speaker expresses familiarity with a male hearer.*

Mani va-nt-aan-da
Mani come-PST-3SGM-ALL.FAM.M
'Mani came.'

c. *Context: The speaker expresses familiarity with a female hearer.*

Mani va-nt-aan-di
Mani come-PST-3SGM-ALL.FAM.F
'Mani came.'

There are a number of languages reported in Antonov (2015) which display gender distinctions in their allocutive markers cross-referencing the addressee, but there is no information as to whether the distinction is made in familiarity and/or politeness contexts. We present two examples here, one is Nambikwara (10), an Isolate spoken in West Central Brazil,

and the other is Beja (11), a Cushitic language (segmentation and glosses adopted from Antonov 2015).

(10) **Nambikwara**[2] (Kroeker, 2001, 66)

a. *Context: The speaker talks to a male hearer.*

yxau^{2}-na^{3}-la^{2}
stay-EQUAT-PERF.ALL.M
'He is here.'

b. *Context: The speaker talks to a female hearer.*

yxau^{2}-na^{2}-na^{2}
stay-EQUAT-PERF.ALL.F
'He is here.'

(11) **Beja** (Appleyard, 2007, 467)

a. *Context: The speaker talks to a male hearer.*

rihja=he:b=a
see.PST.3SG=1SG.ACC=ALL.M
'He saw me.'

b. *Context: The speaker talks to a female hearer.*

rihja=he:b=i
see.PST.3SG=1SG.ACC=ALL.F
'He saw me.'

As for Beja, Antonov (2015, 76) concludes that it is not unreasonable to assume that the sociopragmatic circumstances are very similar to the well-known pattern from Basque. Since our fieldwork revealed a parallel configuration in Tamil, we are optimistic that future research will reveal similar patterns in languages like Beja and Nambikwara, which will corroborate the addressee generalization proposed in (4).

2.3 Speaker allocutivity

As was introduced in section 1, speaker allocutive languages like Kũṛux encode the gender information of the speaker. Furthermore, the gender information is expressed irrespective of whether the utterance is made in a politeness or familiarity context. For instance, Burmese, a Sino-Tibetan language, uses *kinbyar* for a male speaker and *shin* for a female speaker as final sentence particles to express politeness towards the addressee.

[2]The numerical superscripts in Nambikwara indicate tones, where 2 refers to rising and 3 refers to low level tone.

(12) **Burmese** *(fieldwork)*

a. *Context: A male speaker expresses politeness towards the hearer.*

thu dimar ma-shyi hpu kinbyar
3SG here NEG-BE NEG ALL.M
'He/she is not here.'

b. *Context: A female speaker expresses politeness towards the hearer.*

thu dimar ma-shyi hpu shin
3SG here NEG-BE NEG ALL.F
'He/she is not here.'

These particles can also have 2SG pronominal use, in which case they indicate familiarity rather than politeness.

(13) **Burmese** *(fieldwork)*

a. *Context: A male speaker expresses familiarity with the hearer.*

thu kinbyar ko thi te
3SG 2SG.ALL.FAM.M OBJ know DECL
'He knows you'

b. *Context: A female speaker expresses familiarity with the hearer.*

thu shin ko thi te
3SG 2SG.ALL.FAM.F OBJ know DECL
'He knows you'

If we compare the Burmese data with the Kũr̤ux data in (3), we find that both languages tie the gender of the speaker to the simultaneous presence of a 2nd person argument in the clause. In Kũr̤ux, this fusion appears as a form of agreement, while in Burmese the grammatical features are fused on the pronominal.[3] The co-presence of a 2nd person argument is, however, not a necessary condition for speaker allocutive marking to take place. In Kokama-Kokamilla, a Tupian language spoken in South America, the gender of the speaker interacts with the clausal arguments throughout the person paradigm except for 2nd person. In Table 1, we illustrate the interplay of person and gender features (Vallejos, 2010, 42). While the gender distinction in 1st person may not be a good example of allocutivity because the 1st person referentially relates to the speaker, the gender distinction in the 3rd person indicates allocutivity, as 3rd person arguments do not refer to the speaker.[4]

[3]Interestingly, Basque disallows allocutive marking whenever the addressee is an argument of the verb (Oyharçabal, 1993). On the other hand, Punjabi imperatives allows the allocutive marking to obligatorily replace the imperative specific ending (Kaur, 2020).

[4]There are a few other South American languages reported in literature that denote the gender of the speaker in the pronominals (Fleming, 2015; Rose, 2015).

	Female speaker	Male speaker
1SG	tsa, etse	ta
1EXCL	penu	tana
3SG (M/F)	ay	uri
3PL (M/F)	inu	rana

Table 1: Allocutive pronouns in Kokama-Kokamilla

Another interesting aspect of the Kokama-Kokamilla pattern is that allocutive markers seem to spread to several constituents in the sentence, including demonstratives, possessors and some connectives; examples are shown in (14). Given the discussion in Vallejos (2010), it appears that the allocutive markers are obligatory, and thus present across familiarity and politeness contexts.

(14) **Kokama-Kokamilla** (Vallejos, 2010, 42)

a. *Context: A male speaker talks to the hearer.*

uri tsenu ikian yawara=kana=uy tana ku=kuara
3SG.ALL.M hear DEM.ALL.M dogs=PL.ALL.M=PST 1PL.ALL.M farm=in
'She heard the dogs in our farm.'

b. *Context: A female speaker talks to the hearer.*

ay tsenu ajan yawara=nu=uy penu ku=kuara
3SG.ALL.F hear DEM.ALL.F dogs=PL.ALL.F=PST 1PL.ALL.F farm=in
'She heard the dogs in our farm.'

Another language which displays speaker allocutivity in the form of allocutive clitics attaching to the verb and other constituents is Chiquitano (a language isolate from Santa Cruz, Bolivia). From her Pierric Sans field notes, Rose (2015) demonstrates that the presence of the clitic *ti* indicates a male speaker and the absence of the clitic indicates a female speaker. Moreover, the clitic *ti* attaches to the argument marked for masculine in the clause, compare (15a) to (15b). Again, the presentation in Rose (2015) suggests that the speaker allocutive markers are obligatory across contexts.

(15) **Chiquitano** (Rose, 2015, 422)

a. *Context: A male speaker talks to the hearer.*

ba-páche-ro=ti n-i-kisé-s
3-look-TAM=3SG.ALL.M N-3-knife-DET
'He looks for her knife'

b. *Context: A male speaker talks to the hearer.*

ba-páche-ro n-i-kisé-s=ti
3-look-TAM N-3-knife-DET=3SG.ALL.M
'She looks for his knife'

c. *Context: A female speaker talks to the hearer.*

ba-páche-r n-i-kisé-s
3-look-TAM N-3-knife-DET
'He/she looks for her/his knife'

Iatê (Macro-Jê) is like Kũr̥ux, in that it indicates speaker allocutivity by encoding the gender of the speaker in the form of an agreement suffix in the verbal complex (Costa & Silva, 2005). As shown in the following example, the presence of *-ne* indicates a female speaker and the absence of *-ne* indicates a male speaker.

(16) **Iatê** (Costa & Silva, 2005, 25)

a. *Context: A female speaker talks to the hearer.*

ta samake-hlẽ-ne
3sg marry-PF-IND.ALL.F
'She/He got married'

b. *Context: A male speaker talks to the hearer.*

ta samake-hle-∅
3SG marry-PF-IND.ALL.M
'She/He got married'

The final language in our sample is Yanyuwa, a Pama–Nyungan language spoken in Australia, that encodes speaker allocutivity as an effect on noun classes, which results in a number of grammatical differences that are described as obligatory across contexts. Kirton (1988) argues that female speakers distinguish six noun classes, including one for male and one for masculine. Male speakers, however, conflate the male and the masculine noun class. We exemplify this effect with subject and object markers in (17). Whereas the subject prefix varies from *ilu-* (17a) to *inju-* (17b) according to the noun class, the subject prefix in (17c) is ambiguous.

(17) **Yanyuwa** (Kirton, 1988, 121)

a. *Context: A female speaker talks to the hearer.*

k-any-ilu-ma
IND-him-he-cut
'He cut him.'

b. *Context: A female speaker talks to the hearer.*

k-any-inju-ma
IND-him-it-cut
'It cut him.'

c. *Context: A male speaker talks to the hearer.*

k-ilu-ma
IND-him/it:he/it-cut
'He/it cut him/it.'

2.4 Interim summary

Table 2 summarizes the data we have seen so far. Our small survey reveals that speaker allocutive languages express gender information irrespective of socio-pragmatic context. In contrast, addressee allocutive languages seem to distinguish gender only in familiarity contexts, not in politeness contexts.

	GENDER DISTINCTION				
Language	SPEAKER	HEARER	POLITE	FAMILIAR	Sources
Punjabi	✗	✗	✗	✗	Kaur (2020)
Magahi	✗	✗	✗	✗	Alok (2021)
Korean	✗	✗	✗	✗	Pak (2015)
Japanese	✗	✗	✗	✗	Miyagawa (2012)
Basque	✗	✓	✗	✓	Oyharçabal (1993)
Tamil	✗	✓	✗	✓	fieldwork
Nambikwara	✗	✓	?	?	Kroeker (2001)
Beja	✗	✓	?	?	Appleyard (2007)
Kokama-Kokamilla	✓	✗	✓	✓	Vallejos (2010)
Kũr̥ux	✓	✗	✓	✓	fieldwork
Burmese	✓	✗	✓	✓	fieldwork
Chiquitano	✓	✗	✓	✓	Rose (2015)
Iatê	✓	✗	?	?	Costa & Silva (2005)
Yanyuwa	✓	✗	✓	✓	Kirton (1988)

Table 2: Gender distinctions across allocutive languages

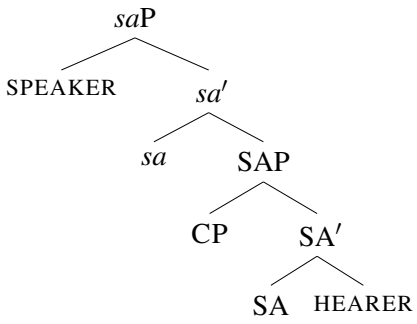
For the remainder of the paper, we will focus on the distinction between addressee and speaker allocutive languages and propose an account that explains why there is sensitivity for context only in the former but not in the latter.

3 Proposal

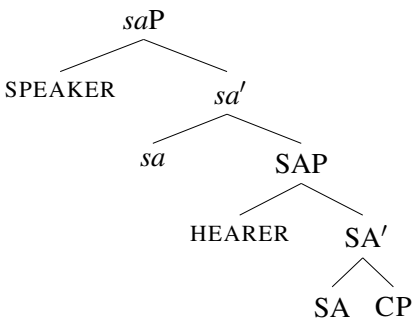
We propose that the discourse participants SPEAKER and HEARER are syntactically introduced by a speech act phrase, as is commonly assumed to account for phenomena like allocutive agreement. The original proposal comes from Speas & Tenny (2003) and is sketched in (18). They argue that argumental relations can also be found in the speech act domain, where SPEAKER is the agent of the speech act, HEARER the goal, and the utterance content (CP) the theme. Interestingly, most recent accounts of allocutive agreement follow revised versions of the original account, where either HEARER is introduced in the specifier of SAP (Hill, 2007; Haegeman & Hill, 2013; Haddican, 2018; Zu, 2018; Akkuş & Hill, 2020; Kaur, 2020; McFadden, 2020) as in (19a), or both SPEAKER and HEARER are specifiers of the same functional head (Baker, 2008; Portner et al., 2019; Alok, 2021; Jou,

2022) as in (19b). The choice of adopting a version of (19) over (18) is for some theories not crucial, while for others it is motivated by the fact that the allocutive agreement probe is situated on C/T, thus needs access to the HEARER argument via c-command (Miyagawa, 2017; Portner et al., 2019; McFadden, 2020; Alok, 2021; McFadden & Sundaresan, 2021).

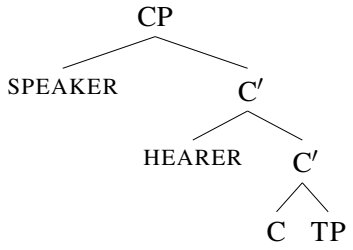
(18)



(19) a.



b.



We believe that the gender agreement facts presented in this paper constitute an argument for the structure in (18). Our analysis, to be developed in the next sections, relates the context sensitivity of addressee allocutive marking to the presence of a movement operation of HEARER to the specificer of the *sa* head. This movement operation can be readily implemented with the structure in (18), but is incompatible with the structure in (19b), while also potentially violating *anti-locality* (Erlewine, 2016) in (19a).

3.1 Hearer shift

In West Germanic and Skandinavian languages, movement falling into the category of scrambling or object shift is often accompanied by specificity/definiteness effects (Holmberg, 1986; Diesing, 1992, 1996; Thráinsson, 2001). Definite pronouns, for instance, must undergo object movement; shown for Icelandic and German in (20).

(20) a. Hann las þær ekki (*þær). **Icelandic**
he read them not them
'He didn't read them.'

b. ... weil ich sie nicht (*sie) gestreichelt habe. **German**
since I her not her petted have
'... since I have not petted her.' (Diesing & Jelinek, 1995)

Such movement is not always visible. Specificity/definiteness can also interact with case marking in some languages, also known as differential object marking (DOM). This is shown in (21) for Hindi, where case marking is obligatory for definite and specific objects. Importantly, a number of DOM accounts model the interaction of discourse prominence and case marking via object shift (Bhatt & Anagnostopoulou, 1996; Kelepir, 2001; López, 2012), as objects (vacuously) move to a case assignment position, which is ultimately only possible if they are of the type that is discourse prominent.

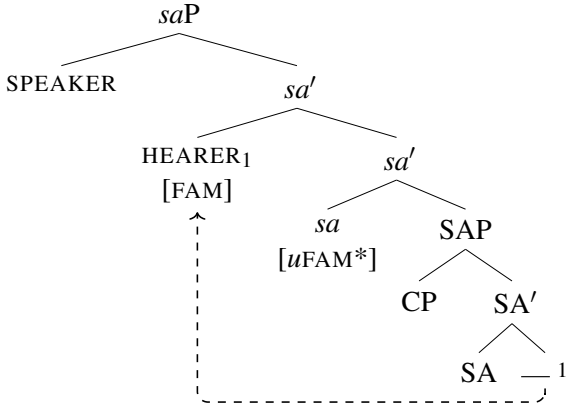
(21) **Hindi** (Butt, 1993; Bhatt, 2007)

a. Zainab-ne us*(-ko) dek-aa.
Zainab-ERG 3SG-ACC see-PFV.M.SG
'Zainab saw him.'

b. Mina ek bacce(-ko) uṭhhaa rahii hai.
Mina a child-ACC lift PROG.F be.PRS.3SG
'Mina is picking up a (particular) child.'

We propose that prominence levels are not only active in the clausal argument domain, but can exist also on the speech act level. As objects are more prominent/salient on the propositional level, if they are specific or definite, HEARER is more prominent/salient on the speech act level, if they are familiar to the speaker. Given that discourse prominence is commonly associated with object shift, we suggest the analoguous operation *hearer shift* targeting *sa*P, which is shown in (22). Movement is encoded by feature strength: the strong [*u*FAM*] feature triggers movement; the weak [*u*POL] feature does not.[5] Each feature encodes the respective presupposition that *speaker and hearer are in a familiar/polite relation*.

(22) HEARER shift due to [*u*FAM*]



In order to derive gender allocutive agreement, we assume that the *sa* head additionally comes with the gender probe [*u*γ:__], which undergoes spec-head Agree. Finally, Merge of SPEAKER is the result of an external Merge feature [*u*D] on *sa*. Thus, the *sa* head comes with a number of features to be spelled out in the post-syntactic component, in particular

[5]See Öztürk (2005) using feature strength for Turkish DOM.

a potentially valued gender probe (either by SPEAKER or by HEARER) together with either [*u*FAM*] or [*u*POL]. Allocutive languages are special in that they provide exponents for these feature combinations. In the next section, we will extend our analysis to model the cross-linguistic variation between allocutive languages.

3.2 Typology

We model the three types of allocutivity – plain, speaker, and addressee allocutivity – via the order of features on the speech act head. This entails that the features are stacked (Stabler, 1997; Müller, 2009), that is they apply in an order. Only the highest feature on the stack is accessible, thus it has to be deactiveated before the next feature can become available. The presence of three features predicts 6 possible orders. We provide an overview in (23), where each order relates to an allocutivity type we have discussed in this paper.[6]

(23) a. *u*FAM*/POL ≺ *uγ*:__ ≺ *u*D — *hearer allocutivity in familiar contexts*

b. *u*D ≺ *u*FAM*/POL ≺ *uγ*:__ — *speaker allocutivity*

c. *u*D ≺ *uγ*:__ ≺ *u*FAM*/POL — *speaker allocutivity*

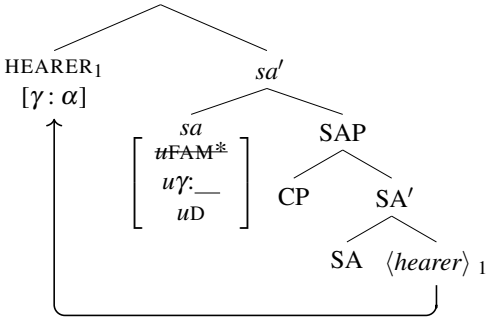
d. *uγ*:__ ≺ *u*FAM*/POL ≺ *u*D — *allocutivity (no gender)*

e. *uγ*:__ ≺ *u*D ≺ *u*FAM*/POL — *allocutivity (no gender)*

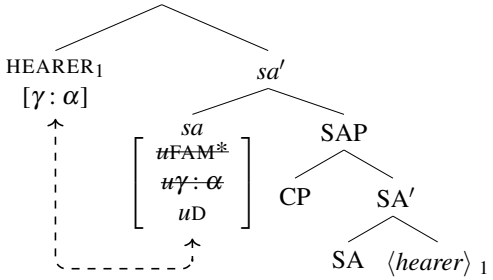
f. *u*FAM*/POL ≺ *u*D ≺ *uγ*:__ — *speaker/hearer allocutivity*

In this section, we will go through each order and show how they derive the patterns. We will start with (23a): a hearer allocutive language, where gender of the hearer is marked in familiar contexts, but not politeness contexts. Let us first discuss utterances where the hearer is familiar to the speaker. In such scenarios, *sa* will come with a strong [*u*FAM*] feature. Since the discourse feature is the first on the stack, HEARER moves to the Spec,*sa*P first (24), putting HEARER in the right position to value the gender probe (25).

(24) *Step 1: Hearer shift*



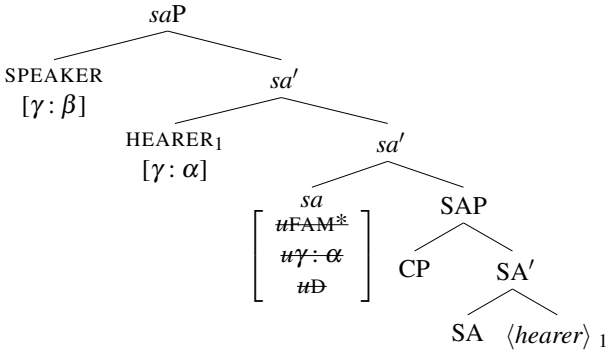
(25) *Step 2: Agree for gender*



[6]The exception is (23f), for which we have not found a language yet. The order of features predicts a pattern where gender of the hearer is marked in familiar contexts and gender of the speaker is marked in politeness contexts. We leave this exploration to future work.

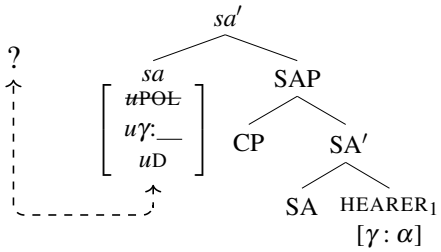
The last feature on the stack is the external Merge feature through which SPEAKER enters the derivation (26). Merge of SPEAKER comes too late to value the gender probe, as it has been deactivated in a previous step. Hence allocutive markers spell out features that are sensitive to the gender of the hearer, e.g. *-da/-di* in Tamil.

(26) *Step 3: Merge of speaker*

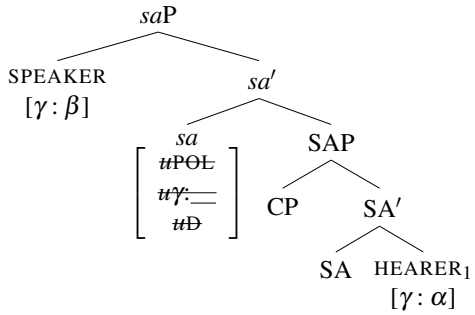


There is no hearer shift in politeness contexts since [*u*POL] does not trigger movement. Given the order of features in (23a), this leads to the situation that the gender probe cannot be valued (27), as the external Merge feature for SPEAKER is only activated in the last step (28). Hence, allocutive markers like *-unge* in Tamil express politeness but not gender.

(27) *Step 1: Agree for gender*

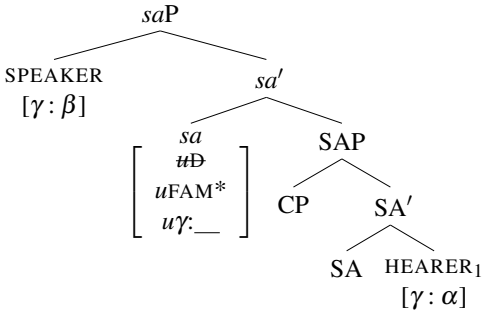


(28) *Step 2: Merge of speaker*

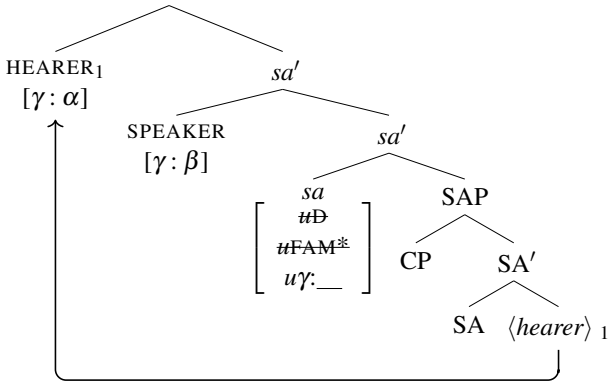


Speaker allocutive languages are derived by the orders (23b) and (23c). Common to both orders is that the external Merge feature is the highest feature on the stack, resulting in a structure where SPEAKER is the closest goal to the gender probe on *sa*. The steps in (29)-(31) illustrate the order (23b) in a familiar context. Merge of SPEAKER is followed by hearer shift, which in turn is followed by the valuation of the gender probe. Crucially, it is the SPEAKER's gender feature which serve as the goal, as it was merged earlier and thus is closer to the *sa* head than HEARER.

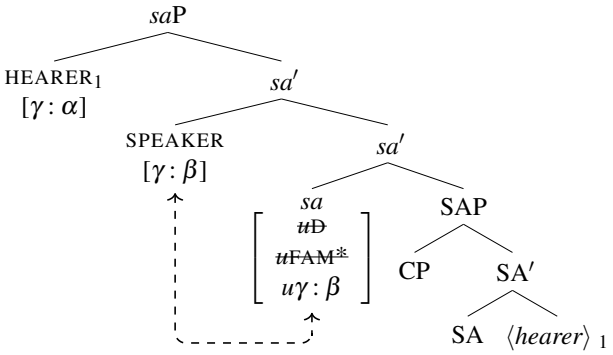
(29) *Step 1: Merge of speaker*



(30) *Step 2: Hearer shift*

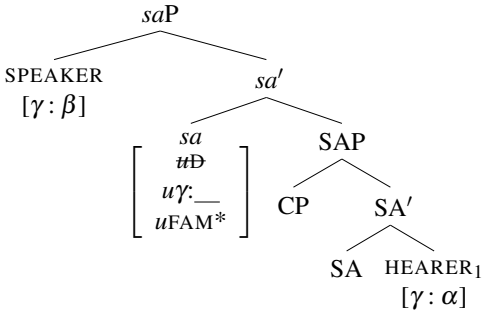


(31) *Step 3: Agree for gender*

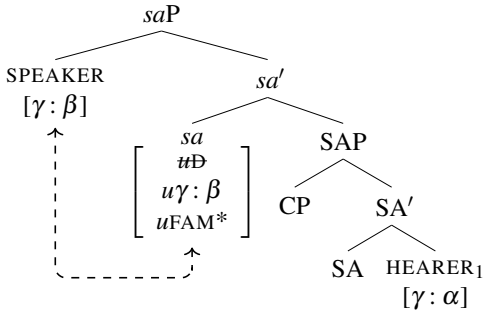


The steps in (32)-(34) display the order (23c) in a familiar context. As with the previous derivation, SPEAKER is merged first. Agreement with the gender probe is taking place in a second step, while hearer shift is the last operation. Again, it is the SPEAKER's gender features that value the probe. Consequently, both orders derive speaker allocutive languages, where the gender that is being marked belongs to the speaker.

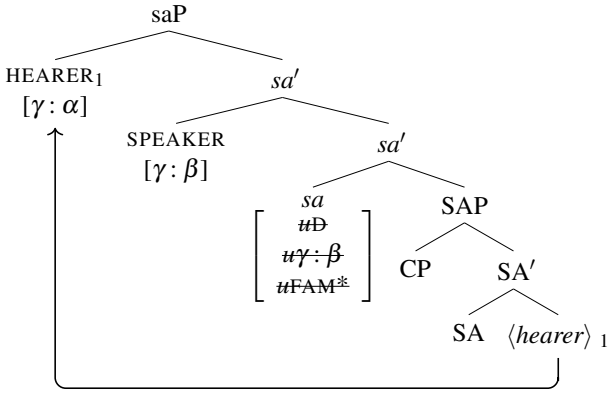
(32) *Step 1: Merge of speaker*



(33) *Step 2: Agree for gender*



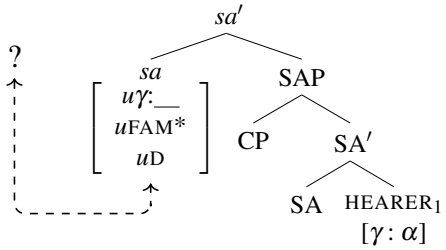
(34) *Step 3: Hearer shift*



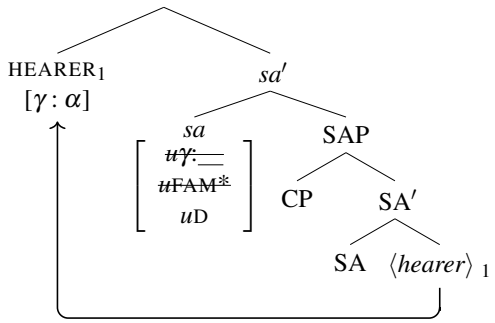
Although we have only shown familiarity contexts, it is easy to see why politeness contexts have the same outcome. Given that hearer shift has no influence on the valuation of the gender probe in either orders, its absence will not matter. Gender of the speaker will be marked across politeness and familiarity contexts.

Let us now turn to plain allocutive languages. Again, two orders derive such a pattern. Order (23d) is shown in (35)-(37) for familiar contexts. Since the gender probe is ordered first on the stack before hearer shift and Merge of SPEAKER can take place, there is no goal for the probe to Agree with. Thus, the probe will remain unvalued.

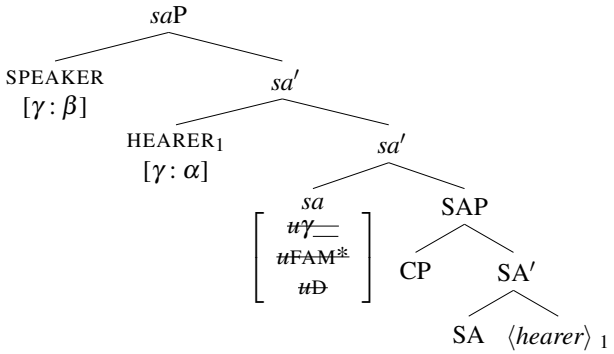
(35) *Step 1: Agree for gender*



(36) *Step 2: Hearer shift*

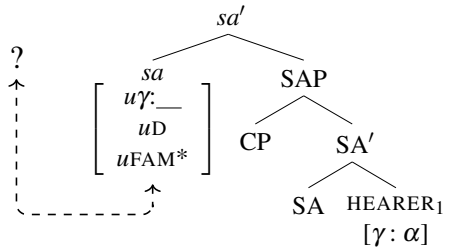


(37) *Step 3: Merge of speaker*

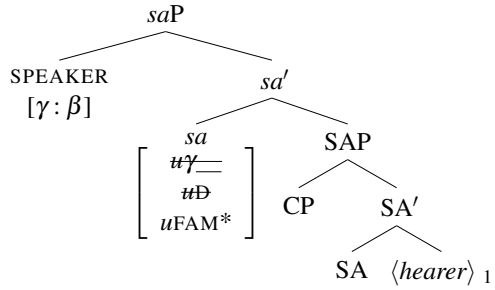


Order (23e) is shown in (38)-(40). Again, the gender probe is ordered first, leaving the subsequent operations no chance to provide a goal for agreement. This, again, results in an unvalued gender probe. The same outcome is predicted in politeness contexts, for both orders (23d) and (23e), since the operation hearer shift always counterfeeds the valuation of the gender probe.

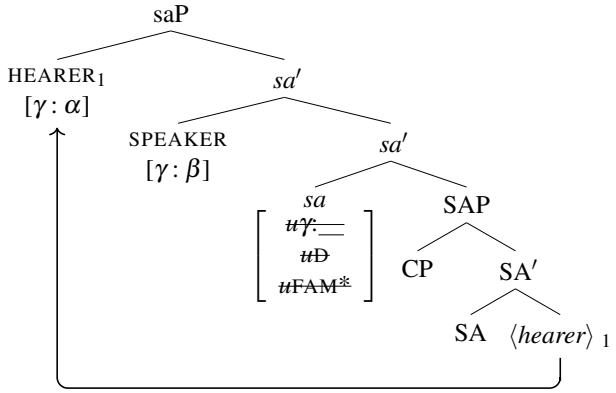
(38) *Step 1: Agree for gender*



(39) *Step 2: Merge of speaker*



(40) *Step 3: Hearer shift*



Hence, plain allocutive languages do not mark the gender of the discourse participants. They do, however, mark the difference between different social relations since spell out can be sensitive to whether the *sa* head comes with a [*u*FAM*] or [*u*POL] feature.

4 Outlook

This paper discusses three types of allocutive languages and derives the typology by the order of features on the little speech act head. Two generalizations are explored and derived by the current system, the addressee and the speaker generalization. The addressee generalization results from hearer shift – a movement operation triggered by a prominence requirement, in parallel to object shift phenomena. The speaker generalization falls out from the fact that SPEAKER is already first merged in a position local to the gender probe, independent of prominence relations. The account presented here provides an argument for the original representation of SPEAKER and HEARER, as envisioned by Speas & Tenny (2003), where HEARER is merged as the complement of the big speech act head.

Several aspects of the typology are not accounted for. We have not discussed languages, where gender information encoded in allocutive markers relates to the speaker as well as the hearer, either simultaneously or separately across contexts (recall also footnote 6). Another point of variation relates to the fact that, especially when it comes to speaker allocutive languages, allocutive morphology does not always emerge as a final sentence particle. Languages like Kokama-Kokamilla and Chiquitano make clear that even though allocutivity realizes information associated with discourse information, it does not necessarily always appear in the left periphery, and at times seems to interact with the gender features of clausal arguments. Finally, more empirical works needs to be done on hearer allocutive languages, in particular the social relations that trigger gender marking of the addressee, so that the addressee generalization can be robustly verified.

Acknowledgements

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What umlaut tells us about the underlying morphological structure of verbs in Sinhala

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ABSTRACT

In this short paper, we investigate the morphophonological process of umlaut in Sinhala with a focus on verbal umlaut. The focus lies on an accurate description of the patterns of application and underapplication of the process in question. In other words: When does umlaut apply and when doesn't it apply? As has been noted in the literature, umlaut itself seems to be triggered by an arbitrary morphological diacritic on specific affixes. What has gone unnoticed so far is the fact that the umlaut-triggers themselves fall into two classes: Strong umlaut-triggers and weak umlaut-triggers. We provide two diagnostics to distinguish these classes and then go on to argue that these two asymmetries are, on an abstract level, due to the same configuration, namely that weak triggers cannot trigger umlaut across a morpheme boundary while strong triggers can. In the final section, we then show that this generalization provides a strong argument for (i) the underlyingly concatenative nature of the verbal morphology of Sinhala and (ii) the necessity to refer to the notion of the morpheme.

1 Introduction

The typological literature has seen a longstanding discussion about whether there is a fundamental difference between fusional and agglutinating languages. Fusional languages tend to allow only for very few, often only one or two, affixes attaching to a given root whereas agglutinating languages allow for more. Similarly, affixes in agglutinating languages are often very independent; they rarely change depending on the specific roots and rarely interact with other affixes. In fusional languages, we often find more complex interactions between the different morphemes. Affixes and roots usually show complex patterns of allomorphy and suppletion. In addition, we often find various non-concatenative processes like reduplication, metathesis, morphological umlaut, etc.

The Indo-Aryan languages are usually viewed as falling on the fusional side of this distinction, and Sinhala, the language that we will be discussing in this paper, is no exception to this (see *e.g.*, the characterization in Garland 2005). In Sinhala, we find many instances of root suppletion, affixal allomorphy, reduplication and a complex pattern of morphologically triggered umlaut as well as a whole array of non-trivial phonological rules. As a result, the surface forms in Sinhala do not straightforwardly lend themselves to morphological subanalysis. In other words, it is often very hard to tell what the individual morphemes are in complex forms.

In this short paper, we take a closer look at one of these (seemingly) non-concatenative

processes, namely the process of umlaut in the verbal domain. Building on this investigation, we set out to present arguments for two claims: First, we will show that the application of umlaut crucially presents a strong argument that the verbal morphology is, underlyingly, perfectly concatenative. The non-concatenative appearance that is a characteristic of fusional languages arises only since superficial additional processes, which apply on the basis of the concatenative, underlying structure, obscure the systematicity of the base pattern. Secondly, we argue that in order to formulate a correct generalization of when umlaut can and when it cannot apply, we need to make reference to morphemes and morpheme boundaries. Approaches that reject the notion of the morpheme will have difficulties describing the pattern accurately.

The paper is structured as follows: In Section 2, we will introduce the topic of this paper, namely the phenomenon of umlaut in the verbal domain in Sinhala. In Section 3, we will present a curious puzzle of underapplication of umlaut. In some cases, umlaut does not apply even though we might expect it to. In Section 4, we take a closer look at the morpheme structure and the phonological processes obscuring it. This paves the way towards describing the empirical generalization about umlaut in a simple and straightforward way. This will be done in Section 5. Finally, Section 6 discusses the generalization we arrived at from a broader perspective and in reference to the two claims of this paper mentioned above.

2 Introduction to umlaut in Sinhala

The main topic of this paper is a detailed description of the morphophonological phenomenon of umlaut in the Indo-Aryan language Sinhala and a short discussion about what the phenomenon tells us about the morphological system of the language. Umlaut in general can be characterized as a change of vowel quality (usually on a stem) induced by certain affixes. In Sinhala, we find that some affixes change all vowels on a stem from back vowels to front vowels. Every /a/ changes to /æ/, every /o/ changes to /e/ and every /u/ changes to /i/. This is shown in (1) with some simple examples from the nominal domain. Here the feminine affix /i/ attaches to stems and as a result all vowels on the stem change to their fronted counterpart.[1]

(1) a. kurullu - $\boxed{\text{i}}$ → /kirilli/
bird - FEM
'female bird'[2,3]

b. baləla - $\boxed{\text{i}}$ → /bæləli/
cat - FEM
'female cat'

[1]Note that the stem-final vowel in some cases deletes in order to avoid a vowel hiatus. Also, the schwa /ə/ does not change its form as it does not have a fronted counterpart.

[2]Unless stated otherwise, all examples are from our own data collection and have been constructed or confirmed by a native speaker of Sinhala. The tasks involved either providing grammaticality judgements for sentences constructed by the authors or translations from English.

[3]In what follows, umlaut-triggering morphemes will be boxed in all examples.

c. wanduru - i → /wændiri/
monkey - FEM
'female monkey'

d. kolu - i → /keli/
lad - FEM
'lass' Chandralal (2010)

In this paper, we will be concerned with the verbal domain and umlaut behaves essentially the same here. It changes all vowels on a stem to their fronted counterparts and it applies without exception to all verbs alike. Consider the examples below. In (2), we see a verb with a back vowel followed by a class marker, a causative, a non-past marker, and an indicative marker. Since none of these affixes trigger umlaut, the verb stem surfaces with a back vowel. If we now exchange one of the affixes for an umlaut-trigger such as the passive morpheme in (3) or the past tense morpheme in (4), then the verb stem will change to a front vowel.

(2) bal-ə-wə-nə-wa
look-CL1-CAUS-NPST-IND
'causes to look'

(3) bæl-∅-e-nə-wa
look-CL1-PASS-NPST-IND
'is looked at'

(4) bæl-ə-wə-u-wa
look-CL1-CAUS-PST-IND
'caused sb. to look'

Other umlaut-triggers include the perfect marker /-la/, the informal imperative marker /-pan/ and the repetitive aspect marker, which is realized by a full reduplication of the verb stem. Consider the examples below, which involve the verb stem /ad-/ ('to pull'). In the regular imperative, which is not a trigger, the stem has a back vowel but in the informal imperative in (6), in the perfect in (7) and in the repetitive in (8), the stem has been umlauted as each of these morphemes is an umlaut-trigger.[4]

(5) ad-i-nnə
pull-CL2-IMP
'Pull!'

(6) æd-ə-pan
pull-CL2-INF.IMP
'Pull, my friend!'

(7) æd-ə-la tie-nə-wa
pull-CL2-PERF be-NPST-IND
'have pulled'

(8) æd-ə æd-ə in-nə-wa
pull-CL2 RED.REP be-PRS-IND
'be pulling'

The table below gives a selection of verbal affixes and classifies them into umlaut-triggers and non-umlaut-triggers.

What this table illustrates is that whether an affix is an umlaut-trigger is an arbitrary property of morphemes (or exponents) as it cannot simply be reduced to its morphological or phonological properties of the affixes in question. We see that derivational affixes such as causative or passive can differ as to whether they are triggers and the same holds for

[4]Perfect and repetitive aspect are both expressed by means of auxiliary constructions where tense and mood are realized on the copula.

Non-Umlaut-triggers		Umlaut-triggers	
CAUS	*-wə / -wa*	PASS	*-e*
NPST	*-nə*	PST	*-u/-GEM*
IMP	*-nnə*	INF.IMP	*-pan*
COND	*-ot*	PERF	*-la*
FOC	*-e*	REP	*-RED*

Table 1: Overview of the umlauting properties of Sinhala verbal affixes

inflectional affixes such as non-past or past or the difference between the regular imperative and the informal imperative. Further, we see that it is, synchronically, no longer possible to attribute the property of being an umlaut-trigger to the phonological properties of the affix itself. We see that some of the affixes that trigger umlaut are or contain back vowels themselves (such as one allomorph of the past tense marker, or the perfect). Similarly, we see that some affixes that are front vowels, do not trigger umlaut such as the verbal focus marker /-e/ (or the class marker for Class 2 - see example (5) above). Furthermore, some of the umlaut-triggers do not even contain segmental material (such as the other allomorph of the past tense, which is marked by gemination or the repetitive, which is marked by reduplication).

The conclusion that the property of being an umlaut-trigger is an arbitrary property of specific morphemes or exponents is in line with the general consensus in the literature on Sinhala: Geiger (1938); Parawahera (1990); Letterman (1997) all note that a synchronic treatment of umlaut in Sinhala will have to stipulate which affixes trigger umlaut and which ones do not. In what follows, we will ascribe to that view and assume that some affixes (namely the ones on the right in the table above) carry some sort of diacritic that specifies them to be an umlaut-trigger.

This observation sets the stage for the discussion in the next section that introduces an observation that, to our knowledge, is not found in the literature.

3 Two types of umlaut-triggers

In this section, we will introduce two asymmetries illustrating differences between two classes of umlaut-triggering morphemes.

3.1 The intervening causative

In this subsection, we illustrate the first asymmetry between the different umlaut-triggers. The first one concerns the question of whether umlaut applies across intervening morphemes. The asymmetry is stated below:

(9) The intervention asymmetry:
Some umlaut-triggers such as [PST] or [PASS] will trigger umlaut on the stem across

intervening morphemes such as the causative. Other umlaut-triggers such as [PERF], [REP] and [INF.IMP] will not.

In order to illustrate this we need to test a configuration, where a low affix linearly intervenes in between the verb stem and the umlaut-triggers. Of course, the intervener cannot be a trigger itself, otherwise we would not be able to test whether the outer morpheme had any effect on the stem. The ideal candidate for an intervener is the causative morpheme /wə/, which is not a trigger itself and which is close enough to the stem so that it can appear in between the stem and all the affixes we want to test.

Consider first the configurations in (10) and (11). In both cases, we have constructed a configuration where an umlaut-trigger (past tense in (10-a) and passive voice in (11-a)) attaches to a verb that already bears a causativizing morpheme. And in both cases we see that that verb stem does undergo umlaut as it shows a front vowel. The abstract representations in (10-b) and (11-b) indicate that the umlaut-property that comes from the past or the passive morpheme can reach the stem vowel despite an intervening causative.

(10) Past Tense:

a. bæl-ə-wə-u-wa
look-CL1-CAUS-PST-IND
'made so. look'

(11) Passive:

a. bæl-ə-w-e-nə-wa
look-CL1-CAUS-PASS-NPST-IND
'is caused to look'

Now consider the examples in (12), (13) and (14). On the surface, we have the exact same configurations as above. The respective umlaut-triggers, the perfect, the informal imperative and the repetitive, are separated from the stem by an intervening causative. And even though we have seen that all three morphemes are umlaut-triggers in the basic forms (see examples (6), (7) and (8)), they do not trigger umlaut in the configurations at hand. The umlaut-property of these three morphemes cannot reach the stem across an intervening causative.

(12) Perfect:

a. ad-ə-wə-la tie-nə-wa
pull-CL2-CAUS-PERF be-NPST-IND
'have made so. pull'

(13) Informal Imperative:

a. ad-ə-wə-pan
pull-CL2-CAUS-IMP
'Make so. pull, my friend!'

(14) Repetitive:

a. and-ə-wə and-ə-wə in-nə-wa
paint-CL2-CAUS RED.REP BE-NPST-IND
'making someone paint repeatedly'

So, what we see is that there seems to be a dichotomy of umlaut-triggers. Some of them can trigger umlaut at a distance (namely, PST and PASS), while others (namely, PERF, INF.IMP and REP) cannot. The latter need to be adjacent to the verb stem in order to trigger umlaut. As noted above, we refer to these two classes of triggers as weak and strong umlaut-triggers. The umlaut-property of weak triggers (PERF, INF.IMP, REP) cannot reach the stem across an intervener, while the umlaut-property of a strong trigger (PST and PASS) can.

3.2 Verb class sensitivity

Below we illustrate the second asymmetry concerning the split between the two types of umlaut-triggers we have seen above. This time, it concerns the application of umlaut in the two verb classes in Sinhala.

(15) Verb class asymmetry:
Some umlaut-triggers such as [PST] or [PASS] will trigger umlaut in verb classes 1 and 2 whereas other umlaut-triggers such as [PERF], [REP] and [INF.IMP] will only trigger umlaut in Class 2 but not in Class 1.

According to standard descriptions (see *e.g.*, Geiger 1938; de Silva 1960; Gair 1970; Chandralal 2010) Sinhala has three classes of verbs, which can be distinguished by the class markers. In what follows, we only focus on the first two verb classes.[5] The verb classes in Sinhala are most easily distinguished in the infinitive. The marker in Class 1 shows up as /a/ (16-a) and as /i/ in Class 2 (17-a). Note that in many examples, however, the underlying differentiation between the classes is neutralized because both vowels /a/ and /i/ are reduced to schwa in open syllables ((16-b) and (17-b)).

(16) a. bal-a-nnə
look-CL1-INF
'to look'

b. bal-ə-la
look-CL1-PERF
'look' Class 1

[5]What is usually referred to as the third class is a class that contains only intransitive verbs (including many verbs that also appear in classes 1 or 2 in a transitive version). The marker of this so-called class 3 is an /e/ and obligatorily triggers umlaut, which is why verbs of class 3 always come with a front vowel, which is why they are uninformative for our purposes. We want to note that the exponent of the so-called class marker in class 3 (/e/), is also the exponent of a passive marker, which we assume to not be a coincidence given that the class only contains intransitive verbs (see Beavers & Zubair (2012) for discussion).

(17) a. ad-i-nnə
pull-CL2-INF
'to pull'
b. æd-ə-la
pull-CL2-PERF
'pulled' Class 2

Apart from the different realizations of the class marker, these verb classes behave differently with respect to a number of other processes including their property to undergo umlaut. Strong umlaut-triggers (PST and PASS) will trigger umlaut in both verb classes while weak triggers (PERF, INF.IMP, REP) will only trigger umlaut in Class 2. Consider first the behavior of PST and PASS in the examples below. PST in (18) and PASS in (19) will trigger umlaut on both verb classes. All the verb stems in (18) and (19) have undergone umlaut.

(18) Past Tense:
a. bæl-∅-u-a
look-CL1-PST-IND
'looked' Class 1
b. æd-∅-d-a
pull-CL2-PST-IND
'pulled' Class 2

(19) Passive:
a. bæl-∅-e-nə-wa
look-CL1-PASS-NPST-IND
'is looked at' Class 1
b. æd-∅-e-nə-wa
pull-CL2-PASS-NPST-IND
'was pulled' Class 2

Again, that can be contrasted with the behavior of weak umlaut-triggers PERF, INF.IMP and REP in the examples below. In these examples, we see that the Class 1 verb *bal-* ('look') does not undergo umlaut but the Class 2 verb *ad-* ('pull') does.

(20) Perfect:
a. bal-ə-la tie-nə-wa
look-CL1-PERF be-PRS-IND
'has looked' Class 1
b. æd-ə-la tie-nə-wa
pull-CL2-PERF be-PRS-IND
'has pulled' Class 2

(21) Repetitive

a. bal-ə balə in-nə-wa
look-CL1 RED.REP be-PRS-IND
'be looking' Class 1

b. æd-ə ædə in-nə-wa
pull-CL2 RED.REP be-PRS-IND
'be pulling' Class 2

(22) Informal Imperative:

a. bal-ə-pan
look-CL1-INF.IMP
'Look, my friend!' Class 1

b. æd-ə-pan
pull-CL2-INF.IMP
'Pull, my friend!' Class 2

So, as with the asymmetry concerning the intervention, we note that there is a difference in behavior between the umlaut-property of strong triggers and the umlaut property of weak triggers. Strong triggers will always trigger umlaut on a verb regardless of its class membership while weak triggers will only do so in Class 2.

4 Arriving at the Generalization

In the preceding section, we have seen two asymmetries that suggest that a further subdivision of umlaut-triggers is needed. There are umlaut-triggers which will trigger umlaut regardless of the verb class in question and regardless of whether there are intervening morphemes or not. The other umlaut-triggers will only trigger umlaut iff they are adjacent to the verb stem and iff the verb in question is a Class 2 verb.

Notably we find that both asymmetries make reference to the same sets of umlaut-triggers. In both cases, it is the passive and the past tense morpheme which always trigger umlaut and in both cases, it is the perfect, the informal imperative and the repetitive which trigger umlaut only under a specific condition.

We take this as sign that there is systematicity to the process, and that ultimately the two asymmetries have the same underlying cause. And, as we will see below, indeed the two asymmetries can be reduced to one when taking a closer look at the nature of the two verbal class markers mentioned in the preceding subsection.

We have seen above that the two verb classes we are interested in for the purposes of this paper can be distinguished by the theme vowels in the infinitive (16) and (17) above. But they can also be distinguished by looking at the exponents of the causative and the past tense morphemes (bolded):

(23) Class 1:

a. anɖ-a-nnə
cry-CL1-INF
'to cry'

b. anɖ-ə-**wə**-nə-wa
cry-CL-CAUS-NPST-IND
'make so. cry' (causative)

c. ænɖ-∅-**u**-a
cry-CL1-PST-IND
'cried' (past tense)

(24) Class 2:

a. ad-i-nnə
pull-CL2-INF
'to pull'

b. ad-**də**-nə-wa
pull-CAUS-NPST-IND
'make so. pull' (causative)[6]

c. æd-∅-**d**-a
pull-CL2-PST-IND
'pulled' (past tense)

For Class 1, the causative is realized as /-wə-/ and the past tense is realized with /-u-/. For Class 2, however, the causative and the past tense involve gemination rather than a purely segmental exponent. Based on Abhayasinghe (1973), Letterman (1997) argues that this actually suggests that Class 2 does not have a class marker underlyingly at all. According to her, the /i/ in the infinitive above as well as the /ə/ in Class 2 in many of the other forms are merely epenthetic material.[7]

To be concrete, Letterman (1997) argues that the past tense exponent is a more abstract element, an empty mora μ which is realized as /u/ when it is adjacent to a vowel and as gemination when it is adjacent to a consonant. In Class 1 (25), the past marker will always be adjacent to a vowel since there is the class marker present. In Class 2, however, according to Letterman (1997), there is no class marker and hence the empty mora that is the tense exponent will be next to the stem-final consonant, leading to gemination (see (26)).[8]

(25) Class 1 - Past:
bal-ə + μ $\longrightarrow$ /bælu/
look-CL1 + PAST

(26) Class 2 - Past:

[6]For Class 2, there is some speaker-variation as to the exponent of the causative. Either the causative is exponed by gemination of the stem-final consonant (plus a schwa), by adding the suffix /-wə/, or by a combination of both, resulting in a /-Cəwə/ affix. So, in addition to the form *ad-də-nə-wa*, we also find the forms *ad-ə-wə-nə-wa* and *ad-dəwə-nə-wa*.

[7]Letterman discusses various forms of hiatus resolution in the language, and shows that in both the nominal and verbal domain there is a high vowel that can be epenthesized. Note that it is not uncommon to have high epenthetic vowels in Indo-Aryan languages (so-called *svarabhakti*-vowels) (see *e.g.*, Masica 1991; Jena 2006).

[8]Maybe it is a bit unusual to assume that the empty mora will be realized as a vowel when it is next to a vowel as this creates a marked phonotactic structure. We have the impression that the /u/ that is usually taken as the exponent of past tense in Class 1 often also has more glide-like properties as it then appears in between the class marker vowel and the verb-final indicative marker /a/. In that sense what is transcribed as the past tense marker /u/ is a combination of the class marker schwa plus a back vowel glide. We leave this for future research.

ad + μ $\longrightarrow$ /ædd/
pull + PAST

In Class 2 in the present tense where the tense exponent is an /nə/, the resulting consonant cluster requires the subsequent application of an epenthesis rule that inserts an /i/ in the position where usually the class marker would appear.

(27) Class 2 - Non-Past:
ad + nə $\longrightarrow$ /adnə/ $\xrightarrow{\text{Epenthesis}}$ /adinə/
pull + NPAST

The same conclusion that Class 2 does not have a class marker is drawn by Geiger (1938)[9] on the basis of diachronic data. He shows that the vast majority of Class 2 verbs are historically all part of the consonant-final verb class in Sanskrit. Further, he shows that older stages of Sinhalese often do not show the apparent /i/-class marker with Class 2 verbs:

(28) a. vad-i-nnə
enter-CL2-INF
'enter' (modern Sinhala)
b. vadnā
enter.INF
'enter' (medieval Sinh. (7th-12th CE)) Geiger (1938:140)

This assumption by Geiger (1938) and Letterman (1997) that Class 2 (unlike Class 1) actually has no class marker patterns extremely well with our observation that Class 2 is more likely to undergo umlaut as this allows us to reduce the both asymmetries to one which can simply be phrased in terms of locality. The reason that Class 1 does not undergo umlaut with the weak umlaut-triggers is that it has a class marker intervening. We already saw that intervention of the causative blocks umlaut triggered by the weak triggers so it is not surprising that intervention by any other morpheme such as the class marker does the same thing. Class 2, on the other hand, does not have a class marker. The segment that looks like a class marker is merely epenthetic and, at the point when umlaut applies, it is not present and thus cannot intervene. In what follows, we will now no longer gloss the /i/ as the class marker for Class 2 but rather gloss it as part of the stem.

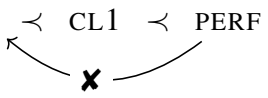
Consider the representations in (29) and (30), both of which feature a verb with a weak umlaut-trigger. In (29), we have a Class 1 verb, which comes with its class marker. Thus, the umlaut-property that is introduced by the weak trigger (PERF) cannot reach the stem because there is a morpheme intervening. In (30), we see a Class 2 verb, which does not have a class marker. Therefore, when the weak umlaut-trigger attaches to it, there

[9]Geiger calls the /i/ in Class 2 a *svarabhakti vowel* noting that (i) it was not present in older stages of the language and (ii) given its vowel quality and its position in the verb, it would be expected to trigger umlaut at the stage when umlaut was still triggered by the phonological properties of the affix itself.

is no intervening morpheme and thus the umlaut-property of PERF can reach the stem as indicated in (30-b). The schwa that is usually taken to be the reduced class marker is merely the result of subsequent epenthesis of /i/ plus additional vowel reduction.

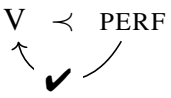
Class 1:

(29) a. anɖ-a-[la] ⟶ /anɖəla/
cry-CL1-PERF
'has cried'

b. 

Class 2:

(30) a. ad-[la] ⟶ /ædəla/
pull-PERF
'has pulled'

b. 

In essence this means that the asymmetry between the two verb classes can be reduced to whether the class has an overt class marker or not. Class 1 does have a class marker and therefore is not affected by the umlaut-property of weak triggers. Class 2 does not have a class marker and therefore will be affected by weak triggers. What this means is that we managed to reduce the two asymmetries we saw in Sections 2.2.1 and 2.2.2 to one, given in (31):

(31) The Empirical Generalization:
[PASS] and [PST] can trigger umlaut on the stem across intervening morphemes while [PERF], [REP] and [INF.IMP] cannot.

5 Discussion

In the preceding section, we arrived at the empirical generalization about the application of umlaut in the verbal domain in Sinhala. In this section, we go on to discuss two important implications of this finding:[10]

- The empirical generlization in (31) strongly motivates a concatenative analysis of the seemingly non-concatenative morphophonological process of umlaut in Sinhala.
- The generalization in (31) also illustrates the need for a morpheme-based analysis of the verbal complex in Sinhala.

We will elaborate on these implications in the following subsections.

[10]Arguably, we want to model the asymmetry between the two types of umlaut-triggers as the result of independent aspects of the verbal morphology in Sinhala. For that the reader is referred to Fenger & Weisser (2022), where we discuss various locality-based solutions to that asymmetry.

5.1 Concatenativity

Umlaut is, descriptively, a non-concatenative process. Some morphosyntactic features are expressed not (just) with a segmental affix but (also) with a change of the vowel quality of the stem.

Nonetheless, we argue that the systematicity of application patterns of umlaut in the verbal domain in Sinhala strongly suggest that it should be derived by means of an underlyingly concatenative mechanism. Umlaut should be conceived of as a floating feature that is introduced by certain suffixes in the structure. The floating feature tries to attach to the stem vowels and depending on the configuration it can or it cannot. This strongly supports the treatment of umlaut that has been proposed for in German(ic) by Lodge (1989); Yu (1992); Lieber (1992); Wiese (1996); Trommer (2021), and the treatment of umlaut in Sinhala in Parawahera (1990); and it falls in line with recent attempts to reduce all sorts of seemingly non-concatenative morphophonology to concatenative processes (*i.e.* affixation). This line of research has been dubbed "Generalized non-linear affixation" (see amongst many others Bermúdez-Otero 2012; Trommer & Zimmermann 2014). The illustration in (32) shows the underlying mechanics. The umlaut process is triggered by a floating feature (here, [–back] (see Lieber (1992))) which originates on the affix that expresses past tense. The affix expressing past tense appears in the correct position where we would expect it to be given the general rules of Sinhala morphology (and the Mirror Principle). From that position, the floating feature will then go on to attach to the vowel of the stem leading to fronting. This way, umlaut is essentially reanalyzed as a concatenative process. The morphology introduces an affix which simply happens to contain a suprasegmental phonological information that needs to associate somewhere to be realized. The actual process of association, its locality or its specific properties is not a matter of morphology; it is outsourced to the phonology.

(32) The Concatenative Nature of Umlaut:

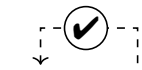
/And̯/ - /ə/ - /u$^{[-back]}$/ - /wa/ ⟶ /ænd̯uwa/
V - CL - PAST - IND

So, in order to see the necessity for a concatenative approach, consider a non-concatenative alternative according to which stem forms of a given verb were simply selected based on the morphosyntactic feature configuration. Under such an approach we could thus say that, for every verb, we choose the umlauted stem in a past or a passive context and the non-umlauted stem elsewhere. Such an approach works for the "strong" umlaut-triggers passive and past because their ability to trigger umlaut does not depend on the configuration.

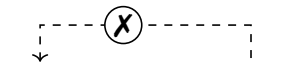
However, this simplistic approach runs into problems when we consider the "weak" umlaut-triggers (*i.e.* perfect, repetitive and the informal imperative). It is not possible to say that we choose the umlauted stem for a given verb in the perfect simply because we also have to consider whether the verb has a class marker or whether there is a causative in the structure or not. Finally, it is absolutely unclear why it is the presence or an absence of a

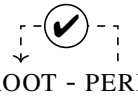
causative or a class marker that should matter for the realization of umlaut but the presence or absence of, say a negative prefix for example does not.

Under a concatenative approach, all of these questions receive straightforward answers. The umlaut feature is introduced at the position of the respective segmental exponents. From that position on, it tries to attach to the stem but it is blocked by any intervening morphemes. A causative as well as a potential class marker is linearly intervening and thus can potentially block association of the floating feature introduced by the affix but negation, being a prefix, cannot.[11]

(33) a. 

b. 

c. 

d. 

We thus take this as a strong argument in favor of a concatenative approach to umlaut in Sinhala.

5.2 The necessity to refer to morphemes

The empirical generalization we arrived at in Section 4 states that weak umlaut-triggers cannot trigger umlaut on the stem when there are intervening morphemes between the trigger and the stem. The crucial minimal pair was the one in (7) and (12) repeated in (34). As we have seen above, the exact same pattern also appears with the repetitive and the informal imperative.

(34) a. ædə-la tie-nə-wa
pull-PERF be-NPST-IND
'have pulled'

b. adə-wə-la tie-nə-wa
pull-CAUS-PERF be-NPST-IND
'have made so. pull'

As we have argued, this blocking of umlaut is not specific to the causative morpheme. In Section 4, we argued that the same logic underlies the asymmetry between the two verb classes. The reason that Class 1 does not undergo umlaut in the perfect is that it has, unlike Class 2, an overt class marker that intervenes:

[11] Alternatively, a non-concatenative approach might assume that umlaut is conditioned by linear adjacency in the same way as allomorphy or suppetion often is. However, this explanation then would fall short of explaining the umlaut properties of strong triggers which can trigger umlaut across other morphemes. Note as well, that in Fenger & Weisser (2022) we also compare verbal root suppletion and umlaut in more detail and find that their locality contexts are different in exactly that respect: Umlaut is potentially non-local (with past or passive) whereas suppletion is only ever possible under adjacency.

(35) bal-ə-la
look-CL1-PERF
'have looked'

We arrived at the generalization that any intervening morphemes between the stem and weak umlaut-triggers block the application of umlaut.[12] This of course raises the question, how this generalization can be rephrased in morphological frameworks that do not adopt the notion of the morpheme.

One prominent example of such a theory is Stump's (2001) Paradigm Function Morphology (PFM). Unlike in *lexical* theories, where phonological features and morphosyntactic features of individual morphemes are directly associated, the association in *inferential* theories such as PFM is indirect. In other words, the concept of the morpheme as a one-to-one mapping between form and function of affixes is rejected and thus it is interesting to look at whether PFM has a plausible way of dealing with the Sinhala pattern. In PFM, the morphosyntactic features are associated with the word as a whole and the phonological makeup of a given word is determined by a sequence of realization rules (Stump 2001, p32f). In order to model stem changes, PFM allows for two distinct mechanisms. Stem changes can either be modelled (i) by means of realization rules or (ii) by metageneralizations.

To give an example from Stump (2001:33) for the first mechanism, the German word form *Müttern* 'mothers.DAT' is formed by applying two realization rules: The first one chooses the umlauted stem of the root *Mutter* 'mother' because the word form is associated with a morphosyntactic plural feature and the second rule suffixes an *-n* to that stem because the word form is also associated with a DATIVE case feature.

So, to transfer the example to our case at hand, we could say one of the realization rules for a given verb in Sinhala chooses the umlauted form of the stem when the word form is associated with a morphosyntactic feature that expresses a perfect.[13]

(36) Choose the umlauted stem if the word-form is associated with the feature [PERF].

Crucially, this will give us the wrong result in some cases, namely when the verb in question is a Class 1 verb or when the word form is also associated with a causative feature. In order to solve this problem, we could invoke more specific realization rules such as (37-a) or (37-b) that overrule the rule in (36). Both are more specific as their context of application

[12]We want to reiterate at that point that the generalization cannot be reformulated by means of purely phonological interveners such as syllables. On the surface the example in (35) is indistinguishable from a similar example in Class 2 (*ædəla* 'have pulled'). Similarly, as noted in Section 4 causatives can, in Class 2, for some speakers, either be exponed by gemination of the stem-final consonant (plus a schwa), by adding the suffix /-wə/, or by a combination of both, resulting in a /-Cəwə/ affix. We want to stress that this choice has no impact on whether the stem can undergo umlaut, which suggests to us that the phonological exponent of the intervening affix is largely irrelevant; it is the morpheme boundary that blocks umlaut.

[13]For reasons of accessibility, we will give all realization rules in prose rather than in PFM's elaborate formalism. To the best of our knowledge, this slight simplification does not affect the point we want to make in this section.

contains a superset of features of that of (36). Hence they take precedence if the more specific context is met.

(37) a. Choose the non-umlauted stem if the word-form is associated with the features [+PERFECT, CLASS 1]
b. Choose the non-umlauted stem if the word-form is associated with the features [+PERFECT, CAUS]

This would give us the right distribution of umlaut in perfect contexts but it arguably fails to capture two important generalizations: First, as noted in the previous section, it remains a complete accident that it is precisely the markers that intervene in between the segmental perfect affix *-la* and the stem that block stem umlaut. It could just as well be a negation feature that were to block it. In a concatenative system, where umlaut is introduced by the exponent and literally floats onto the stem if it can, such intervention cases fall out without further ado. The second problem is that we would need to formulate the overruling rules in (37) of course not only for perfect but also for repetitive and the informal imperative. This seems like a fairly redundant way of dealing with the pattern.[14] All in all, an implementation in terms of realization rules (only) does not seem to capture the umlaut pattern of weak umlaut-triggers in Sinhala.

Thus the question is whether we can capture the pattern more adequately by means of meta-generalizations. As a simple toy example for stem choice conditioned by metageneralizations, Stump (2001:179ff) briefly discusses Sanskrit stem alternations between stems like *tasthús/tasthivát* 'having stood' that are conditioned by whether the immediately following affix in Rule Block 1 (*i.e.* the set of affixes that can immediately follow the root) is a vowel-initial or a consonant-initial one.

In order to try and mimic this solution for Sinhala, we could assume the following (yet, somewhat simplified) templatic rule blocks for Sinhala verbs. Note that, since the class marker and the causative can co-occur, they cannot be part of the same rule block.

(38)

Block 0	Block 1	Block 2	Block 3
Stem	Class	Causative	Perfect, Repetitive, Inf.Imp, ...

Importantly, we note that when no conditions of the specific rules are met, then there will be an identity function that maps the stem onto the stem without any changes. In other words, if there is no causative feature on the entire word form, the respective rule in Block 2 does not apply. Nonetheless, there will be a default rule that applies and that does not change anything about the morphological make-up of the stem.

[14]Recall, that it is not simply possible to have an alternative realization rule stating "Choose the non-umlauted stem if the word form is associated with a causative-feature" because we know that causative verbs can undergo umlaut in the past or the passive.

(39) a. Rule Block 0:
(i) Stem choice
b. Rule Block 1:
(i) Suffix /a/ to the stem iff the word is associated with a verb of [CLASS 1]
(ii) Else, add nothing
c. Rule Block 2:
(i) Suffix /wa/ to the stem iff the word is associated with a feature of [CAUSATIVE]
(ii) Else, add nothing
d. Rule Block 3:
(i) Suffix /la/ to the stem iff the word is associated with a feature of [PERFECT]
(ii) Suffix /pan/ to the stem iff the word is associated with a feature of [INF.IMP]
(iii) Reduplicate the stem iff the word is associated with a feature of [REP]
(ii) Else, add nothing

So, the question is whether we can formulate a meta-generalization that captures the stem-choice similar to the Sanskrit example above. The problem is however, that the system only allows us to (a) the morphosyntactic features of the entire word-form and/or (b) to the phonological properties of the exponent themselves. In the German example *Mutter/Mütter*, the alternation was conditioned by the plural feature of the word form; in the Sanskrit alternation between *tasthus-/tasthivat-*, it was conditioned by the phonological features of affixes.

Stem-umlaut with weak umlaut-triggers in Sinhala is, however, contingent on two syntagmatic properties: First, there must be an umlaut-trigger in Rule Block 3 and secondly, in Rule Blocks 1 and 2, the default rule must have applied. It is particularly the second condition that seems problematic. A default rule does not add phonological material to the stem that we would be able to refer to in order to formulate our meta-generalization. The only possible solution that we see at this point would be to allow for meta-generalization to refer to whether the default rule has applied in blocks 1 and 2.

(40) Choose the umlauted stem iff:
(a) The word form is associated with one of the features [PERF, REPET, INF.IMP][15]
(b) The rules in (40-b. (ii)) and (40-c. (ii)) have applied.

This meta-generalization does capture the pattern accurately but again, it has some fairly obvious shortcomings: First, the rule, again, treats it as a complete accident that it is precisely Rule Blocks 1 and 2 that intervene between the stem and what we take to be the umlaut-triggering morphemes. In a sense, we could easily formulate the same rule referencing Rule Blocks 4, 5, and 6 (which we have not given above for reasons of simplicity but which are required to accommodate tense, modals and mood marking). The second problem is that, as briefly alluded to above, it is not clear whether PFM actually allows us

[15] Alternatively, we could assume that weak umlaut is triggered by a morphomic feature μ that is defined as the set of weak-umlaut-triggers. As we have acknowledged in Sections 1 and 2, every theory needs to model somehow that there does not seem to be a clear natural class (phonologically or morphosyntatically) that sets apart umlaut-triggers from non-umlaut-triggers.

to refer to the application of default rules.[16] In a sense, this is merely a restatement of the fact that no affix (or a undetectable zero-affix) as been added in a given rule block. And given the criticism of zero-affixes used in theories like Distributed Morphology Stump provides (Stump 2001:10f), this cannot really be a viewed as a plausible solution. If we can refer to the application of a default rule in a given rule block, then this essentially becomes equivalent to having more zero-affixes in a verbal structure than any theory of DM (we know of) would assume.[17] We think this is an undesirable result against the background of the framework but without actually referring to morpheme boundaries, we do not see at this point how the theory could accommodate the Sinhala facts. What we thus want to conclude from this section is that the generalization we arrived at in Section 4 can straightforwardly modelled and maintained in a theory that allows to make reference to morpheme boundaries and morphemes but a theory that does not will need to make some – as we argue implausible – additional assumptions.

6 Conclusion

In this short paper, we investigated the application of umlaut patterns in the verbal domain of Sinhala. In line with the existing literature, we found that umlaut itself is, synchronically, an arbitrary feature of certain affixes attaching to the verb. We found that the umlaut-triggering affixes fall into two classes: Strong umlaut-triggers like passive and past tense and weak umlaut-triggers such as perfect, repetitive and the informal imperative. This subdivision manifested itself in terms of two asymmetries: First, whether umlaut can skip an intervening causative affix, or secondly, whether umlaut is found in both verb classes or only in Class 2. Based on phonological and diachronic evidence, we argued that the two asymmetries can be reduced to one, namely whether umlaut can skip any intervening morphemes. Umlaut triggered by strong triggers can, and umlaut triggered by weak triggers cannot. Based on this generalization, we proceeded to argue for two independent claims: First, the generalization is most straightforwardly derived if we conceive of umlaut as an underlyingly concatenative process: certain morphemes introduce a floating feature which attempts to associate with the verbal root. In some cases that attempt succeeds, in others it does not. The second claim was that the empirical generalization we arrived at strongly suggests that we need to make reference to morphemes and morpheme boundaries, which turns out to be problematic for amorphematic theories of morphology.

[16] Stump's discussion of how to model morphophonological processes (Stump 2001:48) does unfortunately not involve cases where referring to the absence of a phonological exponent would be crucial.

[17] There is, to our knowledge, no account formulated in DM that would posit a zero-affix to account for the absence of a causative morpheme. Rather all accounts would simply posit that there is no syntactic causative-head in the structure to begin with. However, if the rule in (40) were on the right track, it does exactly that: It refers to the absence of a phonological marker in the slot that a causative-head would have occupied.

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Specification of the underspecified: A pragmatic analysis of the injunctive in the *Ṛgveda*

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ABSTRACT

This paper uses formal pragmatics to show that discourse context alone is inadequate to explain the function of "injunctive" verb forms (i.e., finite verbs unspecified for tense or mood) in Ṛgvedic Sanskrit. Prior treatments, which explain the temporal and modal specification of the injunctive as being picked up from other verb forms in the immediate discourse, do not fully account for the injunctive's observed meanings. By applying a framework known in neo-Gricean pragmatics as a "Horn strategy" to tense and modality, I explain the various functions of the injunctive as arising from partial blocking relationships that hold between it and other verb forms with which it competes.

1 Introduction

The term *injunctive* refers to a verbal category in Sanskrit grammar that is not marked for tense or mood. The name "injunctive" does not accurately describe its function(s) and should be thought of as a formal designation only. Injunctives may be built to either of two distinct aspect stems of concern to us here: the present (neutral aspect) and the aorist (perfect(ive) aspect). The former is called the *present injunctive*, the latter the *aorist injunctive*.[1] These consist of no more than the aspect stem plus agreement morphemes marking person, number (singular, dual, or plural), and voice (active or middle).

From the present stem are also formed the present indicative and the imperfect indicative. The imperfect is identical in form to the present injunctive but with a past-tense marking prefix called the augment (*á-*). The present indicative has a special series of tense endings (*-mi*, *-si*, *-ti*, etc.). To the aorist stem is also built the aorist indicative, which is identical in form to the aorist injunctive but with the augment *á-*. Despite their names, the present and aorist injunctives should not be thought of as having any particular temporal specification (unlike the indicatives, which are specified for tense).[2]

So, to the root $\sqrt{kr̥}$ 'make' the injunctive and indicative forms are constructed as shown in (1), using the active third-person singular as an exemplar.

[1] I set aside the perfect injunctive for the purposes of this paper, as it is of much more limited occurrence than the other two. Its functions in no way conflict with the findings here presented.

[2] There is no good substitute for this unfortunate naming convention. Replacing *injunctive* with the term *augmentless* ("augmentless imperfect" or "augmentless aorist") would give the false impression that these forms are derived from the augmented ones. It would also not do to substitute the traditional labels with purely aspectual terms, such as *imperfective* and *perfective*, since the kind of aspect expressed by the present and aorist stems is a matter of ongoing debate. I follow Dahl 2010 and Hollenbaugh 2021 in assuming that the present stem is aspect neutral and the aorist is perfect(ive) (similarly Kiparsky 1998).

(1) FORMATION OF THE INJUNCTIVE AND CORRESPONDING INDICATIVES[3]

	INDICATIVE			INJUNCTIVE	
PRS. STEM	ipf.	/á-kr̥-ṇo-t/	:	prs.	/kr̥-ṇó-t/
	prs.	/kr̥-ṇó-ti/			
AOR. STEM	aor.	/á-kar-t/	:	aor.	/kár-t/

From the two aspect stems may also be built a variety of marked modal forms. These include the subjunctive, which has prospective meaning (effectively a future tense), the optative (potential or deontic), and the imperative. Examples of these formations to $\sqrt{kr̥}$ 'make' are: prs. sbjv. *kr̥-ṇáv-a-t(i)*, prs. opt. *kr̥-ṇu-yā́-t*, prs. imp. *kr̥-ṇu(-hí)*; aor. sbjv. *kár-a-t(i)*, aor. opt. *kur-yā́-t*, aor. imp. *kr̥-dhí*.

The injunctive retains its full range of functions only in the most archaic Sanskrit text, the *Ṛgveda* (*RV*). In later Vedic texts it is of drastically more limited occurrence, and in the Classical language it is virtually restricted to the prohibitive construction with *mā́* 'don't' (cf. Hollenbaugh 2020). As it occurs in the *Ṛgveda*, the injunctive is said to be "undifferentiated" (Renou 1952: 368–9) or "un(der)specified" (Kiparsky 2005, 1968) for tense and mood (similarly Macdonell 1916: 349–50; Hoffmann 1967: 276, 278).[4] Accordingly, it can have essentially any kind of temporal or modal interpretation, which is commonly held to be determined by context (so Macdonell 1916: 349–50; Renou 1952: 369; Kiparsky 1968, 2005).

While context certainly plays a role, I argue that it is not sufficient in itself to account for the observed temporal and modal readings available to the injunctive, and that these arise primarily from the resolution of a series of competitions between forms of the injunctive and other finite verb forms (viz. marked modals and indicatives). Because more specific verb forms are in principle always available for use, the move to use the injunctive means that interlocutors must rely on essentially Gricean principles to resolve its meaning. If a speaker uses a less specific form than they could have used, the addressee reasons that they must have done so for some special purpose, and so the injunctive is assigned an interpretation that the more specific form would not have. Each possible interpretation relies on a partial blocking relationship that holds between particular pairs of forms—one specified for tense and mood and one unspecified.

I formalize these blocking relationships in terms of "Horn strategies" (after Horn 1984), applying Blutner's (2000) framework of bidirectional OT to tense and modality (follow-

[3] As is conventional, *r̥* indicates syllabic *r*. An underdot marks retroflex consonants (e.g., *ṇ*), except in the case of *ḥ*, which is simply [h] (distinct from *h* [ɦ]). The voiceless palatal fricative is written *ś*; the palatal stops are *c* (voiceless) and *j* (voiced). The velar nasal is *ṅ*; the palatal nasal is *ñ*. In certain sandhi environments nasalization is written *ṁ* or *ṁ̐* (e.g., in (4b) below). Aspirated or breathy-voiced stops are indicated with a following *h* (e.g., *th*, *dh*). Vowel length is indicated by a macron, accent by an acute (or by a following grave when the accented vowel is nonsyllabic, as in *nyàk* in (4b) below).

[4] It has sometimes been erroneously classified as a mood in its own right (Avery 1885; Macdonell 1916: 349–52; Hoffmann 1967: 29).

ing Grønn 2007, 2008). How the meaning of an injunctive is resolved depends on which blocking relationship is relevant in a given situation (e.g., prs. inj. vs. ipf. ind., or aor. inj. vs. aor. ind., or inj. vs. imp.). In this way, the underspecification of the injunctive can lead to it receiving specific interpretations that do not match the temporal or modal function of indicatives or marked modal forms in the immediate discourse.

I also demonstrate how underspecification does not necessarily correlate with imprecision of expression, nor is the use of underspecified forms motivated solely by the economy principle. On the contrary, underspecified forms are typically selected when none of the more marked forms available in the language will make the speaker's intended meaning easily recoverable to the addressee. By using the underspecified form in such contexts, interlocutors achieve maximum specificity. The results of this analysis go to show that in order to understand the function of a single verbal category in a language we must consider its place in the verb system as a whole.

This paper is structured as follows: Section 2 reviews prior research and highlights remaining problems, for which I put forth a new proposal. My analysis is given in Section 3, with conclusions in Section 4.

2 Problematization

Whereas prior accounts have privileged syntactic environment, discourse anaphora, and shared common ground as determining factors for deciding the temporal or modal reference of the injunctive in a context, these have the problem that they predict that the injunctive will always match the interpretation of verbs with which it is conjoined or which occur in the immediate discourse. They are unable to handle the large number of cases in which the injunctive shows a meaning that is distinct from that of other verbs in the discourse, or in which the injunctive occurs entirely on its own. My analysis (§3), on the other hand, is able not only to accommodate but to explain such cases by treating the interpretation of injunctives as dependent on other verb forms with which they compete, not necessarily on the verbs that occur in the local discourse.

In his first formulation, Kiparsky (1968: 35–8) attributed the injunctive's context dependent temporal and modal specification to the syntactic phenomenon known as conjunction reduction, whereby "both tense and mood were in conjoined structures neutralized by the injunctive." This means that when two or more verbs are conjoined only the first has to be marked for tense and mood, and so the the injunctive will always follow the marked indicative or modal forms. Thus, an injunctive following an indicative past tense will have past time reference (e.g., *RV* V.32.1), whereas one following a present indicative will have present time reference (e.g., *RV* I.61.1), and one following a marked modal form will have future time reference and some sort of modal value.[5]

The problem with this formulation is that the linear order "marked indicative/modal + injunctive" has in fact nearly as many exceptions as adherents. For this reason, Kiparsky (2005: 225) later broadened his formulation to say that the "temporal/modal interpretation

[5] Putative examples include VI.40.4bc (subjunctive), II.33.14ab (optative), and VIII.17.1 (imperative).

of injunctives is analogous to determining the antecedent of a pronoun, a process in which the hearer relies not only on the local syntactic environment, but also on the discourse context, and on the common ground shared between hearer and speaker." This allows for the injunctive to either precede or follow verbs specified for tense and mood, albeit without a clear explanation of how its temporal and modal values are determined in cases where they cannot be explained syntactically.[6]

Yet even under Kiparsky's (2005) expanded formulation several problems remain. One is that the injunctive often co-occurs with forms specified for tense or mood without matching in interpretation. Far from picking up temporal or modal reference anaphorically, in such cases the injunctive's distinctive form seems to signal a difference in function from the surrounding indicatives or marked modal forms. This is true especially when the injunctive is the only non-modal verb in a verse, as in (2), which shows an injunctive both following and preceding an optative.[7]

(2) INJ. NOT MATCHING THE INTERPRETATION OF A COORDINATED MODAL
bhágo vā góbhir aryamém
bhaga.NOM.SG.M or cow.INS.PL.F aryaman.NOM.SG.M.it
anajyāt *só asmai cā́ruś*
anoint.PRF.OPT.ACT.3SG it.NOM.SG.M him.DAT.SG.M dear.NOM.SG.M
chadayad *utá* ***syāt***
seem.PRS.INJ.ACT.3SG and be.PRS.OPT.ACT.3SG
'Or else Bhaga (and) Aryaman **should anoint**$_{[\text{OPT.}]}$ it [=the hymn] with cows. It [=the hymn] **seems**$_{[\text{INJ.}]}$ dear to him [=Agni] and so it **should be**$_{[\text{OPT.}]}$' (*RV* X.31.4cd, transl. after Jamison 2015–: ad loc.).

Were we to follow Kiparsky (2005: 222) in interpreting the injunctive as matching the meaning of the surrounding optatives, we would read 'may it seem and be pleasant to him'. Yet this makes little sense, since "being" typically implies "seeming" and vice versa. There is no reason, moreover, to suppose that the hymn's *actually* being dear to Agni (= the ritual fire) is in doubt and in need of being distinguished from its only *seeming* to be dear, or, conversely, that the hymn needs not only to *be* dear to Agni but also to *seem to be* dear to him. Rather, the injunctive *chadayat*, by virtue of its formal contrast with the surrounding forms, is best understood as having a non-modal meaning, most appropriately with present reference time ('seems'), as often. The optative *syāt* serves to validate the statement of the injunctive: this situation *seems* to be true and that is just how things *ought to be*.

In (3) we see the injunctive following a marked indicative (imperfect) without, as it seems, matching it in time reference. Again, the formal contrast between the indicative and the injunctive appears to signal a functional contrast, rather than a functional match. The

[6]Even so, Kiparsky (2005: 225) stresses that in the majority of cases of verbal and sentential conjunction the more specific form precedes the injunctive (thus maintaining to some degree the notion of conjunction reduction). But if such neutralization applies also at the discourse level, we should expect to find the same tendency of word order even without overt conjunction, contrary to fact (cf., e.g., (9) and (10) in §3 below).

[7]Except where noted, all translations of Ṛgvedic text are based on those of Jamison & Brereton (2014) (q.v. ad loc.), though often modified to reflect my own interpretations where necessary.

first pāda refers to Agni's first creation by means of kindling sticks, and the second pāda follows up on this by referring to Agni's *capacity* to be "born" regularly from within the sticks (see Jamison & Brereton 2014: 412). The change in time reference is signaled by the change in form to the injunctive. This, in turn, is picked up by the present indicative in the next hemistich, which likewise refers to the habitual present, as Agni regularly "resides" inside the kindling sticks (cf. Jamison 2015–: ad loc.).

(3) INJ. NOT MATCHING THE TENSE INTERPRETATION OF A PRECEDING IND.
uttānā́yām ***ajanayan*** *súṣūtam*
outstretched.LOC.SG.F birth.CAUS.IPF.IND.ACT.3PL easily.born.ACC.SG.M
bhúvad *agníḥ* *purupéśāsu*
become.AOR.INJ.ACT.3SG agni.NOM.SG.M many.ornamented.LOC.PL.F
gárbhaḥ
embryo.NOM.SG.M
śíriṇāyāṁ *cid* *aktúnā* *máhobhir*
waterway(?).LOC.SG.F even night.INS.SG.M power.INS.PL.N
áparīvr̥to ***vasati*** *prácetāḥ*
unconfined.NOM.SG.M dwell.PRS.IND.ACT.3SG attentive.NOM.SG.M
'In her with (legs) agape [=kindling sticks] they **engendered**$_{[\text{IPF.IND.}]}$ him whose birth is easy. Agni **becomes**$_{[\text{AOR.INJ.}]}$ the embryo in the (women) of many ornaments [=logs].
In the (birth-)canal [?] also he **dwells**$_{[\text{PRS.IND.}]}$ by night, (though) because of his powers he cannot be confined, the discerning one' (*RV* II.10.3).

(3) also illustrates a second problem with Kiparsky's (1968, 2005) proposal, namely that we frequently find verses in which the switch to the injunctive is followed by a return to an indicative or modal verb. If use of the injunctive is just a kind of contextual neutralization, such sequences would not be expected. Rather, we would expect to find the switch to the injunctive lasting for the remainder of the utterance, or at least of the sentence, such that all subsequent verbs are in their "reduced" injunctive form. Yet we frequently see a rapid alternation, within the same sentence or even pāda, from indicative to injunctive and back to indicative, as in (4a), or the reverse: injunctive to indicative to injunctive, as in (4b). Note that in these examples there does not appear to be a difference in time reference between the injunctive and indicative forms.

(4) ALTERNATION OF INDICATIVE AND INJUNCTIVE
a. *āvír* *bhávann* ***úd atiṣṭhat***
visible become.PTCP.NOM.SG.M.PRS.ACT up stand.IPF.IND.ACT.3SG
parāvŕ̥k
outcast.NOM.SG.M
práti *śroṇá* ***sthād*** ***ví*** *anág*
firm lame.NOM.SG.M stand.AOR.INJ.ACT.3SG far.and.wide blind.NOM.SG.M
acaṣṭa
see.IPF.IND.MED.3SG

‘Becoming manifest, [Indra] **stood up**$_{[\text{IND.}]}$—he who was shunned:
The lame one **stood firm**$_{[\text{INJ.}]}$; the blind one **saw clearly**$_{[\text{IND.}]}$’ (*RV* II.15.7bc).

b. *yá udnáḥ phaligám **bhinán***
REL.NOM.SG.M water.GEN.SG.N bolt.ACC.SG.M split.PRS.INJ.ACT.3SG
*nyàk síndhūṁr **avā́srjat***
downward river.ACC.PL.M down.release.IPF.IND.ACT.3SG
*yó góṣu pakváṁ **dhāráyat***
rel.NOM.SG.M cow.LOC.PL.F cooked.ACC.SG.N fix.PRS.INJ.ACT.3SG
‘[Indra] who **split**$_{[\text{INJ.}]}$ the bolt of the water (and) **released**$_{[\text{IND.}]}$ the rivers downward,
who **fixed**$_{[\text{INJ.}]}$ the cooked (milk) fast in the cows’ (*RV* VIII.32.25).

The third outstanding problem is that Kiparsky’s (2005) account has no clear way of handling data of the type in (5) and (6), where an injunctive occurs in the first verse of the hymn, with no non-injunctive verb in the sentence or immediate discourse from which it can pick up its temporal and modal specification. In such situations, the injunctive tends to have a special function as a performative verb. The verb is typically in the first person with the poet(s) as its subject, as in (5).

(5) PERFORMATIVE AORIST INJUNCTIVE (HYMN-INITIAL)
ápūrviyā purutámāni asmai mahé
foremost.ACC.PL.N much.SUP.ACC.PL.N 3SG.DAT.M great.DAT.SG.M
vīrā́ya taváse turā́ya
hero.DAT.SG.M powerful.DAT.SG.M oncoming.DAT.SG.M
virapśíne vajríṇe śáṁtamāni
having.abundance.DAT.SG.M having.mace.DAT.SG.M beneficial.SUP.ACC.PL.N
*vácāṁsy āsā́ sthávirāya **takṣam***
speech.ACC.PL.N mouth.INS.SG.N strong.DAT.SG.M fashion.AOR.INJ.ACT.1SG
‘For him [=Indra] I **(hereby) fashion**$_{[\text{AOR.INJ.}]}$ with my mouth (these) words, unprecedented, best of many, most wealful—
for the great hero, powerful and precipitous, conferring abundance, bearing the mace, stalwart’ (*RV* VI.32.1).

Because the performative meaning cannot be derived from any other verb in the immediate discourse context, it must arise by some other means.

Yet performative is not the only function available to the injunctive at the beginning of a discourse. It may also have its past, present, or modal functions that we find in other discourse positions. Crucially, this is even true when the verse contains no other verb from which the injunctive can pick up its temporal or modal specification anaphorically, as shown in (6) and (7).

(6) INJUNCTIVE ISOLATED IN ITS VERSE (HYMN-INITIAL)

a. ***tákṣan*** *ráthaṁ* *suvṛ́taṁ*
fashion.AOR.INJ.ACT.3PL chariot.ACC.SG.M well.rolling.ACC.SG.M
vidmanā́pasas ***tákṣan***
with.wisdom.working.NOM.PL.M fashion.AOR.INJ.ACT.3PL
hárī *indravā́hā* *vṛ́ṣaṇvasū*
fallow.ACC.DU.M indra.bearing.ACC.DU.M having.bullish.goods.ACC.DU.M
tákṣan *pitṛ́bhyām* *ṛbhávo*
fashion.AOR.INJ.ACT.3PL father.DAT.DU.M the.ṛbhus.NOM.PL.M
yúvad *váyas* ***tákṣan***
youthful.ACC.SG.N vigor.ACC.SG.N fashion.AOR.INJ.ACT.3PL
vatsā́ya *mātáraṁ* *sacābhúvam*
calf.DAT.SG.M mother.ACC.SG.F companion.ACC.SG.F

'They **fashioned**$_{[\text{AOR.INJ.}]}$ the smooth-rolling chariot, working with their know-how; they **fashioned**$_{[\text{AOR.INJ.}]}$ the two fallow bays that convey Indra and bring bullish goods.

They **fashioned**$_{[\text{AOR.INJ.}]}$—the Ṛbhus—for their parents youthful vigor; they **fashioned**$_{[\text{AOR.INJ.}]}$ for the calf a mother to stay by it.' (*RV* I.111.1).

b. *śrīṇánn* ***úpa*** ***sthād***
prepare.PTPL.PRS.ACT.NOM.SG.M towards stand.AOR.INJ.ACT.3SG
dívam *bhuraṇyú* *sthātúś* *carátham*
sky.ACC.SG.M flickering.NOM.SG.M stationary.ACC.SG.N mobile.ACC.SG.N
aktū́n ***vy*** ***ū̀rṇot***
night.ACC.PL.M apart cover.PRS.INJ.ACT.3SG

'Bringing (the sacrifice) to readiness, bustling about, he [=Agni] **approaches**$_{[\text{AOR.INJ.}]}$ heaven. He **discloses**$_{[\text{PRS.INJ.}]}$ the still and the moving through the nights' (*RV* I.68.1).

In (6a) there is only a single, repeated verb in the verse, the aor. inj. *tákṣan* 'they fashioned'. We know it must be past referring because it refers to the well known achievements of the Ṛbhus (artisan deities), which lie firmly in the remote past. Here the aorist indicative (*átakṣan*) would lend itself to the perfect-resultative interpretation typical of augmented aorists (thus 'have fashioned', as at *RV* VII.7.6b, X.39.14b, X.48.3a). Using the injunctive form instead therefore implicates non-resultative perfective meaning, thus giving rise to the remote past interpretation that we see in (6a).

In (6b) we find just the opposite: Two injunctives are used with present time reference, as is clear from the subject matter. The focus of this hymn is on ritual, "especially on the joint activity performed by 'all' in their separate ways and the rewards they share because of it" (Jamison & Brereton 2014: 190). In fact, the first four lines of this hymn contain exclusively injunctives, all of which refer to generalities about Agni and those who serve him. As the corresponding augmented forms would necessarily have past reference, the poet's choice not to use the indicative signals to the addressee that some other interpretation is intended,

in this case generic-habitual.

In (7), the inj. 2sg. *dhāḥ* (/dhā-s/) 'set!' has the force of an imperative, as often, yet there is no marked imperative in this verse from which it could derive this meaning. The finite verbs that follow in the second hemistich are respectively perfect indicative (with habitual present meaning) and aorist injunctive (with resultative meaning).[8]

(7) INJUNCTIVE WITH IMPERATIVE MEANING
imā́m ū ṣú prábhr̥tiṁ sātáye
this.here.ACC.SG.F PTCL well offering.ACC.SG.F attainment.DAT.SG.F
dhāḥ *śáśvac-chaśvad ūtíbhir*
put.AOR.INJ.ACT.2SG ever-renewing.ACC.SG.N help.INS.PL.F
yā́damānaḥ
unite.PTCP.PRS.MID.NOM.SG.M
suté-sute ***vāv̥rdhe*** *várdhanebhir*
pressing-pressing.LOC.SG.M grow.PRF.IND.MID.3SG nourishment.INS.PL.N
yáḥ kármabhir mahádbhiḥ súśruto
REL.NOM.SG.M deed.INS.PL.N great.INS.PL.N well.renowned.NOM.SG.M
bhū́t
become.AOR.INJ.ACT.3SG
'**Set**$_{[\text{AOR.INJ.}]}$ this offering here to be won, [o Indra,] being ever newly united with help.
At every pressing he **is strengthened**$_{[\text{PRF.IND.}]}$ by strengthenings, he who **has become**$_{[\text{AOR.INJ.}]}$ well famed through great deeds' (*RV* III.36.1).

We are left to wonder, then, where the imperatival value of *dhāḥ* comes from, as it cannot be derived from context along the lines suggested by Kiparsky (2005: 225).

The answer, as it happens, has nothing to do with context but rather paradigmatic blocking: A form that would ordinarily be blocked from use in an imperative context by the marked imperative surfaces when no such marked imperative exists. As Hoffmann (1967: 256, 261–2) notes, the verbs $\sqrt{dhā}$ 'put' and $\sqrt{dā}$ 'give' lack aorist imperative forms in the active singular of the second-person. So, the corresponding injunctives are used instead, respectively *dhā́ḥ* 'put!' and *dā́ḥ* 'give!' (e.g., *RV* VI.33.1). The aorist injunctive is *available* for this use because it is underspecified for tense and mood, and therefore compatible with imperative meaning. But it is only *employed* in this function because there is no marked imperative form in this slot of the paradigm that could be used instead. The marked imperative can thus be said to apply wherever possible, while the injunctive in imperatival function occurs just in case of a gap in the imperative paradigm.

In fact, as Hoffmann (1967: 236–64, 268–9) demonstrates, the same is true of all modal uses of the injunctive, whether imperative, optative, or subjunctive (= future). The injunctive in these functions typically occurs only when no corresponding marked modal form is viable for the verbal root or stem in question. Predictably, the present stem almost never attests modal functions, since it tends to have more complete modal paradigms than does the

[8] Notably, the second injunctive *bhū́t* does not pick up the habitual present function of the perfect.

aorist (cf. Whitney 1889: 284, 290–3).[9] These facts cannot be reconciled with Kiparsky's (2005: 226) statement that "injunctive forms freely alternate with more highly specified tensed and modal forms."

To summarize, marked modal forms are always preferred to injunctive forms when available. Tensed interpretations of the injunctive seem to be substantially less restricted, occurring alongside marked indicatives with considerable frequency and being employed even when a corresponding indicative form is available for use.

While Kiparsky (2005: 229) notes that "underspecified forms in paradigms can *only* surface when ECONOMY outranks EXPRESSIVENESS," his analysis is a morphological one and so provides no clear account of how such a ranking is supposed to come about, except to say that it has something to do with discourse context. But, as I have shown, context alone is not a reliable predictor of the injunctive's use, nor is ECONOMY sufficient to motivate the occurrence of the injunctive in cases like (4), where the injunctive alternates in rapid succession with the indicative, or like (3), (5), and (6a), where the aorist injunctive has distinctive functions unavailable to the corresponding indicative.

I therefore argue that all of the injunctive's available interpretations can be understood as arising from blocking relationships that hold between forms of the injunctive and corresponding forms of the indicative or marked modals. While firmly in the realm of pragmatics, this does not rely on discourse context alone. Rather, it relies on the knowledge shared by interlocutors about the forms available within the Vedic verb system: the set of forms that *could* have been used in a particular utterance and the form that was actually used.

When the injunctive is used, it is always instead of some other form that is specified for tense and mood (except in cases of paradigmatic gaps). From the very knowledge of this fact specific meanings of the injunctive arise, precisely by virtue of its being unspecified for tense and mood: The speaker could have chosen to express tense and mood explicitly with the indicative or a marked modal form but chooses not to, in order to express some alternative meaning to which the more highly specified forms are not well suited. The addressee, being aware of the choices available to the speaker, is in most cases able to reliably recover this alternative meaning that the speaker intends. The goal of my analysis is to show precisely how the interlocutors arrive at the meanings of the injunctive that they do, and hence why the injunctive has the meanings that it does.

3 Analysis

Assuming Horn's (1984) Q(uantity) and R(elation) principles, many terms can be understood to have their meanings via competition with other terms.

- Q Principle (addressee based): Make your contribution sufficient. Say as much as you can (given R).

[9] One regular exception is the class of reduplicating presents, which generally lacks true subjunctive forms and so uses injunctives instead (Whitney 1889: 244–5). Other exceptions to this generalization are few and debatable (cf. Hoffmann 1967: 256–61; Hollenbaugh 2021: 259–62).

- R Principle (speaker based): Make your contribution necessary. Say no more than you must (given Q).

One consequence of these principles is that, when a speaker uses some form B, the addressee reasons that the speaker has opted for that form in order to express something which is not typical of form A. This partial blocking process may be represented as a 2×2 game between the speaker's preference for "short, unmarked forms" and the addressee's preference for "stereotypical, unmarked meanings" (Grønn 2007). It can be visualized as in the following tables, where the vertical arrows represent the speaker's preferences, and the horizontal arrows represent the addressee's preferences. To help conceptualize this framework, I begin with an English example of lexical blocking in Table 1.

	m_1: direct killing		m_2: indirect killing
f_1: *kill*	✓	⟵	✗
	↑		↑
f_2: *cause to die*	✗	⟵	✓

Table 1: Interpretations of *kill* and *cause to die*

In Table 1, the speaker prefers the minimally marked form (viz. *kill* (f_1)) and the addressee assumes its most stereotypical meaning (viz. direct killing (m_1)). When a speaker makes the discourse move to say *cause to die* instead (f_2), some less stereotypical meaning (viz. indirect killing (m_2)) is assumed, because if the speaker had meant m_1 there was a better form available (viz. *kill*). Applying the algorithm of weakly bidirectional OT (Jäger 2002; Blutner 2000), the preferences of speaker and addressee conspire to prefer the pair $\langle f_1, m_1 \rangle$ over the pairs $\langle f_1, m_2 \rangle$ and $\langle f_2, m_1 \rangle$. The two losing pairs are removed from the table (✗) and the optimal pair remains (✓). Thus, *kill* is the preferred form with the preferred meaning of direct killing. The remaining pair $\langle f_2, m_2 \rangle$ survives despite the existence of the optimal pair $\langle f_1, m_1 \rangle$. This is said to be the weakly optimal candidate: "True, there is a better form (f_1), but *not* given meaning m_2. Similarly, there is a better meaning (m_1), but *not* given form f_2" (Grønn 2007).

Importantly, markedness need not strictly involve more morphological material, as can be seen from lexical pairs like *cow* and *beef* discussed by Grønn (2008) following Blutner 1998 (q.v. for further references). Even though both are monosyllables with equivalent morphological complexity, *cow* is the form associated with the "stereotypical, unmarked meaning," which in this case is "countable animal." For its part, *beef* is blocked in the primary meaning and is the weakly optimal candidate in the sense "non-countable cow-meat."

By the same line of reasoning, forms that are grammaticalized in certain functions, even where they involve greater morphological complexity than alternatives, will be considered as the default forms (f_1) in those functions. For instance, Levantine Arabic dialects have grammaticalized an indicative marker *b-*, which contrasts with simplex forms that lack the *b-* and have modal functions (Cohen 1984: 294). So, a marked indicative such as *b-yišrab* 'he drinks' contrasts with the unmarked *yišrab* 'may he drink (vel sim.)' (*š* = [ʃ]).

Historically the *b-* prefix was a progressive marker. At that stage (Stage A), prefixed forms competed with their unmarked counterparts for use in indicative contexts, with both forms being in principle unspecified for modality. The prefixed forms were used when the event was depicted as being in progress; the unprefixed forms were used elsewhere, including for non-progressive present events. Because events depicted as ongoing tend to be ongoing *in the real world* of the speaker, the *b-* prefix was eventually reinterpreted as a marker of indicative mood (Stage B). As a consequence, the unprefixed forms became pragmatically restricted to their modal meanings, despite not being morphologically marked for modality. The grammaticalization of the *b-* prefix leads to a change wherein the more marked form (f_2) at Stage A, represented by Table 2, becomes the stereotypical form (f_1) in the meaning [indicative] at Stage B, as shown in Table 3.[10]

	m_1: [elsewhere]		m_2: [indicative]
f_1: *yišrab*	✓	⟵	✗
	↑		↑
f_2: *b-yišrab*	✗	⟵	✓

Table 2: Stage A (15th-century Levantine)

	m_1: [indicative]		m_2: [non-indicative]
f_1: *b-yišrab*	✓	⟵	✗
	↑		↑
f_2: *yišrab*	✗	⟵	✓

Table 3: Stage B (Modern Levantine dialects)

In a similar way, the forms in Sanskrit that are grammaticalized for indicative or modal meanings contain a greater number of morphemes than their injunctive counterparts and clearly do not derive their indicative/modal meanings pragmatically. The tense/modality of these forms is semantically specified (i.e., as an entailment), not an invited inference. For this reason, the tables below position the marked indicative and modal forms as f_1, associated with the "stereotypical, unmarked meaning" m_1, while the injunctive is positioned as the competitor f_2, making it the weakly optimal candidate for a variety of senses (m_2) depending on the f_1 that it is being contrasted with.[11]

As discussed in the previous section, Ṛgvedic Sanskrit shows blocking of the injunctive on two fronts, which are not equally distributed.

1. In the modal domain (prospective, potential, deontic): Non-injunctive modal categories block the injunctive in that they tend to apply wherever they can. The injunctive is available for use only when no marked modal form is available.

[10]Compare the development of the simple preterite in English: Originally used as a perfect as well as a remote past tense, by the advent of the *have*-perfect it was largely restricted to non-perfect past usage.

[11]In principle the same results could be obtained if all the tables were reversed (i.e., with the injunctive as f_1), but this would have the undesirable effect of implying that indicative mood is not entailed by the marked indicatives and the other modalities are not entailed by the marked modals.

2. In the indicative domain: The indicative blocks the injunctive wherever undesired ambiguity would arise, particularly with respect to the injunctive's performative and remote past interpretations. The injunctive is available when such interpretations are, in fact, desirable, or when the chance for ambiguity is contextually minimized.

An adequate analysis of the injunctive must explain why we find such frequent alternation between specified and underspecified forms in the indicative domain but relatively little in the modal domain (except for the generic-habitual use, discussed below).

Crucially, ambiguity of the injunctive only arises when the reference time is non-past. Tense and mood are mutually exclusive categories in Vedic generally (Kiparsky 2005: 230), and there are no past modal functions of the injunctive of the type 'should have done' (vel sim.), nor do we typically find modal uses of the injunctive in subordinate clauses (Kiparsky 2005: 223–4 with further references). The generic-habitual interpretation is likewise unavailable in past time: It cannot mean 'such and such used to happen/be true', only 'such and such always happens/is true'. This means that the injunctive in a robustly narrative or mythic context can only have one time reference: past, and only one modality: indicative. All other possible interpretations of the injunctive—performative, generic-habitual, prospective, potential, deontic—only apply outside of past contexts. This remains true even in the absence of marked indicative forms in the local discourse, as we have seen in example (6a) above. Because the chance for ambiguity is minimal in such contexts, the injunctive is allowed to occur, apparently favoring "ECONOMY" over "EXPRESSIVENESS" in Kiparsky's (2005: 227) terms.

Yet an interesting distributional fact about the indicatival uses of the injunctive is that the aorist injunctive occurs with considerably more frequency in past narration than does the present injunctive (cf. (4) above). Taking the second book (Maṇḍala) of the *Ṛgveda* as a sample, the present injunctive with remote past reference is less than a fifth as common as the imperfect in the same meaning. This makes good sense for the present system, since the present injunctive has a more marked counterpart that regularly refers to remote past events, namely the imperfect indicative. Accordingly, this is the optimal form for use in past narration, with EXPRESSIVENESS outranking ECONOMY.

In the aorist system, however, the marked indicative does not regularly refer to remote past events. Instead, it typically has resultative perfect meaning (Kiparsky 1998), while the aorist injunctive is frequent in past narration (Avery 1885). In *RV* II, for instance, the ratio of injunctive to augmented aorists with remote past reference is nearly two to one, while the ratio of augmented to injunctive aorists with resultative perfect meaning is nearly seven to one.[12] The strong preference for the injunctive to refer to the remote past can be explained by reference to the available alternatives. If the speaker wishes to use an aorist in sequential past narration, the indicative is a fairly poor choice, since it is typically associated with resultative perfect meaning. The injunctive, having no such association, is the better choice in that it provides the best chance for the intended meaning (remote past) to be recovered

[12]For the readings on which these figures are based, and the methods used to obtain them, see Hollenbaugh 2021.

by the addressee.

So, unlike the present system, in the aorist system using the underspecified form actually makes the intended meaning more easily recoverable than would the more marked form. This gives the appearance of ECONOMY outranking EXPRESSIVENESS when the aorist is used to refer to remote past events, though in fact clarity of expression is still being favored in this case *by means of* underspecification. Thus we commonly find examples like (4a) above, where the aorist injunctive is used alongside imperfect indicatives in sequential past narration, and (6a), where the aorist injunctive is used on its own in the same meaning. In the present system, on the other hand, using the injunctive offers no particular benefit in terms of clarity of expression, and examples like (4b), where the present injunctive alternates with the imperfect indicative, are comparatively infrequent. In general, EXPRESSIVENESS is favored over ECONOMY: When no clarity of meaning stands to be gained by using the morphologically briefer form, the more specific one is preferred, even where context makes the time reference clear.

The blocking processes that give rise to these readings may be analyzed in terms of Horn strategies. The remote past interpretation of the aorist injunctive can be represented as in Table 4. Here I use /á-takṣ-an/ 'they have fashioned' to represent the aorist indicative in its resultative perfect meaning (as at *RV* VII.7.6b) and /tákṣ-an/ 'they fashioned' to represent the aorist injunctive in its preterital function (as in (6a) above). The aorist indicative is the stereotypical form associated with resultative meaning (Kiparsky 1998), making it our f_1 in this case. It will accordingly be preferred in the resultative meaning (m_1), while the aorist injunctive (f_2) is weakly optimal for non-resultative perfective meaning (m_2). Table 4 thus captures the intuition that the aorist injunctive is used to express a meaning for which the aorist indicative is generally unavailable.

	m_1: [resultative pfv.]		m_2: [non-resultative pfv.]
f_1: /á-takṣ-an/	✓	⟵	✗
	↑		↑
f_2: /tákṣ-an/	✗	⟵	✓

Table 4: Interpretations of aor. ind. and aor. inj. for the feature [resultative pfv.]

The apparent change in aspect between the augmented and injunctive aorist that emerges due to Table 4 provides an explanation for Avery's (1885: 330) observation (137 years after he observed it) that, when the injunctive is used "in a historical sense" (= past narrative), the distinction "between imperfect and aorist" tends to be "obliterate[d]." That is, the aorist seems to lose its a resultative aspect when it occurs in past narration, where the imperfect is wont to occur. But given Table 4, this turns out to be only illusory: The aorist indicative is generally disfavored in past narrative contexts, due to its association with resultative meaning, and so the better alternative for expressing remote past meaning, if the aorist stem is to be used at all, is the aorist injunctive. This gives rise to the appearance that stripping the aorist of its augment neutralizes the aspectual distinction between the aorist and the imperfect (or present injunctive).

Outside of sequential narrative contexts, all readings available to the injunctive are, in principle, equally possible. These include remote past, generic-habitual, performative, and modal. I begin with the remote past interpretation. We find the present injunctive having remote past reference in passages like (8), the opening to a hymn about Agni which focuses on his relationship with the gods, who begot him (*janayanta*) in the distant past (see discussion in Jamison & Brereton 2014: 780).

(8) REMOTE PAST PRS. INJ. NOT IN SEQUENTIAL NARRATION
āsánn á pā́traṁ ***janayanta***
mouth.LOC.SG.N to drinking.cup.ACC.SG.N birth.CAUS.PRS.INJ.ACT.3PL
devā́ḥ
god.NOM.PL.M
'As a drinking cup to their mouth the gods **begot**$_{[\text{PRS.INJ.}]}$ (him) [=Agni]' (*RV* VI.7.1d).

Of course, context plays a role in determining the reference time of *janayanta* here, but in the absence of sequential narration (this is the first finite verb of the hymn) the use of the injunctive cannot be explained simply as a contextual neutralization.

The past tense interpretations of the present injunctive in such cases may be understood as arising in contrast to the present indicative. The relevant feature here is [present], our m_1. As the form stereotypically associated with this meaning, the present indicative is our f_1, which I represent with /hán-ti/ 'slays' in Table 5. Because the present indicative is the form best suited to present meaning, it blocks the corresponding injunctive, /hán-t/ 'slew', from having a [present] interpretation. For its part, the present injunctive (f_2) is weakly optimal in the meaning [non-present] (m_2), and so is interpreted as having past time reference.[13]

	m_1: [present]		m_2: [non-present]
f_1: /hán-ti/	✓	⟵	✗
	↑		↑
f_2: /hán-t/	✗	⟵	✓

Table 5: Interpretations of prs. ind. and prs. inj. for the feature [present]

This is meant to capture the intuition that if a speaker chooses to use a present injunctive where the present indicative could have been used refer to present time, the intended meaning must be something opposite to [present] for which the present indicative is ill-suited, namely [non-present]. Such a case is found in *RV* VIII.29, discussed below, where the prs. inj. *manvata* '(the poets) thought up' occurs only once (10a) in a hymn otherwise dominated by the present indicative. Standing in contrast to the present indicative, the underspecified injunctive form receives its distinctly preterital function. A further prediction of this analysis is that the present injunctive will be preferred to the present indicative in

[13]This could equivalently be represented as a [non-past] vs. [past] distinction. A future interpretation is ruled out by the existence of a marked future tense in Sanskrit.

contexts where English would have the so-called historical present, as is in fact the case (see Kiparsky 1968: 37–41). For its part, the aorist injunctive with remote past reference in non-narrative contexts (e.g., *RV* I.148.1a) may be derived as in Table 4 above.

Yet there is also the performative use of the aorist injunctive. This must likewise arise by contrast to the aorist indicative, which, as discussed above, regularly has resultative perfect meaning. That this is so is evident from pairs like *prá vocam* 'I (hereby) proclaim' (e.g., *RV* I.32.1a) vs. *prá avocam* 'I have proclaimed' (*RV* IV.45.7a) or *takṣam* 'I (hereby) fashion (this hymn)' (VI.32.1d) vs. *átakṣāma* 'we have fashioned (this hymn)' (*RV* X.39.14b). The performative aorist injunctives regularly come at the beginning of the hymn, referring to the speech act of the poet as it is accomplished, whereas the aorist indicatives occur in hymn-final summary verses, in reference to what the poet has just accomplished.

Unlike the aorist system, the present system again has a temporally specified form compatible with performative meaning, namely the present indicative. Just as the imperfect is more common than the present injunctive for remote past reference, the present indicative is far more common in the performative function than the present injunctive, of which no clear cases are known to me. The present indicative and aorist injunctive even alternate in this function within the same passage, as in (9).[14] We see again that where a more highly specified form exists to express a particular meaning, it is used (sc. present indicative), while the underspecified form is used when its specified counterparts are ill-suited to the intended meaning (sc. aorist injunctive).

(9) PERFORMATIVE AORIST INJUNCTIVE AND PRESENT INDICATIVE
prá *te* ***yakṣi*** ***prá*** *te* ***iyarmi***
forth 2SG.DAT sacrifice.AOR.INJ.MID.1SG forth 2SG.DAT send.PRS.IND.ACT.1SG
mánma
thought.ACC.SG.N
'I **begin the sacrifice**$_{[\text{AOR.INJ.}]}$ to you (and) I **propel**$_{[\text{PRS.IND.}]}$ my thought to you' (*RV* X.4.1a).

The performative function of the aorist injunctive may be derived as in Table 6. The resultative perfect use of the aorist indicative can be understood as a specific kind of past tense interpretation.[15] Competition between the aorist indicative and aorist injunctive with respect to the feature [past] will lead to the injunctive having a [non-past] interpretation. Non-past perfectives are a cross-linguistically common means of expressing performativity (Fortuin 2019: 20–29), as we find in Ancient Greek (Bary 2012). I therefore take the performative use of the aorist injunctive in the *Ṛgveda* to arise in precisely this way. Here I use as an exemplar the aor. ind. /prá á-voc-am/ 'I have proclaimed' (as at *RV* IV.45.7a) and the aor. inj. /prá vóc-am/ 'I (hereby) proclaim' (as at *RV* I.31.1a).

[14]The opposite order (present indicative followed by aorist injunctive) occurs at *RV* X.85.25ab.

[15]On the perfect readings being a subset of those available to a more general past perfective see Condoravdi & Deo 2014: 266.

	m_1: [past]		m_2: [non-past]
f_1: /prá á-voc-am/	✓	⟵	✗
	↑		↑
f_2: /prá vóc-am/	✗	⟵	✓

Table 6: Interpretations of aor. ind. and aor. inj. for the feature [past]

Similarly, we find the injunctive in its generic-habitual meaning standing in deliberate contrast to the indicative referring to the recent past in (10). The opening of *RV* V.45 is given in (10a), and the ending of the same hymn is given in (10b). As Jamison & Brereton (2014: 718–19) explain in their introduction to this hymn, the opening (10a) employs several injunctives in reference to "the *ideal* sunrise to which the poet aspires," whereas the conclusion (10b) has augmented indicatives in reference to today's sunrise, "making it clear that the sunrise there has indeed (just) occurred."

(10) CONTRASTIVE GENERIC-HABITUAL AOR. INJ. AND RECENT-PAST AOR. IND.

a. *vidā́* *divó* *viṣiyánn*
knowledge.INS.SG.N sky.GEN.SG.M unbind.PTPL.PRS.ACT.NOM.SG.M
ádrim *ukthaír* *āyatiyā́*
stone.ACC.SG.M hymn.INS.PL.N go.PTPL.PRS.ACT.GEN.SG.F
uṣáso *arcíno* ***guḥ***
dawn.GEN.SG.F radiant.NOM.PL.M come.AOR.INJ.ACT.3SG
ápā-vṛta *vrajínīr* ***út*** *súvar*
un-cover.AOR.INJ.MID.3SG having.enclosures.ACC.PL.F up sun.NOM.SG.N
gād . . .
come.AOR.INJ.ACT.3SG

'Through knowledge unloosing the stone of heaven with hymns—the shining (beacons) of the approaching dawn **come**$_{[\text{AOR.INJ.}]}$ (out of it)—
he **uncloses**$_{[\text{AOR.INJ.}]}$ (the doors) to the enclosures: the Sun **comes up**$_{[\text{AOR.INJ.}]}$. . . ' (*RV* V.45.1a–c).

b. ***ā́*** *sū́riyo* ***aruhac*** *chukrám*
hither sun.NOM.SG.M ascend.AOR.IND.ACT.3SG bright.ACC.SG.N
árṇo ***áyukta*** *yád dharíto*
flood.ACC.SG.N yoke.AOR.IND.MID.3SG since golden.ACC.PL.F
vītáp̥ṛṣṭhāḥ
having.flat.back.ACC.PL.F

'The Sun [i.e., of today] **has mounted**$_{[\text{AOR.IND.}]}$ the gleaming flood, now that he **has yoked**$_{[\text{AOR.IND.}]}$ his golden, straight-backed (horses)' (*RV* 10ab).

It is no coincidence that the generic-habitual injunctives in (10a) are all aorists, seeing as the present injunctive tends to be dispreferred to the present indicative to express the generic-habitual meaning (despite examples like (6b) above). For example, in *RV* VIII.29, a riddling hymn that describes characteristic actions of various gods in each verse, the

present indicative is uniformly used throughout (along with a few perfect indicatives). The present injunctive occurs in this hymn only once, in the final verse (10a), where it is past referring (*manvata* '(the poets) thought up') preceding the imperfect indicative *arocayan* 'they caused (the sun) to shine'. Accordingly, we often find the present indicative occurring side by side with the aorist injunctive in the generic-habitual function, with apparently identical meaning, as in (3) above (for further examples see Hoffmann 1967: 113–6). As in the case of the performative and remote past functions, the present injunctive is generally dispreferred to its more marked counterpart. Yet this situation does not hold for the aorist, as the aorist indicative has no generic-habitual function, so the injunctive is the only viable option if the aorist stem is to be used. I defer further discussion here, since, in order to adequately account for the generic-habitual reading we must first examine the injunctive with respect to the modal domain.

The regular indicative interpretation of the injunctive may be accounted for by assuming that the marked modal forms block the application of the injunctive wherever possible with respect to the feature [modal], as shown in Table 7. Here I use the prs. sbjv. /hán-a-t(i)/ '(s)he will slay', prs. opt. /han-yā́-t/ 'may (s)he slay', and prs. imp. /hán-tu/ 'let him/her slay' as representative of the marked modal forms (f_1).

	m_1: [modal]		m_2: [non-modal]
f_1: /hán-a-t(i)/, /han-yā́-t/, /hán-tu/	✓	←	✗
	↑		↑
f_2: /hán-t/	✗	←	✓

Table 7: Interpretations of modal and inj. forms for the feature [modal]

As noted above, certain kinds of stem formations, particularly among the aorist paradigms, lack marked modal forms of one kind or another. In such cases no blocking can apply and the injunctive is predicted to be used modally, as we in fact find. Its modal interpretation can be understood as arising from contrast to the indicative, which is explicitly marked by the augment. In competition with the augmented form, the injunctive form is the weakly optimal candidate for a non-indicative interpretation. Whether this is realized as having imperative, optative, or subjunctive (future) force will depend on what the rest of the verb's paradigm looks like. For instance, aor. ind. 2sg. /ádās/ 'you have given' has corresponding subjunctive and optative forms attested (i.e., built to the same aorist stem) but lacks a corresponding imperative. Accordingly, the injunctive takes on the imperative function rather than one of the other two logically possible modal functions. I represent this blocking relationship in Table 8, using as an examplar the aor. inj. /á-dā-s/ 'you have given' and its injunctive counterpart /dā́-s/ 'give!'. I name the relevant feature here [indicative] for consistency with the foregoing tables, though this could equivalently be represented as a [non-modal] vs. [modal] distinction.

	[indicative]		[non-indicative]
á-dā-s	✓	⟵	✗
	↑		↑
dā́-s	✗	⟵	✓

Table 8: Interpretations of aor. ind. and aor. inj. for the feature [indicative]

The generic-habitual use of the injunctive requires special consideration. One option would be to assume that this is a [non-past] interpretation of the injunctive derived along the same lines as in Table 6 above. While possible, such an analysis would leave certain facts unexplained. First, Hoffmann (1967: 130–4) has observed that the injunctive is not typically used to refer to eventualities in progress at the time of speech ("aktuelle Gegenwart"). With few exceptions (cf. Hollenbaugh 2021: 230–7), the injunctive's presential interpretations are limited to the generic-habitual use (unlike the present indicative). Second, given the analysis so far, it will not do to simply say that the generic-habitual injunctive is non-past referring, since in that case the aorist would be predicted to have its performative function (present perfective). Third, the generic-habitual interpretation of the injunctive is often called "timeless," being delinked from any particular time reference rather than strictly present.

For these reasons, I follow Boneh & Doron (2008, 2010) in classifying the generic-habitual reading as a kind of modal interpretation. This means that the generic-habitual reading of the injunctive may be derived along the lines of Table 8 above, by means of contrast with the augmented forms. Yet, unlike all other modal interpretations of the injunctive, there is no marked modal form that serves a generic-habitual function. As a result, the generic-habitual reading of the aorist injunctive is uniquely unconstrained among its modal uses, and any aorist injunctive may in principle have this meaning, irrespective of paradigmatic gaps. The present injunctive, however, will be blocked in the generic-habitual function by the present indicative. The latter is accordingly predicted to be preferred in this function, as is in fact the case (discussed above).

4 Conclusion

In conclusion, the injunctive, being underspecified for tense and mood, acquires all of its temporal and modal specifications contrastively. Its remote past interpretations arise by contrast to the marked present or aorist indicative (Tables 4 and 5). The performative interpretation of the aorist injunctive arises by contrast to the aorist indicative (Table 6). The indicative interpretations of the injunctive arise by contrast to the marked modals (Table 7). The modal interpretations of the injunctive, when not blocked by the existence of a corresponding marked modal form in the paradigm, arise by contrast to marked indicatives (Table 8). The generic-habitual function, being a modal interpretation, is always available to the aorist injunctive, since no marked modal form is specified for this function. Yet the present injunctive is of limited occurrence in this function, due to the existence of the present indicative, which is used instead.

The fact that the injunctive frequently co-occurs with indicative forms but has modal functions only in the event of a paradigmatic gap has been explained by observing that using the injunctive often makes the intended meaning clearer than would using the corresponding indicative. There is thus an incentive to use the injunctive for greater clarity in the indicative domain, and no such incentive in the modal domain (excepting the generic-habitual function). The aorist injunctive is used to refer to the remote past because its corresponding indicative generally does not, whereas in the present system the imperfect is prefered over the present injunctive, since there is no communicative benefit to underspecification beyond ECONOMY. Likewise, the injunctive aorist is used to express the performative meaning, for which its corresponding indicative is ill-suited. Meanwhile, in the present system, we regularly find the present indicative in this function, which is perfectly well suited to being performative, rather than the injunctive. Again, where a more highly specified form exists, it tends to be used. Finally, the aorist injunctive is used in generic-habitual contexts, because no modal form expresses this meaning. As expected, the present injunctive is comparatively uncommon in this function, since (unlike the aorist) it competes with a marked indicative form that is also compatible with the generic-habitual meaning, namely the present indicative.

The interpretation of the injunctive thus depends on one's awareness that it is *not* the indicative or a marked modal form. In this sense, the injunctive's distinctive readings can be understood to arise by virtue of what they are not. Paradoxically, then, precision of expression is sometimes achieved not by overt specification but by the judicious use of an underspecified form.

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Acoustic phonetic properties of p-words and g-words in Sora

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ABSTRACT

This paper presents the first analysis of the intonational properties of polysyllabic verbal forms in Sora, a mildly polysynthetic language belonging to the Munda language family of India. The data indicate the previous claims on Sora cannot be maintained, and the language in no sense reflects a Quantity Sensitive trochaic pattern of prominence assignment.

1 Introduction

Sora is a Munda language spoken by ca. 400,000 people mainly in southern Odisha and adjacent parts of northern Andhra Pradesh as well as in diaspora primarily in tea gardens in Assam and West Bengal, as well as Tripura, Bangladesh, etc. Morphologically, Sora can be described as mildly polysynthetic and agglutinative (in terms of grammatical words), which often consist of multiple morphemes. However, it is well known that mismatches in p-words and g-words are common in polysynthetic languages. Until very recently, g-words in Sora have not been analyzed phono-prosodically; this process is currently underway. This study is the first step to understanding the phonetic properties of g-words in Sora.

Previous work on Sora has presented a confusing array of perspectives. The original comments on the system of prominence in Sora comes from Gidugu (1931), who suggests that the pattern is not phonologically driven *per se*, but rather there is morphologically conditioned stress (or it may be conditioned morpho-lexically). In a series of papers, Donegan & Stampe (1983, 2004) and Donegan (1993) Donegan (1993) claim that Sora rather is an example of a Quantity Sensitive trochaic stress pattern, the development of which was allegedly driven by language contact at the Proto-Munda level, and this in turn triggered the alleged shift from an iambic pattern to a trochaic one. The latter claim has been proven to be inaccurate by instrumental and statistical data (Horo, 2017; Horo et al., 2020) for disyllabic words of any structure (underived, inflected). The former view of Gidugu is currently being subjected to rigorous testing and we report here some of those preliminary results.

In the following sections we detail our study. In section 2 we address what has become to be considered the traditional view of Sora of Donegan and Stampe subsumed under a heading of a theory called 'rhythmic holism' and why this cannot be maintained. In 3 we introduce the system of vowels attested in Sora. In 4 we review our instrumental conclusions on disyllables and we present an interim summary of the facts about Sora vs. the received fiction about the language. In section 5 we introduce the concept of p-words

and g-words and detail to what degree these can be shown to overlap and where mismatches might occur. Section 6 details the data collection and analyses we undertook. Section 7 presents these findings focusing on trisyllabic and tetrasyllabic g-words in Sora. Section 8 summarizes the findings.

2 The fallacy of rhythmic holism

The theory of rhythmic holism (Donegan & Stampe, 1983, 2002, 2004; Donegan, 1993) asserts that there is a fundamental rhythmic organization of languages that dictates structural typology ranging from the realization of phonemes to the organization of morphosyntax, and that this organizational parameter is crucuially sensitive to language contact and macroareal patterns, and indeed defines and explains such patterns. Sora formed the basis of this theory but has only recently been subjected to critical review from the perspective of Sora.

The foundation of the theory is that the languages that belong to the Munda and 'Mon-Khmer' groups of Austroasiatic (the latter now abandoned as a valid taxon within Austroasiatic) are claimed to canonically instantiate and exhibit South Asian [SA] vs. Mainland Southeast Asian [MSEA] typological profiles, with the latter old in Austroasiatic and the former secondary. The claim is that this was caused by a contact-triggered resetting of the rhythm of Proto-Munda from the inherited iambic/rising pattern to a South Asian trochaic/falling pattern. This shift in rhythm allegedly triggered a process of drift that subsequently entailed a complete typological shift in the South Asian Munda languages covering everything from the nature and history of the vowel systems to prosodic features to syntactic phrase structure and use of case markers in the morphosyntax. Such bold statements have been made as "....Munda and Mon-Khmer, and other South and SE Asian languages, do not just differ in structure: they are opposite at every level of structure" (Donegan & Stampe, 2002, p. 112) or "(t)he South Asian (Munda) and South-East Asian (Mon-Khmer) branches of the Austroasiatic language family are perhaps the most divergent in the world. They are opposite in structure at every level." (Donegan & Stampe, 2004, p. 3). Their claims are summarized in Table 1.

To be sure the theory has been well received and extended to other language families that also straddle South and Southeast Asia, *e.g.*, Tibeto-Burman/Trans-Himalayan. It has only recently been assessed critically in light of the attested Munda data in broader historical or comparative light (Ring & Anderson, 2018; Anderson, 2020), where it is shown that the putative dichotomy between SA and MSEA presented by the theory of rhythmic holism glosses over some actually attested facts, and agglutinative structures exist outside of SA in Austroasiatic as well, and Khasian and Nicobaric (both considered 'Mon-Khmer' in the now outdated view of the Austroasitic family) show some SA features too. As just alluded to, the understanding of Austroasiatic linguistic history has significantly advanced since the publication of these articles (Sidwell, 2014) and Munda is no longer considered to be coordinate with the rest of the family. This new research has revealed more complexities and commonalities with Munda languages than previously appreciated and reinforce the fact that Munda is simply one of many co-equal branches of Austroasiatic.

The basis of the theory of rhythmic holism is that Sora - and all Munda languages - underwent a shift from iambic to trochaic word structure, at the Proto-Munda language level presumably. This claim has also only recently been reviewed from the perspective of instrumental phonetics (Horo & Sarmah, 2015; Horo, 2017; Horo et al., 2020; Ring & Anderson, 2018). The results of these instrumental and statistical studies is that none of the attested acoustic cues of prominence, viz., intensity, duration and fundamental frequency, falls on the first syllable, but rather the second one in Sora disyllables. It turns out that this is also true of many other Munda languages (Santali (Horo & Anderson, 2021), Gtaʔ, Remo, Gutob). It is clear that these languages never underwent a shift from iambic to trochaic structure and therefore, nothing else in the history of these languages could be triggered by a shift that never occurred, and more nuanced, periodized and refined accounts for the development of secondary features must be advanced than a one-time resetting of 'rhythm' at the proto-language stage.

3 Sora Vowel Data

Among the claims made previously about Sora that instrumental data has revealed is that rather than a nine-vowel phoneme inventory proposed by Donegan and Stampe, Sora has six vowels, five peripheral vowels and one central vowel. These discrepancies are presented in Table 2.

The lax or lower mid and high central vowels proposed by Donegan and Stampe are attested in Sora, but they are not phonemic. As the second syllable is prominent in disyllables, there is actually a fait bit of inter- and even intra-speaker variation in the realization of the vowels of the initial non-prominent syllable, but the specific realizations of these vary considerably across speakers. This may be the result of a sampling error, with an insufficient number of speakers recorded and without being informed by processes of statistical normalization, etc., and this may have given this false impression that there are nine contrastive vowels, not the six actually attested see Figure 1.

4 Sora word prosody in disyllables

What the instrumental and statistical data reveal is that the vowels in second syllables in Sora disyllables are more peripheral and contrastive than in first syllables where they are more centralized and overlapping in vowel space, see Figure 2. As can be seen in Figure 3, 4 and 5, the three discerned acoustic cues of prominence for Sora, namely vowel duration, vowel intensity and fundamental frequency, all converge on the second syllable in Sora disyllables. Likewise, the smoothed contour graphs show that there is a clear rise in pitch on the second syllable in Sora disyllables; see Figures 6 and 7.

Thus, while the received fiction claimed that Sora has falling or trochaic word prosody, this is clearly false in Sora disyllables. Indeed, the fact is that Sora appears to retain old prosodic word patterns within its larger morphological constructs. Therefore, change in rhythm cannot explain the expansion of agglutination. Moreover, preliminary data suggest

Table 1: Munda and Mon-Khmer Structural differences (Donegan & Stampe, 2004)

	Munda	**Mon-Khmer**
Phrase Accent	Falling (Initial)	Rising (Final)
Word Order	Variable - OV, AN, POstpositional	Rigid - VO, NA, Prepositional
Syntax	Syntactic - subj/obj agreement on verb	Analytic - no inflectional morphology
Word Canon	Trochaic	Iambic, monosyllabic
Morphology	Agglutinative, Suffixing, Polysyntactic	Fusional, Prefixing or Isolating
Timing	Isosyllabic or Isomoraic	Isoaccentual
Syllable Canon	(C)V(C)	Unaccented (C)A, accented (C)(C)V(G)(C)
Consonantism	Stable, Geminate clusters	Shifting, Tonogenetic, Non-geminate, clusters
Tone/Register	Level tone (Korku only)	Contour tones or register
Vocalism	Stable, monophthongal, harmonic	Shifting, diphthongal, reductive

Table 2: Sora Vowel Data

Vowels	Donegan & Stampe (2002)	Horo (2017)	English
i	iɖ-	id-	*scratch*
ə	əɖ-	əd-	*prop*
u	-luɖ-	-luʔ-	ear
ɑ	ɑɖ-	ad-	*drive*
ɨ ∼ ə	ɨɖ-	əʔ-	*fan*
e ∼ i	-eɖ-	-iʔ-	*thorn*
ɛ ∼ e	ɛɖ-	ed-	*roll*
ɔ ∼ o	ɔɖ-	od-	*knead*
o ∼ u	-loɖ-	-lud-	*cord*

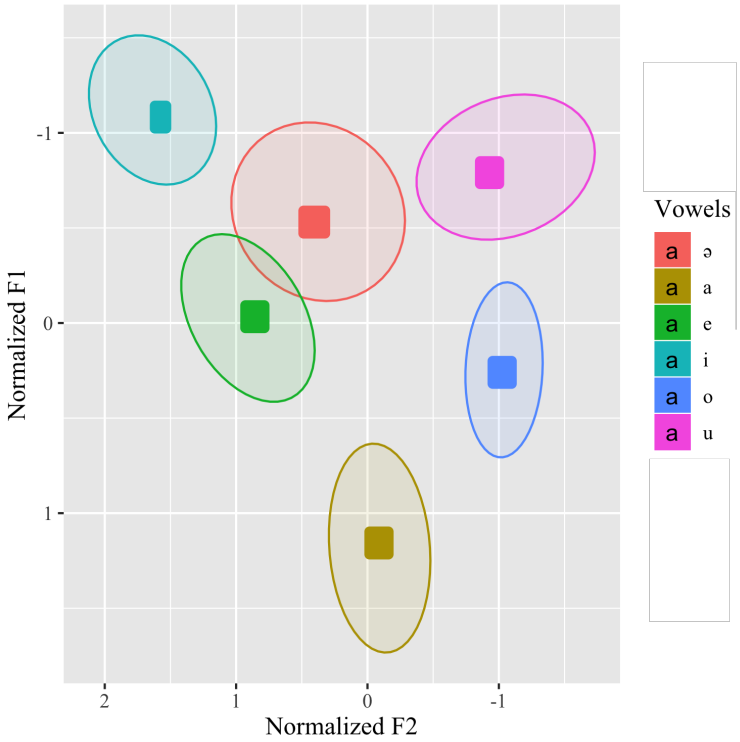

Figure 1: Sora Vowels (Horo et al., 2020)

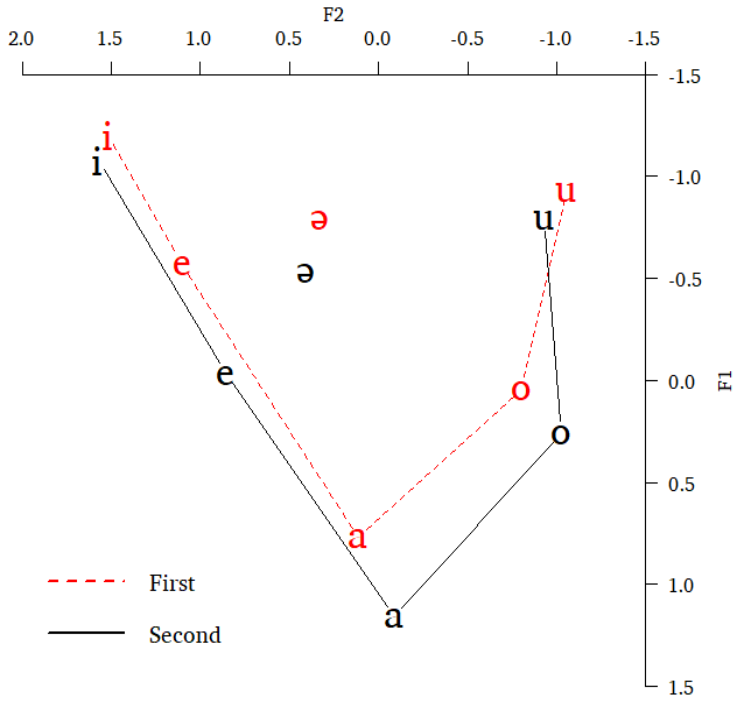

Figure 2: Sora Vowels in disyllables (Horo et al., 2020)

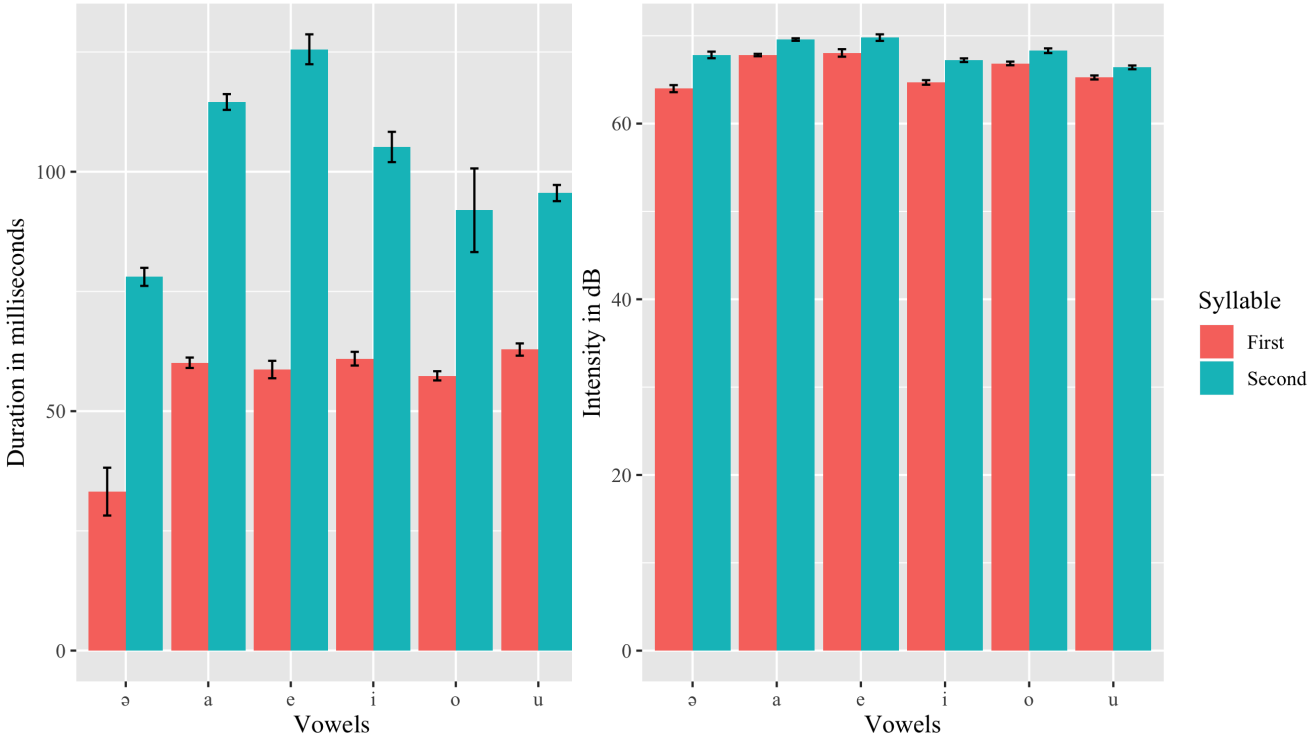

Figure 3: Vowel duration in Sora disyllables (Horo et al., 2020)

Figure 4: Vowel intensity in Sora disyllables (Horo et al., 2020)

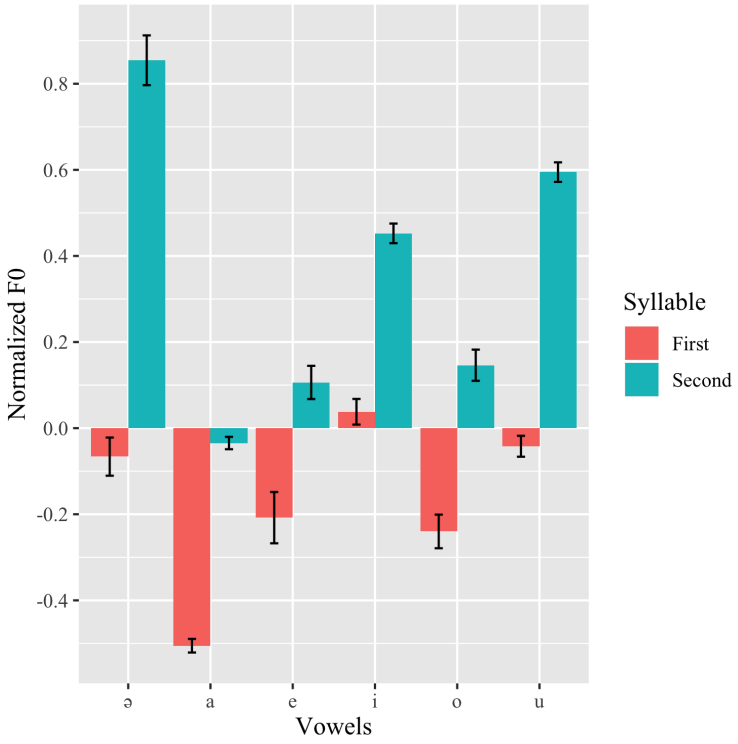

Figure 5: Fundamental frequency in Sora disyllables (Horo et al., 2020)

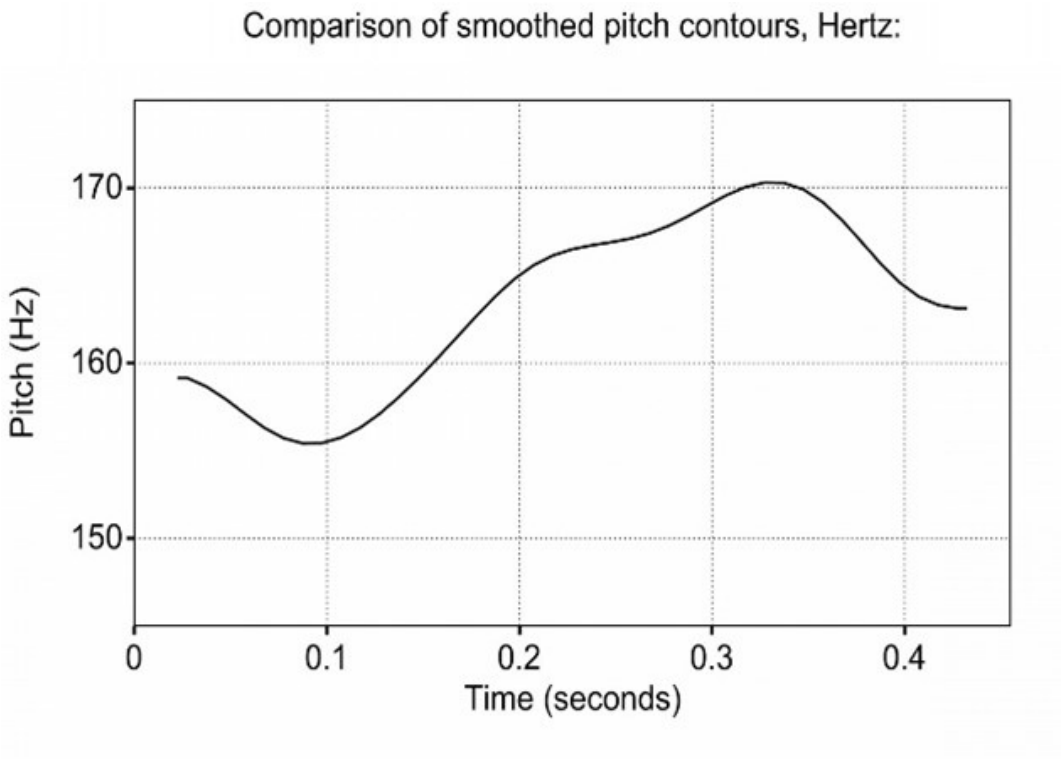

Figure 6: Sora pitch contour in disyllables (Ring & Anderson, 2018)

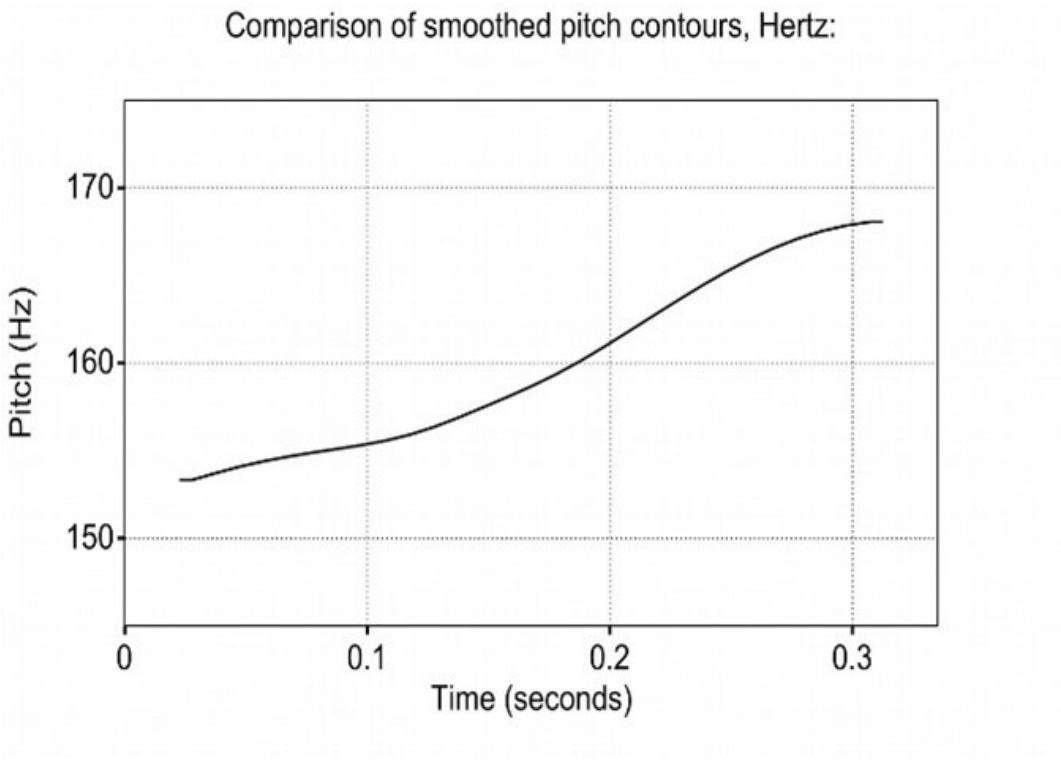

Figure 7: Sora pitch contour in disyllables (Ring & Anderson, 2018)

that many Munda languages have prominence on the second syllable, including Santali, Remo, Gtaʔ, Gutob and Gorum. The same likely is true of Koɽowa, Ho, Mundari, Korku, and Juang, thus spanning the entire genetic spectrum within the Munda family. Note that Kharia (Peterson, 2010) as well has a LH word prosody. It is of course possible that Munda languages show a low pitch first syllable prominent pattern as proposed by Rehberg (2003) for Kharia [L∗H], but the Sora acoustic/phonetic properties mentioned above favoring 2nd syllable over 1st syllable vowels do not support this.

5 P-words and G-words

It is well known that in morphologically complex languages, what is defined as a word grammatically does not always align exactly with what the prosodic or phonological characteristics of the language suggest is a word (Bogolomets & van Der Hulst, in press; Aikhenvald & Dixon, 2020; Bickel & Zúñiga, 2017; Hildebrandt, 2015). Thus, there are sometimes mismatches between p-words and g-words in such languages. One area where this is straightforward is in the placement of subject clitics in Kherwarian Munda languages such as Santali.

(1) Santali (Field Notes)

a. am iɲ=em ɖaɽ=otʃo=ki-d=iɲ=a
2SG 1SG=2SG.SUBJ run-CAUS=TR.PFV-TR=1OBJ=FIN
'you made me run.'

As is seen in example 1a, in Santali, as in most Kherwarian languages, in non-imperative forms, the preferred place for the subject clitic is enclitic to the word immediately preceding the syntactic element functioning as the verb. Morphotactics may reveal the inherently ambiguous nature of some elements with respect to their phono-prosodic vs. syntactic properties in Sora. In example 2a we find what appears to be a possessive prefix, insofar as the element appears to be integrated prosodically with the following word.

(2) Sora

a. ənsəlo-n ə-oʔon
woman-N.SFX POSS-child
'the woman's child.'

b. mari-n ə-daŋgaɖi oʔon
Marie-N.SFX POSS-young.FEM child
'Marie's young daughter.'

But the forms in example 2b suggest a different analysis may be warranted, or that there are phono-prosodic vs. syntactic factors at play here determining the placement of the possessive marker.

Thus, what appear to be phono-prosodic prefixes may turn out to be syntactic proclitics, even if phono-prosodically they are part of the p-word, as we see that the possessive marker

occurs on the left most part of the possessed phrase, including a modifier. These Santali and Sora data are just two subtypes of potential mismatches between phono-prosodically vs. syntactically defined 'words'.

6 Data for this study

Data for the verbal g-words of Sora used in this study were recorded in four villages of Assam: Sessa, Sinrijhan (Sonitpur District) Koilamari (Lakhimpur District) and Lamabari (Udalguri District) from forty people (ten in each village including five male and five female speakers in each location). Data were recorded for nominal g-words of Sora in 2 villages of Gajapati district Odisha (Luhangar, Luhasing) from 2 male and 2 female speakers all with no formal education and in their fifties.

The words were recorded in three contexts, i) in isolation, ii) in a phrasal frame 3a and iii) an explicitly out of focus frame 3b.

(3) a. ɲen _____ gamlai

'I _____ said'

b. ɲen _____ akkarra gamlai dirga idʒdʒa

'I _____ loudly said softly did not'

Data recording was conducted in the field in a noise free environment using a Tascam linear PCM recorder and a Shure unidirectional head-worn microphone connected via XLR jack. The digital data were stored at a sampling frequency of 44.1 kHz and 32 bits in .WAV format.

7 Prominence in polysyllabic g-words in Sora

In the following sections we detail our findings on polysyllabic g-words in Sora focusing for now on trisyllabic nominal forms (7.1), tetrasyllabic nominal forms (7.2) and on trisyllabic and tetrasyllabic verb forms (7.3). Further studies currently ongoing expand this to sequences of five to nine syllables as well.

7.1 Trisyllables

Starting first with trisyllabic nouns, these are of several morphological shapes, but one potentially variable factor in compound nouns involves a combination with a shortened form of the noun used in compounds and incorporated structures known conventionally in Munda linguistics as the 'combining form' [CF]. Compound nouns can have the combining form in final or non-final position. Most are final. Other CFs are related to their corresponding syntactically freestanding and prosodically independent full forms via processes of glottal infixation or reduplication of the combining form to create the full form

[FF], not via compounding or prefixation. See Table 3 examples (i)-(iv). In the discussion that follows we refer to forms as in (iii) as ones with the CF in final position and forms like (iv) as non-final or initial.

In order to see if there was any difference intonationally in these two structural subtypes of compounds we present the data distinguishing these two subtypes. In the following graphs we also divide the data into the three different contexts of elicitation used and enumerated in 3a and 3b above. As can be seen in Figure 8, in the word in isolation context, duration peaks on the second syllable except in the quasi-focal sentential/phrasal frame in forms with the combining form in initial position. Figure 9 shows a somewhat different pattern. Here duration peaks on the final syllable in isolation, but on the second syllable in the phrasal and unaccented contexts. With respect to intensity, here we find a consistent peak on the second syllable across all three recording contexts, regardless of whether the combining form is in final position or not. See Figures 10 and 11. Fundamental frequency shows a different pattern. Fundamental frequency peaks on the second syllable on words in isolation, but on the final syllable on words in the phrasal and unaccented contexts. Like intensity this is true whether the combining form appears in final position or not; see Figures 12 and 13.

Table 3: Sora Combining Forms and Free Forms

	CF	FF	means of deriving FF from CF	gloss
(i)	-si	siʔi	glottal infixation	‘hand’
(ii)	-saŋ	saŋsaŋ	reduplication	‘turmeric’
(iii)	-bun	kəmbun	prefixation	‘pig’
(iv)	-boŋ	boŋtel	compounding	‘buffalo’

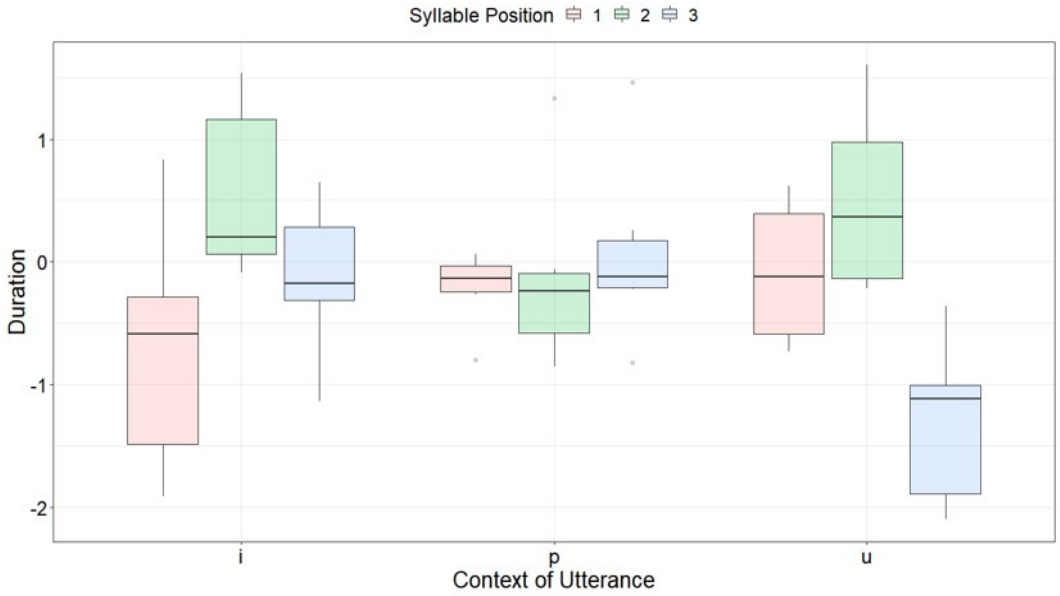

Figure 8: Vowel duration in Trisyllables

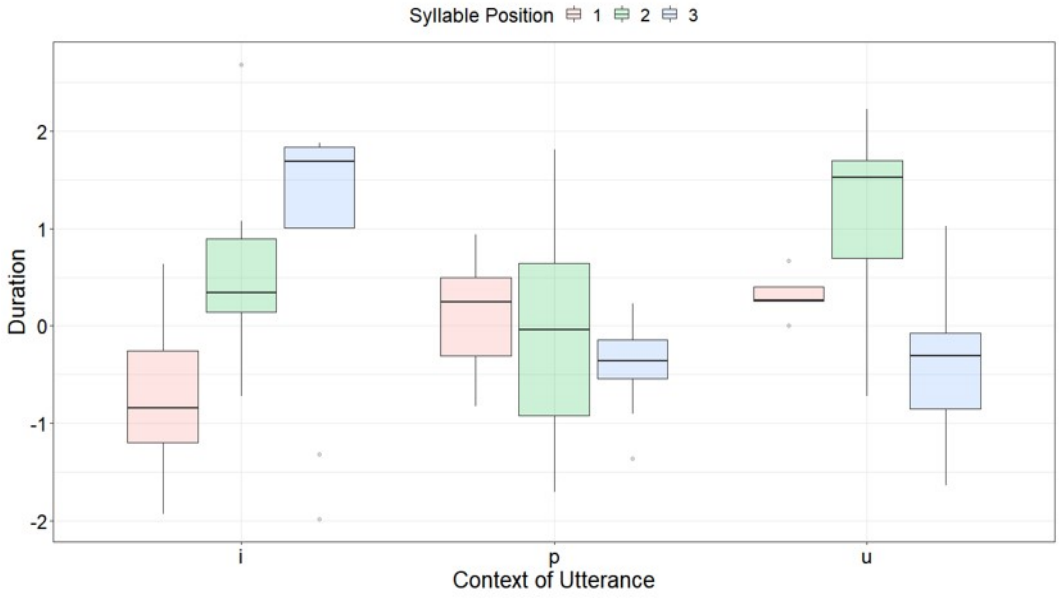

Figure 9: Vowel duration in Trisyllables

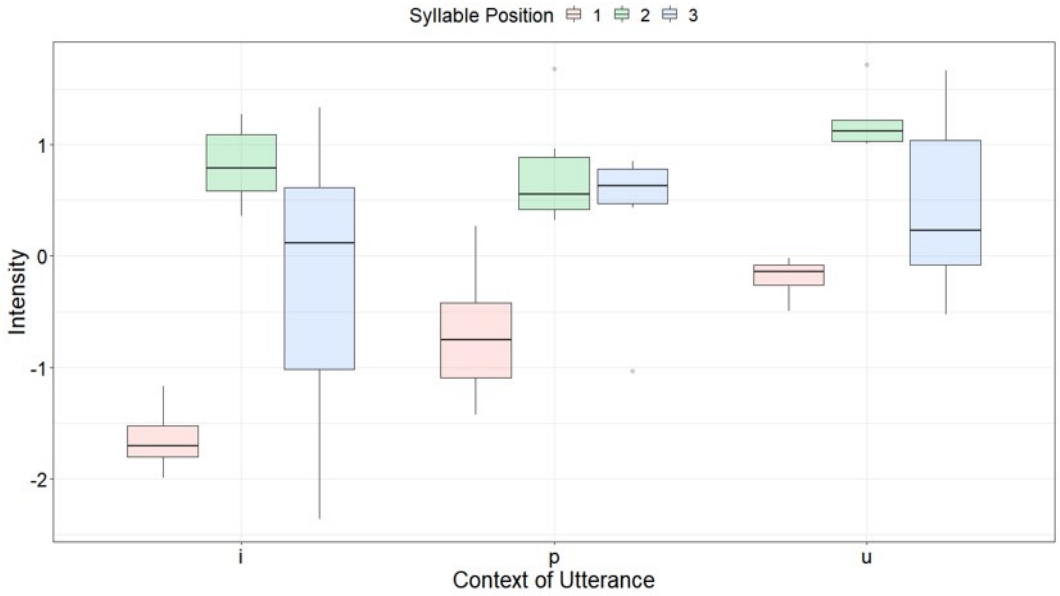

Figure 10: Vowel intensity in Trisyllables

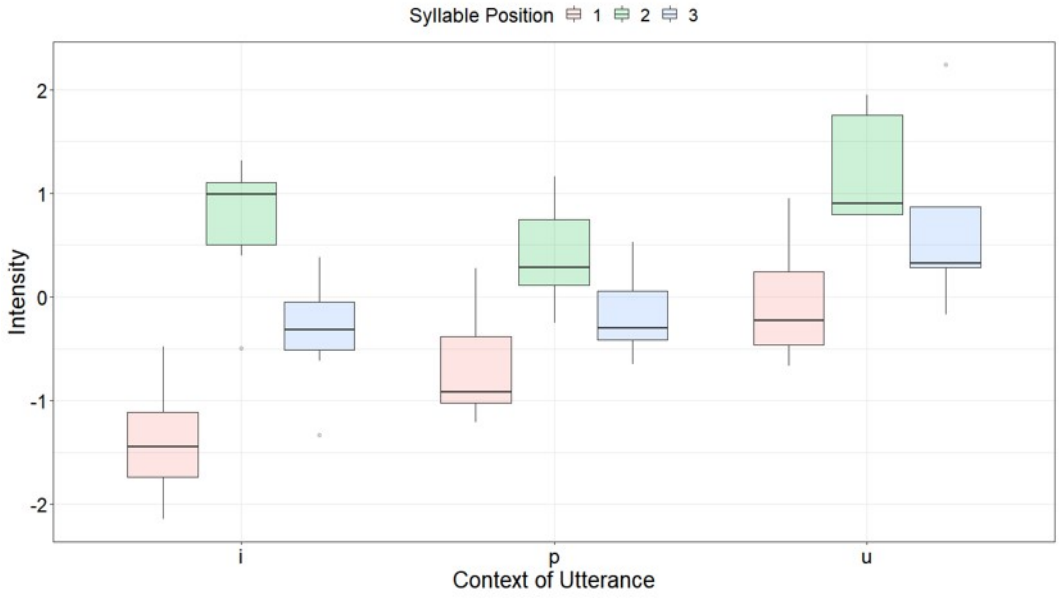

Figure 11: Vowel intensity in Trisyllables

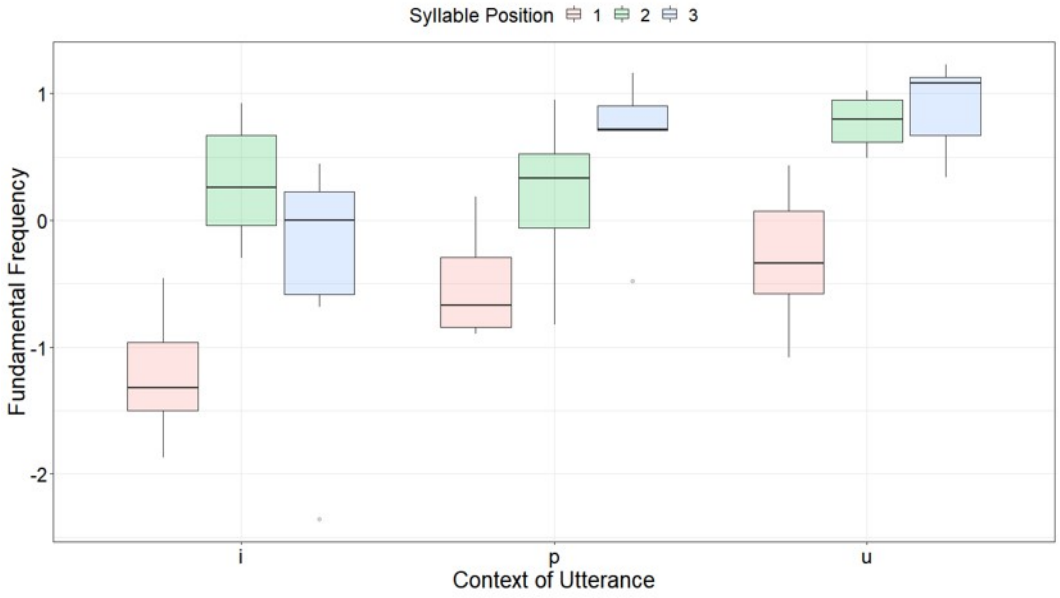

Figure 12: Fundamental Frequency in Trisyllables

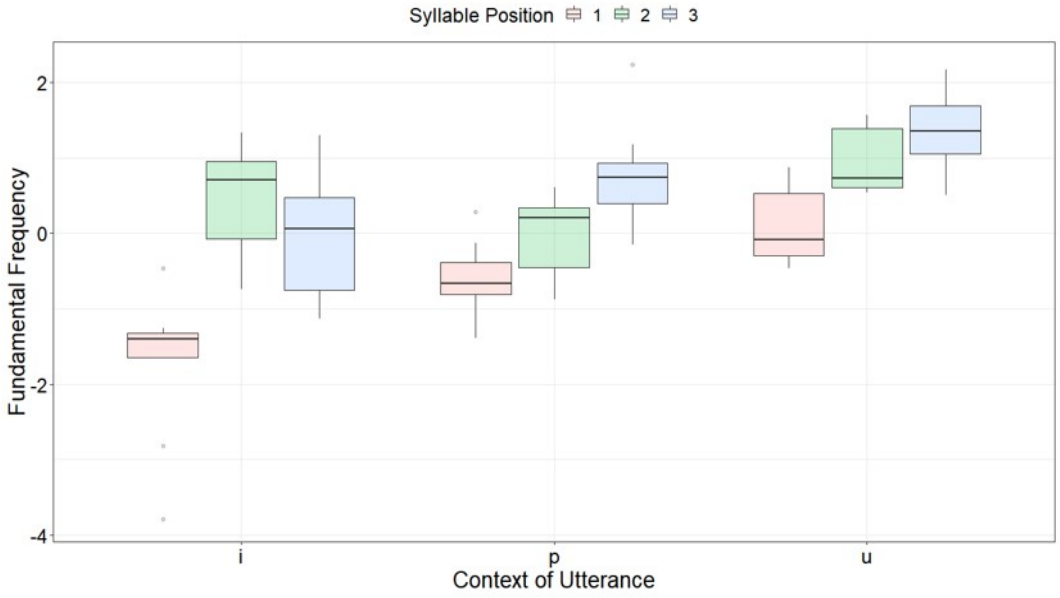

Figure 13: Fundamental Frequency in Trisyllables

7.2 Tetrasyllables

For tetrasyllabic inflected nouns, plural forms were used to keep the data consistent across all contexts. With respect to the acoustic cue of duration (Figure 14), in both isolation and the quasi-focal phrasal context we find a peak on the final syllable, while in the unaccented frame the peak is on the second syllable. Intensity patterns identically to the trisyllabic forms: Across all three contexts the peak in intensity is on the second syllable (Figure 15). Fundamental frequency in Sora tetrasyllabic nouns shows a distinct pattern. In both the isolation and unaccented contexts, the peak is on the third syllable while in the quasi-focal phrasal frame it is rather on the last/fourth syllable where the peak is typically found (Figure 16).

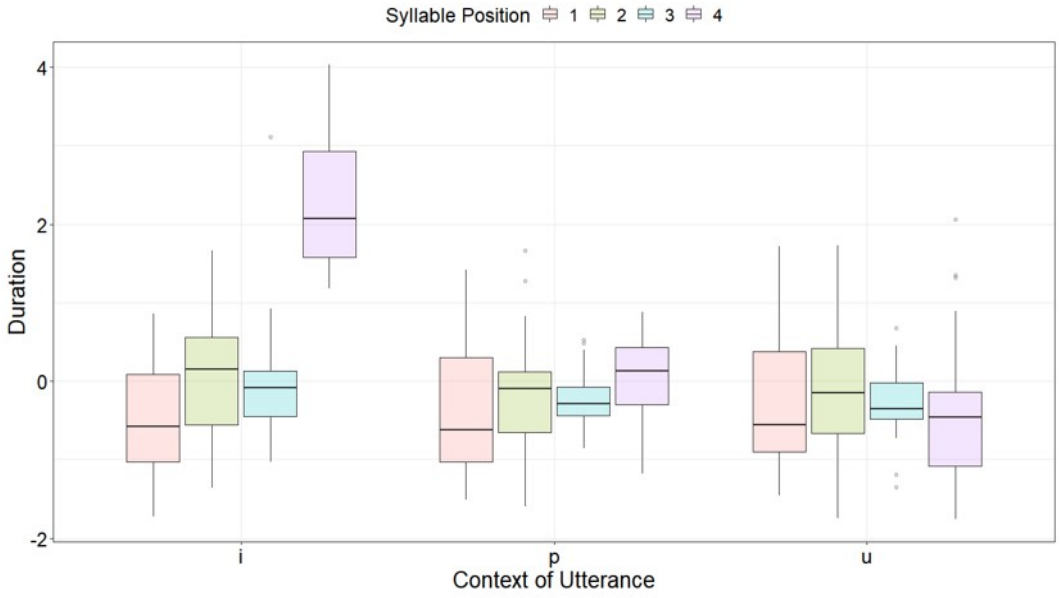

Figure 14: Vowel duration in Tetrasyllables

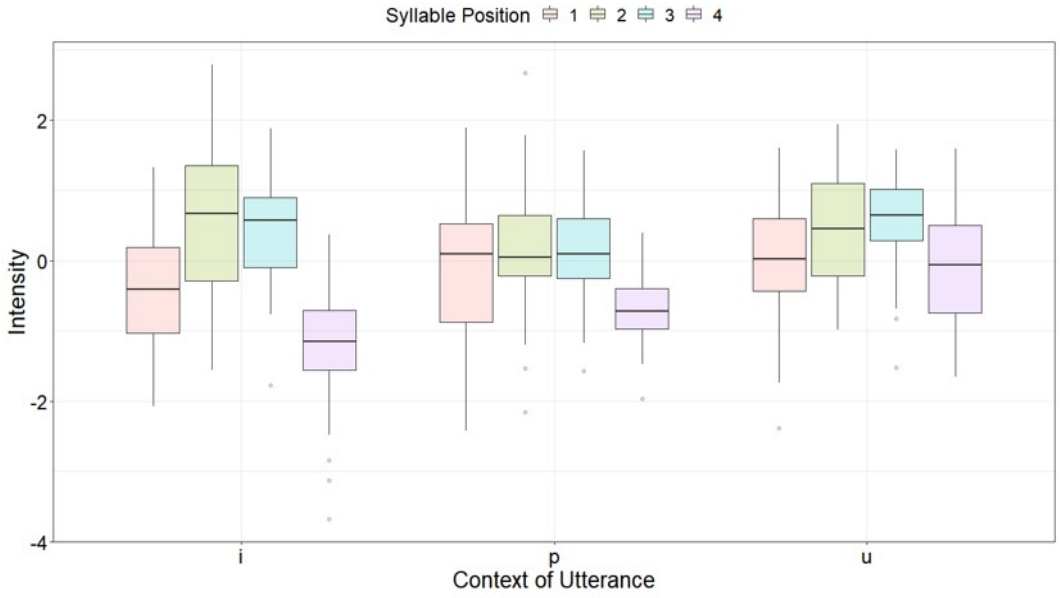

Figure 15: Vowel intensity in Tetrasyllables

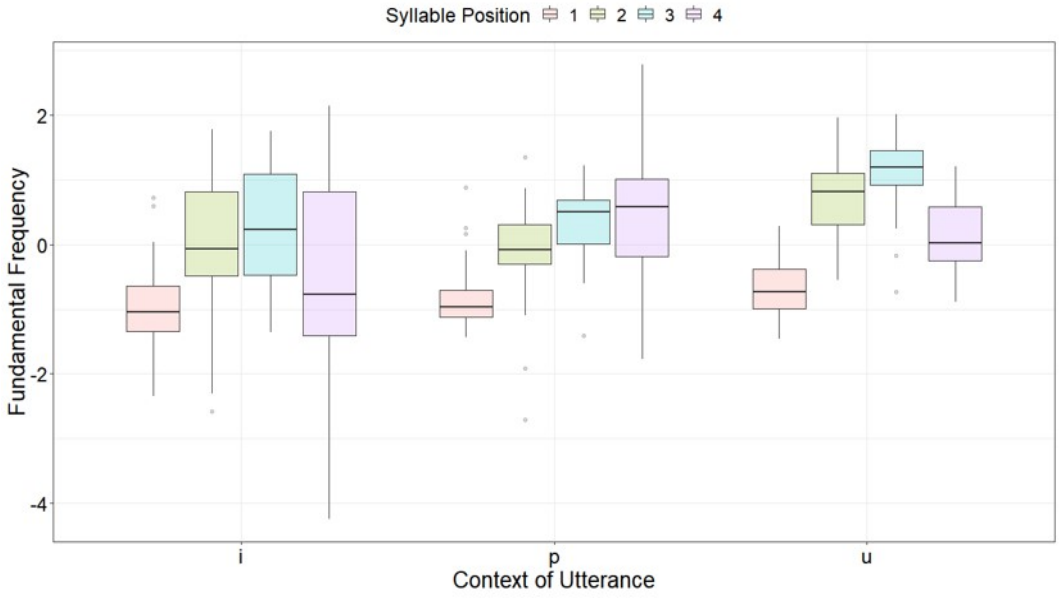

Figure 16: Fundamental frequency in Tetrasyllables

7.3 Verb forms

Before detailing the data with respect to the Sora trisyllabic and tetrasyllabic verbal forms, we first should give a very brief introduction to the Sora verb template, since as in most polysynthetic languages, it is the verb where most of the morphology is found. The verb in Sora consists of a verb stem (itself potentially simplex or derived by a voice prefix or infix), potentially proceeded by two prefix slots and up to nine suffixes or enclitic slots (see Table 4). No verb form ever has every slot filled. But given this structure, it is very easy to generate polysyllabic verb forms. For the present study we limit ourselves to discussing trisyllabic and tetrasyllabic verbs in Sora. Larger forms are presently being analyzed.

First turning to trisyllabic forms, one finds a clear peak of duration on the final syllable in Sora verbal forms of this length; see Figure 17. Perhaps unsurprisingly given the discussion of nouns above, intensity peaks on the second syllable in Sora verbs as well. This is shown in Figure 18. With respect to the pitch patterns found in Sora trisyllabic verbs, there is a clear peak in fundamental frequency on the third syllable; see Figure 19.

Turning now to tetrasyllabic verbs, we can make the following preliminary observations: The final syllable is the locus of the peak of duration in Sora tetrasyllabic verb forms; see Figure 20. Intensity shows the identical patterning to that in trisyllabic verbs and in both trisyllabic and tetrasyllabic nouns in Sora: it always peaks on the second syllable. This is graphically demonstrated in Figure 21. The pattern of fundamental frequency in Sora tetrasyllabic verb forms shows a different pattern. Figure 22 shows that the peak of fundamental frequency is on the third (penultimate) syllable. Thus, by far the most consistent cue in its distribution across these forms is the correlation of peak in intensity and the second syllable.

Table 4: Sora Verb Template

Position of Affixes	Function of Affixes	Position of Affixes	Function of Affixes
+2	1/2PL:SUBJ	-4	ITR/MDL
+1	NEG	-5	OBJ
0	verb.stem[1]	-6	1SG/PL:SUBJ/PST.INSTV
-1A	CF1	-7	3PL
-1B	CF2	-8	MOD/NFIN/1DL
-2	REFL	-9	COND
-3	TNS		

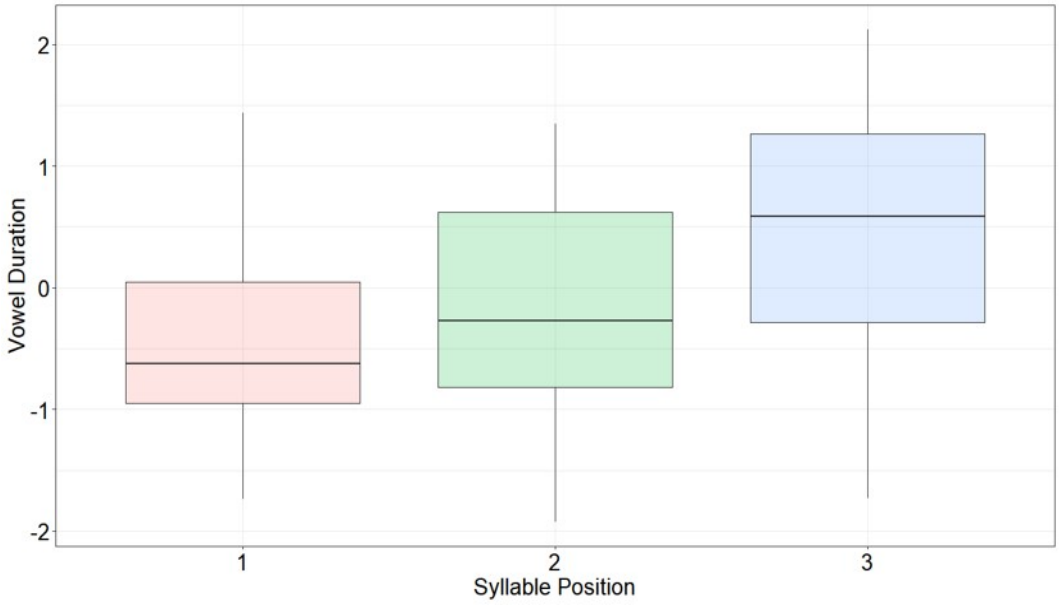

Figure 17: Vowel duration in trisyllabic verbs

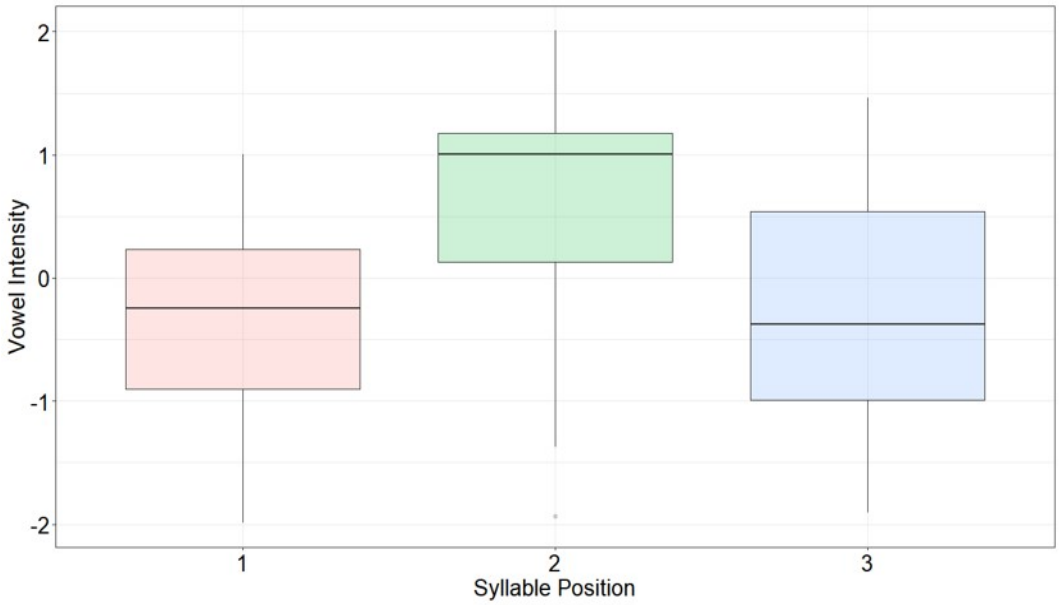

Figure 18: Vowel intensity in trisyllabic verbs

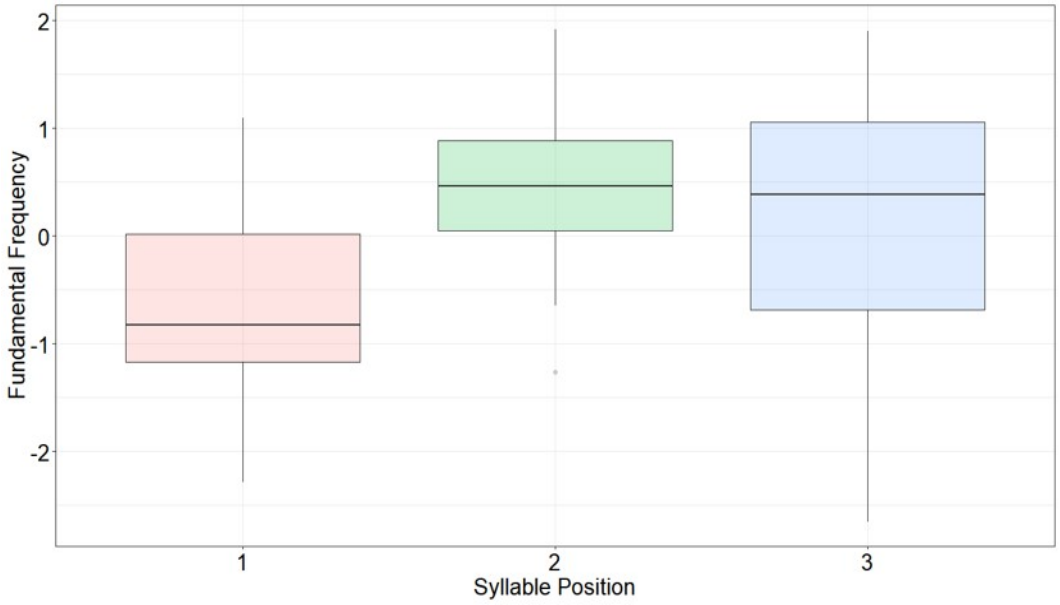

Figure 19: Fundamental Frequency in trisyllabic verbs

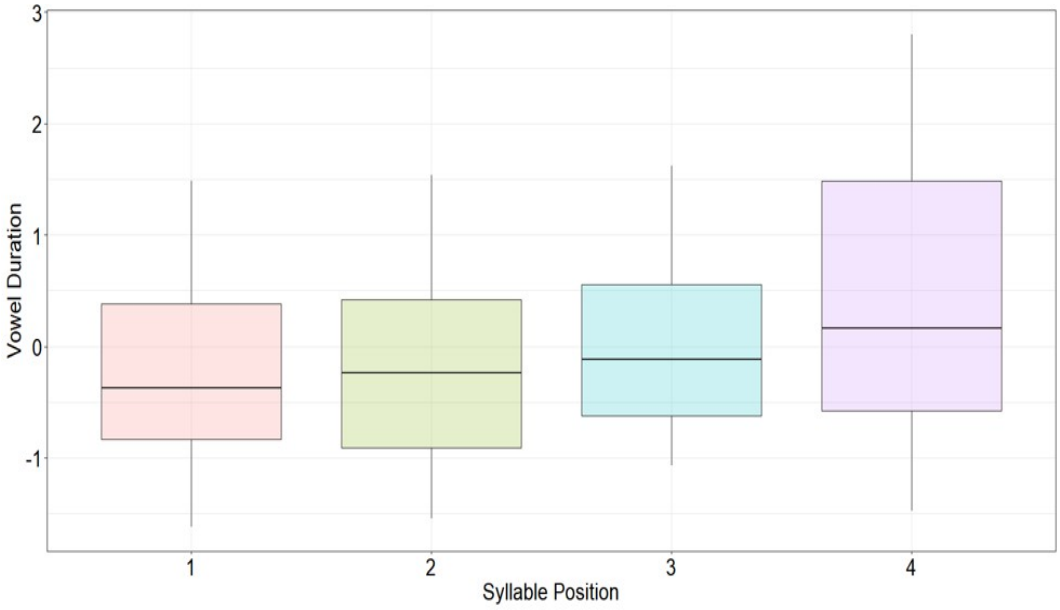

Figure 20: Vowel duration in tetrasyllabic verbs

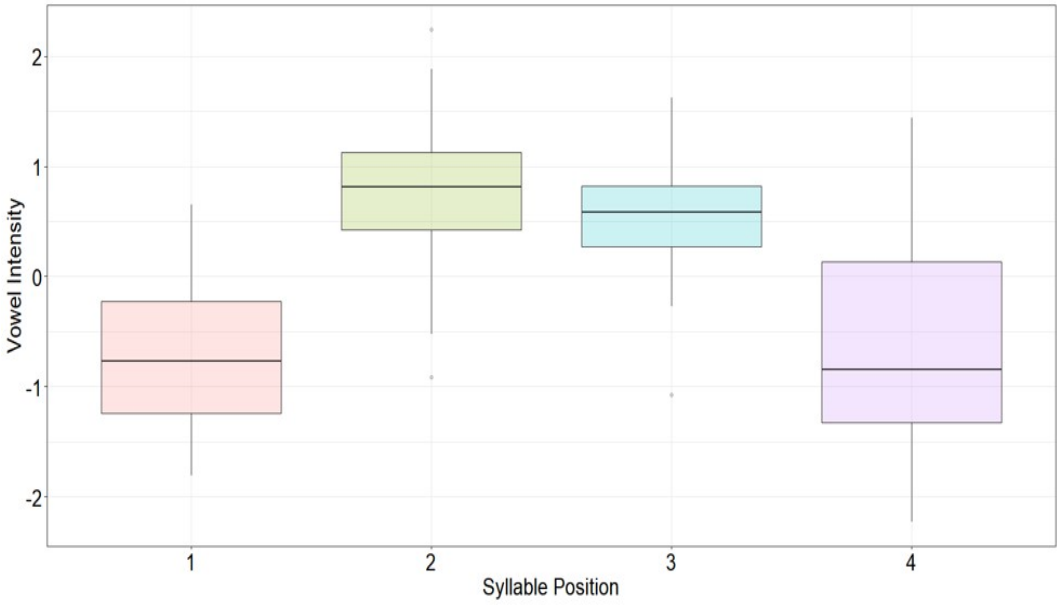

Figure 21: Vowel intensity in tetrasyllabic verbs

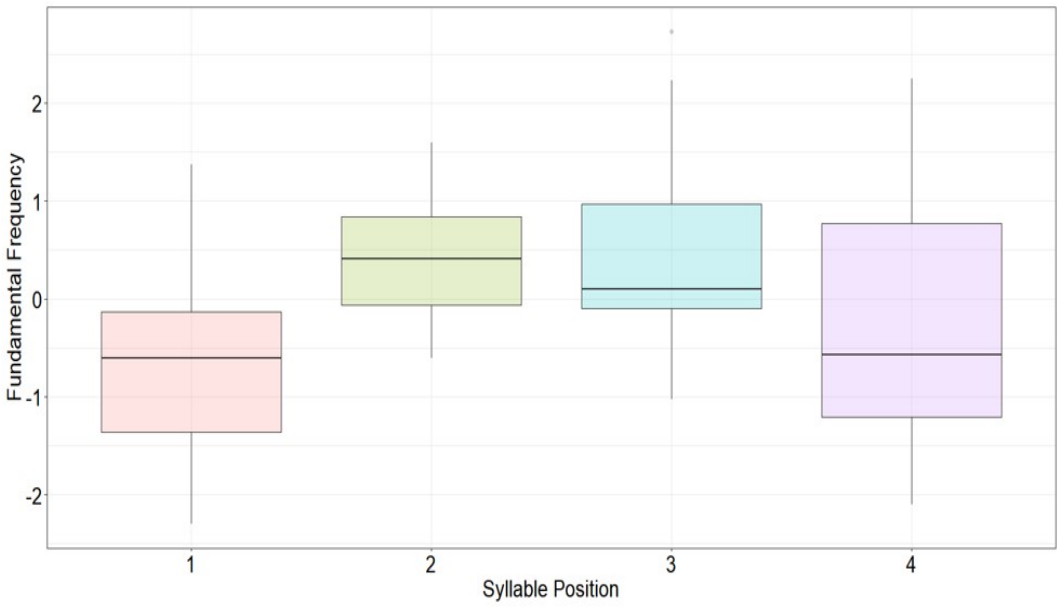

Figure 22: Vowel intensity in tetrasyllabic verbs

8 Discussion

What we can conclude from this preliminary investigation is that all disyllabic words in Sora have prominence on the second syllable seemingly cued by a conspiracy of duration, intensity and f_0. The trisyllabic and tetrasyllabic forms analysed appear to form p-words coterminous with g-words in Sora. It has also become apparent that intensity is the most consistent cue of prominence and is found on the second syllable. Duration, on the other hand, appears to delimit the last syllable, thus serving as a marker of word boundary. That fundamental frequency is found on the penult syllable in four syllable forms and may reflect a general drop in pitch in final syllable of word boundary, but it is final in three-syllable verbs, so we must still find an explanation for this, and see if larger data sets support or modify this or if this is morphologically conditioned. Verbs are morphologically complex and there may be morphemic overrides to these general patterns. A major goal of ongoing research is to resolve whether specific morphemic structure has predictable correlates to attested loci of f_0 peaks. Next steps in our research are to extend analyses to 5-8 syllable g-words to determine their intonational patterns and how these align with, or mismatch with, potential p-word patterns and to determine what is the maximal p-word in Sora.

Acknowledgements

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The influence of orthography on spoken word recognition in Bangla

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ABSTRACT

The lexical representation of words constitutes the phonological, orthographic and semantic information about a word, which is accessed together despite the task demanding only one aspect of the information. The role of orthography in word recognition tasks has been validated, though its influence on phonological tasks is lesser known. Recent studies in psycholinguistics have begun to investigate the possible influences of orthography on the auditory processing of words. The present paper reviews studies that have looked at orthographic influence on phonological tasks, and reports findings from a Rhyme-monitoring task in Bangla, to examine the role of orthography in auditory processing.

1 Introduction

What do we hear when we hear a word? What are the levels of information that we access to recognise them? Do the orthographic representations of these words play any role in their recognition? These are some questions that shall be addressed in the present study, specifically with respect to the influence of orthography on auditory word recognition. The target language that we investigate is Bangla.

To recognise words, listeners are required to match speech signals to the phonological representations (of these words) that are stored in the lexical memory (Peereman, Dufour, & Burt 2007). Thus, it would appear that information accessed and retrieved directly pertains to the task at hand i.e. those features which are needed for the task are accessed and other features that are not demanded by the task are ignored. If this were the case, in an auditory processing task only phonological representations would be accessed, and orthographic information would neither be retrieved nor accessed directly or indirectly. However, several studies (Seidenberg & Tanenhaus 1979; Dijkstra, Roelofs, & Fieuws 1995; Castles, Holmes, Neath, & Kinoshita 2003) have shown that orthographic variables which were not demanded by the task actually impacted auditory word processing.

In this paper, we intend to investigate whether this orthographic interference is observed in the auditory word recognition of Bangla speakers as well. We used a rhyme-monitoring test to assess whether certain inconsistencies in Bangla spellings affected the response times (RTs) of the participants. This shall be discussed in detail in the later sections.

The current paper has been organised as follows: Section **2** lists details of the studies that have shown orthographic influence in word processing tasks, followed by the theoretical models that explain auditory processing in Section **3**. A note on Bangla orthography has been provided in Section **4**, and finally, the study on Bangla has been presented in Section **5**.

2 Orthographic influence on phonological tasks

In this section, we report studies which have in some way or the other witnessed or reported orthographic influences on auditory word recognition tasks. We group them under tasks which looked at lexical decision/rhyme detection tasks and phoneme monitoring tasks with reference to the speed of response i.e. reaction time latencies. The experiments are largely done in English, but we report a few in other languages as well.

2.1 Lexical Decision and Rhyme Monitoring tasks

The first work to report orthographic influence during a word recognition task was Meyer, Schvaneveldt and Ruddy (1974), who found that lexical decision was faster when the second words matched the primes in terms of orthography and phonology (*couch–pouch*) than when they matched for orthography and not phonology (*touch–couch*). They explained that once the prime is encoded orthographically and phonologically, it leads to an expectation of a similar word, thus biasing them. In the case of *touch–couch*, such bias needed to be reversed thus leading to a latency.

One of the earliest and most influential sets of studies to support the claim that orthographic access may be an automatic component of lexical access in spoken perception was reported by Seidenberg and Tanenhaus (1979) in rhyme judgement tasks. They presented participants with a visual or auditory cue word, followed by a list of five auditory target words. Participants pressed a button as soon as they detected a word that rhymed with the cue. Perhaps not surprisingly, the results showed that with visual presentation of the cue word, responses were faster when the cue and target were orthographically similar (*stroke–joke*) than when they were not (*stroke–soak*). More importantly, however, a similar pattern was found with the auditory presentation of the cue.

In a further experiment, using a simpler procedure, Seidenberg and Tanenhaus (1979) aurally presented these rhyming pairs. The critical variable was whether the target word was orthographically similar or different from the cue word (*e.g., 'pie–tie' and 'rye–tie'* respectively). They found that monitor latencies to detect orthographically different rhymes were longer than latencies to detect orthographically similar rhymes, whether cue words were presented aurally or visually.

On replicating this orthography effect in the next batch of experiments, they used only auditory presentation of the cue word and a larger sample of items, and found similar results. For the rhymes, averages were 779 ms for orthographically similar pairs, and 878 milliseconds for dissimilar pairs. Hence similar word pairs were judged 99 ms faster than dissimilar pairs. The authors concluded that ''both visual and auditory stimuli may be encoded in terms of both visual and auditory features . . . auditory encoding does not always occur to the exclusion of visual information.'' (Seidenberg and Tanenhaus 1979: 554).

Ziegler and Ferrand (1998) focused on the consistency-regularity issue of words and found that the inconsistency in the spelling-to-sound mapping adversely affects word perception and reading aloud. In a visual lexical decision task in English and French (Stone et al. 1997; Ziegler, Montant, & Jacobs 1997), the authors found that words with phonological rimes that could be spelt in more than one way (e.g., /-ip/ may be spelt -eap or -eep)

produced slower correct 'yes' responses and more errors than did words with phonological rimes that could be spelt in only one way (e.g., /-uk / may only be spelt -uck).

Ziegler and Ferrand (1998) thus found that lexical decision tasks were influenced by the orthographic consistencies of words. It was revealed that inconsistent words (words containing rimes that could be spelt in more than one way) led to delayed response time in comparison with consistent words (words containing phonological rimes that could be spelt in only one way).

2.2 Phoneme-monitoring task

One task that is widely used in spoken word recognition is phoneme monitoring, in which subjects push a response button as soon as they identify a target phoneme in a spoken word or nonword. It is assumed that this task is performed using phonetic or phonological representations of words, and should have no use of orthographic information. To test whether an orthographic representation of the words is employed as well, Dijkstra et al (1995) conducted an experiment in which Dutch subjects monitored for phonemes with either a primary or secondary spelling in phonologically matched spoken words and nonwords. Phoneme monitoring times were slower when the phoneme had a secondary spelling than when it had a primary spelling. The effect monitoring times were faster for words than for nonwords.

These findings indicate that an orthographic representation of words is engaged in phoneme monitoring. In another phoneme monitoring task conducted by Castles et al (2003), it was revealed that it was easier for adults to perform phoneme deletion tasks for orthographically related pairs than those which were not. For instance, they found it easier to delete the segment /rə/ from struggle than /wə/ from squabble. Phoneme reversal tasks yielded similar results. When the same experiment was conducted on Grade 5 children, the findings were analogous. In each of these cases, therefore, the influence of orthography on phoneme detection tasks was very pronounced.

3 Theoretical models of lexical access and spoken word recognition

The auditory encoding of words has always played a major role in their recognition, storage, and retrieval; and there has been evidence of auditory encoding in the perception of visual as well as aural stimuli. As Norman opines, "it was (and is) commonly accepted that linguistically based materials — printed words — entered the visual system and then was transformed into an auditory or articulatory form in the short-term memory." (Norman 1972: 277).

Several word recognition models draw heavily on this assumption and we will discuss them in the following subsections.

3.1 Logogen Model

The Logogen Model proposed by J. Morton in 1969 was a model of speech recognition that sought to explain how the human mind processes spoken or written words. As is clear from the name, the basic unit of this model is called the 'logogen'. Morton defines it

as "…a device which accepts information from the sensory analysis mechanisms concerning the properties of linguistic stimuli and from context producing mechanisms" (Morton 1969). He claims, when the logogen accumulates more than the threshold amount of information, a response becomes available. This information shapes the definition of the logogen. The information was described by Morton as the members of the sets of attributes that he called *Si*, *Vi*, and *Ai*, referring to the semantic, visual, and acoustic sets, respectively.

According to this theory, therefore, a logogen of a word is said to constitute its meaning, spelling, and pronunciation, or, its semantic, orthographic, and phonological information. The process of word recognition takes place when its logogen passes a threshold and its encoded information becomes available for output. Hence, it can be seen that a single set of logogens is fed both by visual and auditory features.

3.2 Spreading Activation Model

This model of Collins and Loftus (1975) proposes that the process of word recognition entails certain consequences which are subsumed under the notion of what they call "spreading activation". They state that there exist certain interconnected semantic and lexical networks where each node in these networks represents a particular word or feature.

During the process of word recognition, when one such node is 'activated', this activation subsequently spreads along all the interconnected networks. Presentation of one word, therefore, entails the activation of all such words that are semantically or orthographically related to it. A link is established between the semantic, orthographic, and phonological information of words.

This has several important implications. Just as the phonological and semantic codes are rendered available both in the case of auditory as well as visual word recognition, so should the orthographic code, since its means of access is just as similar as the other two codes.

3.3 TRACE Model

A highly interactive model of auditory word processing, the TRACE model was developed by James McClelland and Jeffrey Elman in 1986. It is a top-down word processing model which focuses on context dependency in word recognition, claiming that knowledge of the lexicon aids in the process of acoustic perception.

According to this model, all the elements constituting a word are represented in the form of a network by several connected nodes. These nodes can be affected positively as a result of both lower levels of representation like phonemic or featural properties as well as higher levels such as the sentential information. Consequently, there exists a higher possibility of recognising words that are appropriate to a particular context than those that are not. Further, each node in the networks has different levels of activation and a particular threshold which determines the point that which this level of activation can influence other connected nodes. This influence may be either facilitatory (positive) or inhibitory (negative). There is active competition between all the nodes to get selected. The final word node that dominates all the other nodes is the one that gets recognised.

3.4 Cohort Model

The Cohort Model (Marslen-Wilson & Welsh 1978) proposes that a word's visual and auditory inputs are directly mapped onto a word which exists in the hearer's mental lexicon. Thus, each time a person hears a speech segment, all such words beginning with that segment get 'activated'. As the number of these segments increases, irrelevant words which do not have matching segments get eliminated. Finally, the word which consists of all the segments that correspond to the input signals gets selected.
This entire process takes place in three stages:

• Access: This is the stage at which hearers encounter the first few sound segments of a word which results in the activation of all such words which begin with the same segments in the hearer's mental lexicon. All these possible words are called 'cohorts'.

• Selection: As more and more sound segments are heard, there is a decrease in the activation of those words which no longer match the speech signals. As a result, they get eliminated. This stage is called 'activation and selection' and continues till what is called the 'recognition point', or the stage at which all the competitors have been eliminated, and only one word remains.

• Integration: It is at this stage that the syntactic and semantic information of the words are encoded and integrated into the higher levels of utterance.

The original framework of this model was later reworked to account for the influence that context had on aiding the process of elimination of competitors. Further, it also sought to account for the impact that coarticulation had on activation resulting in minor acoustic mismatches.

What all these studies seem to point at is the fact that there is a continuous interplay between the semantic, phonological, and orthographic contents of words so far as their recognition or retrieval is concerned. Consequently, each of these layers should have an impact on the other. Just as the semantic and phonological codes of a word become available in visual word recognition, so should the orthographic code, when it comes to auditory word recognition. It is this possible influence of orthography on the other levels of information that shall be the focus of this study.

4 Bangla Phonology-Orthography mapping

There exist several writing systems in the world, and each lays out its orthographic structure in different ways, using different phonological/semantic units to which each grapheme maps. While logographic and ideographic systems like Chinese, represent complete words in a grapheme, Korean maps a morpheme, Japanese and Cherokee, a syllable (as a unit, unanalysable into phonemes), and languages like English, German, and Finnish, a phoneme (the alphabetic script). The distinction between writing systems is not watertight as some languages may resort to the use of modified or mixed systems that cannot be strictly classified.

An alpha-syllabary, like Bangla, is one such mixed system. What is significant, however, is the fact that in spite of their diversity, it is assumed that all these orthographic

systems tend to influence the perception and cognition of words in literate speakers. It is the extent and nature of this influence that shall be the main concern of this study.

What concerns us, in particular, is the inconsistency in some segments of Bangla spellings and if or/and how they affect auditory word recognition. To this end, some of these inconsistencies have been discussed below.

4.1 Vowels

It has been observed that for vowels, three letters can be read with more than one phonetic form, i.e. অ which represents /ɔ/ and /o/ (1); আ which represents /a/ and /æ/ (2); and এ which represents /e/ and /æ/ (3).

(1) অ read as /ɔ/ with actual values /ɔ o/: অনেক (anek) /ɔnek/ 'a lot'; অতি /oti/ (ati) 'very'

(2) আ read as /a/ with actual values /a æ/: আমি (Ami) /ami/ 'me'; আমেরিকা (AmerikA) /æmerika/ 'America'

(3) এ read as /e/ with actual values /e æ/: এবং /ebɔŋ/ 'and'; এমন /æmon/ 'like'

This is a case of orthography-phonology inconsistency and should affect reading aloud unless the phonological contexts in which a particular sound value is to be used are specified.

The second kind of inconsistency we observe is a phonology-orthography inconsistency, where a sound can be represented in more than one orthographic form. This is true of the two vowel graphemes ই and ঈ which represent /i/ (4) and উ and ঊ (5) which represent /u/. This would cause difficulty in spelling.

(4) ই read as /rɔʃʃo i/ with actual values /i/: ইচ্ছে (icche) /iʧʧʰe/ 'wish'

ঈ read as /dirgho i/ with actual values /i/: ঈগল (Igol) /igɔl/ 'eagle'

(5) উ read as / rɔʃʃo u/ with actual values /u/: উঠ (uth) /utʰ/ 'camel'

ঊ read as /dirgho u/ with actual values /u/: ঊরু (Uru) /uru/ 'thigh'

One of the other confusions relates to the absence of a diacritic representation of the grapheme অ which is the inherent vowel in this language. Hence, they may be articulated as /o/, /ɔ/, or sometimes even without the sound of the inherent vowel. The choice is phonologically driven.

4.2 Consonants

Bangla consonants show a different sort of mapping inconsistency. The first is the presence of consonant sets which are phonemically indistinct i.e. they represent one particular phone. For instance, জ /borgio jɔ/ and য /ɔntʰostʰo jɔ/ which represent /jɔ/, ণ /moddʰanno nɔ/ and ন /dɔnto nɔ/ which denote /n/; ত /t̪ɔ/ and ৎ /kʰɔndo /t̪ɔ/ for /t̪/; and স /dɔnto ʃ/, শ /talobbo ʃɔ/, ষ /moddʰanno nɔ/, which represent /ʃ/.

The distinctions however remain in orthography — a case of phonology-orthography

inconsistency. As discussed earlier, Bangla also has several consonant clusters. Usually, consonant clusters which appear word-finally are always vocalic. They are followed by the sound /o/. For instance:

- শব্দ (shobdo) /ʃɔbdo/ 'words'
- অঙ্ক (onko) /ɔŋko/ 'mathematics'
- ক্লান্ত (klanto) /klanto/ 'tired'

However, in some borrowed words, the final consonant is non-vocalized, as in the following cases:

- বোর্ড (bord) /bord/ 'board'
- বন্ড (bond) /bɔnd/ 'bond'
- পোস্ট (post) /post/ 'post'
- ফার্স্ট (farst) /pʰarst/ 'first'

These variations lead to confusion while reading. What needs to be investigated is whether they lead to delays in word retrieval and recognition as well.

4.3 Consonant clusters

One of the biggest inconsistencies lies in the use of consonant clusters, where the second consonant in orthography is /j/, /m/, or /b/. These consonants seem to have variable effects depending on the position they occur in. In word-final positions, they phonologically geminate the first consonant.

4.3.1 ma-phala

In word-initial positions, for instance, in clusters like স্ম /sm/ and শ্ম /shm/ the sound of /m/ is lost and the preceding character gets nasalised. This can be noticed in words like স্মরণ(smaran) /ʃɔ̃ron/ 'to remember'.

Word medially and word finally, however, the /m/ sound is lost and the consonant sound preceding it gets geminated. This happens in clusters like ত্ম /tm/ and দ্ম /dm/ as well:

- ছদ্ম(chhadma) /ʧʰadda/ 'disguise'
- আত্মা(atma) /ãtta/ 'soul'
- ভীষ্ম(bhishma) /bʰiʃʃo/ 'name of a mythological character'

As a result, the pronunciation of these words is similar to those of words with geminate consonant clusters like দ্দ /d̪d̪/ ত্ত /t̪t̪/ and so on.

4.3.2 ja-phala

The case of ja-phala is also similar. Usually, it can appear in all the word positions. However, this has an effect on the pronunciation of these words. Depending on its place of occurrence, ja-phala has the following pronunciations.

Word initially, there is no change in the utterance of the consonant preceded by the ja-phala. For example, দ্যূত (dyuta) /ɖuto/ 'gamble'. In word-medial and word-final positions, it can result in three types of utterances

1. Repetition of the preceding sound segment such that the same sound gets geminated. This is observed in words like বাল্য (balyo) /ballo/ 'child' and মাল্য (malya) /mallo/ 'garland'.

2. When preceded by an unvoiced aspirated consonant, the resultant sound unit consists of the sound of the unvoiced unaspirated consonant and its unvoiced aspirated form. For example, মিথ্যে (mithya) /mitt^{h}a/ 'lie'.

3. A voiced aspirated consonant preceding ja-phala results in a voiced unaspirated consonant and its voiced aspirated form. An example of one such word is অসভ্য (asabhya) /ɔʃobb^{h}o/ 'uncivilised'.

4.3.3 ra-phala

Inconsistencies in spellings also occur in words that have consonants with modifiers of the consonant /r/. This happens for words with ra-phala followed by the /i/ sound and the diacritic of ঋ (ৃ) /ri/. Thus, spellings of words like প্রিয় /priyo/ 'favourite' and তৃণ /trino/ 'grass'; both of which have a /ri/ sound, lead to confusion.

/r/ has yet another modifier called reph which appears at word-medial and word-final positions only. For example, in চর্চা (chorcha) /ʧɔrʧa/ 'practice', it appears in the word-medial position; and in তর্ক (torko) /tɔrko/ 'argument', it appears word-finally.

Full and half consonants: The inconsistency in spelling arises from the fact that the consonant /rɔ/ itself can appear word-medially too, as in words like দরজা (dorja) /dɔrja/ 'door'. Clearly, this results in spelling variations in the word medial positions.

The consistencies discussed above can be summarised as follows:

(1) Consonant Allographs: জ /borgio jɔ/ and য /ɔnt^{h}ost^{h}o jɔ/ for /jɔ/
ণ /modd^{h}anno nɔ/ and ন /dɔnto nɔ/ for /n/
ত /ʈɔ/ and ৎ /k^{h}ɔndo ʈɔ/ for /ʈ/
স /dɔnto ʃ/, শ /talobbo ʃɔ/, ষ /modd^{h}anno nɔ/ for /ʃ/

(2) Vowel allographs: ই (ি) and ঈ (ী) for /i/ উ (ু) and ঊ (ূ) for /u/

(3) C_1C_2–CC: jo-phala and geminating consonants, as in [গদ্য (goddo) /goddo/ 'prose'] and [হদ্দ (hoddo) /hɔddo/ 'limit']

(4) C_1C_2–C_1C_3: ma-phala and ja-phala, such as [গ্রীষ্ম (grisma) /griʃʃo/ 'summer'] and [দাস্য (dashyo) /daʃʃo/ 'servitude']

(5) Full–half akshara: reph and র /rɔ/ in words like [গর্ত (gorto) /gɔrto/ 'hole'] and [করত (korto) /korto/ 'did']

Keeping in mind these different types of inconsistencies, the task reported below uses a rhyme detection task, where one pair has two words which are orthographically and

phonologically similar, and the other pair has ones that are orthographically different but phonologically similar. The second aim was to check whether particular kinds of inconsistency have a differential effect on the rhyme detection task and the speed with which rhymes are detected.

5 The Study

5.1 Objectives

The aim of the present study was to investigate the role of orthography in spoken word recognition in Bangla. The inconsistencies resulting from the factors discussed in the previous section were considered, and the interference resulting from them (if any) was investigated.

The questions that this study wishes to find answers to are the following:

• Do Bangla speakers automatically co-activate orthographic representation when they make judgements on auditory words?

• Does orthographic inconsistency affect their auditory word processing speed?

• Do specific kinds of inconsistency affect their word processing more than others?

What the study wishes to throw light on is the relationship shared between the various levels of information stored in the lexical representation of Bangla words.

5.2 Participants

40 (20=female and 20=male) native speakers of Bangla participated in the experiment. They were all above 18 years with a mean age of 23;0 (SD=2.85). Each participant had had formal education in Bangla and could read, write, and speak the language with fluency. None of them had reported any sort of hearing problems or neurological disorders.

5.3 Task Stimuli

28 pairs of target word pairs and 10 fillers were used for the rhyme detection task. The target words consisted of pairs of disyllabic (CV.CV or CVC.CV) Bangla words which were phonological rhymes. Though the frequency of the words was not controlled, most of the words used in the experiment were very common. It was intuitively felt that about one-seventh of the words were less frequent.

Two versions of the stimuli were designed consisting of 14 target pairs each. There were two conditions:

1. Where the words were phonologically as well as orthographically similar, as in [ছদ্ম–পদ্ম (chhadma–padma) /ʧʰɔddo–pɔddo/ ‘disguise–lotus’]: [14 pairs]
2. Where the words were phonologically similar but orthographically dissimilar, as in [ছদ্ম–সদ্য (chhoddo–shoddo) /ʧʰɔddo–sʰɔddo/ ‘disguise–word’]: [14 pairs]

The orthographically dissimilar target words were designed such that the various spelling

inconsistencies mentioned earlier could be taken into account.

10 filler non-rhymes were included in each version of the stimuli. These non-rhymes were categorised into two types:

1. Where mismatch occurred in the onset consonant of the rhymes of the words [C_1V_1–C_2V_1] such as বালা /bala/ 'bangle' and জামা /jama/ 'dress': 5pairs
2. Where the mismatch occurred in the nucleus of the rhymes of the words [C_1V_1-C_1V_2], as in বালি /bali/ 'sand' and কালো /kalo/ 'black': 5pairs

5.4 Experimental design

The task was a rhyme detection task, where participants listened to a pair of words and said whether the words rhymed or not by pressing YES/NO button on a laptop. The word pairs were manipulated for their orthographic (dis)similarity. The accuracy and time taken to respond were compared. A practice trial consisting of six filler items (3 rhymes and three non-rhymes) was conducted before the main experiment.

Each participant could hear only one version of the stimuli i.e. either orthographically similar targets or dissimilar ones. This was done to avoid practice effects. 10 fillers consisting of non-rhymes were created. The targets and the fillers were randomized. All the stimuli were recorded at a sampling rate of 44kHz. The entire experiment was conducted using the PsychoPy software.

5.5 Results

We discuss the results in terms of accuracy, the response time for the two conditions (orthographically similar and dissimilar), and also with respect to the different types of phonology-orthography mapping inconsistencies in Bangla.

Accuracy: The accuracy rate of rhyme detection was above 95% suggesting that the task which demanded the detection of auditorily presented pairs was done accurately. The accuracy for orthographically similar pairs was 98.21% (550 correct responses out of 560 responses) while that of the orthographically dissimilar pairs was 96.42% (540 correct responses out of 560 responses. Though the rhyme detection accuracy was lower for dissimilar pairs, the difference was not significant. This suggests that orthographic inconsistency in the pairs did not affect accuracy decisions.

Response time: Though the accuracy of rhyme detection does not show a difference between the dissimilar and similar pairs, we found a significant difference in response time i.e. time taken to decide whether the two words in the pair rhyme or not. It was observed that participants took longer (324.1107ms) to identify rhymes that were orthographically dissimilar (Mean=4314.1607, SD=396.821) than those which were similar (Mean=3990.05 SD=288.561). The difference was statistically significant [$F(1,78) = 19.1385$ $p<0.05$].

Phonology-orthography mapping inconsistency and response time: In the data set we looked at five kinds of inconsistencies, with the objective of examining whether any kind of inconsistency interferes more with rhyme judgements than others.

In the case of the first type, which consisted of words having a difference in spelling arising from the use of consonant diacritics and consonant geminates (C_1C_2–CC), the mean

RT for orthographically similar pairs was 4252.15ms (SD=158.058) while that of orthographically dissimilar pairs was 4615.13ms (SD=350.203), the difference in the RTs being 362.98ms. There was a statistically significant difference between the RTs [F (1,78) = 35.6984 $p < 0.05$].

Similarly, dissimilar pairs which differed in the second orthographic consonant in the cluster pairs i.e. C_1C_2–C_1C_3 (Mean=4418.15ms SD=476.279) took longer to process (a difference of 601.85ms) than similar pairs (Mean=3816.3ms SD=196.698) and the difference was significant [F (1,78) = 54.5657].

In type 3 words, where the spelling variations resulted from the use of half akshara (reph) and the full consonant /r/ in word medial positions, the mean RT for orthographically similar pairs was 4016.13ms (SD=394.197) and that of the orthographically dissimilar pairs was 4403.65ms (SD=368.715). The difference (387.52ms) in this case too was statistically significant [F (1,78) = 20.5769 $p < 0.05$].

The next group consisted of words where different consonant allographs led to spelling variations. In this case, the mean RT for orthographically similar words was 4012.39ms (SD=380.222) and for orthographically dissimilar pairs was 4296ms (SD=366.115); their difference being 283.61ms. There was, thus, a significant difference in the RTs [F (1,78) = 11.5480, $p< 0.05$).

A table consisting of the mean and SDs of the RTs for each pair type has been provided below:

Type	Similar RT	Dissimilar RT	F	P
Consonant diacritic-Geminate (C_1C_2-CC)	4252.15 (SD= 158.058)	4615.13 (SD= 350.203)	35.6989	0.0000
Consonant Cluster-Consonant Cluster (C_1C_2-C_1C_3)	3816.3 (SD= 196.698)	4418.15 (SD= 476.279)	54.5657	0.0000
Half Akshara-Full Consonant	4016.13 (SD= 394.197)	4403.65 (SD= 368.715)	20.5769	0.0000
Consonant Allographs	4012.39 (SD= 380.222)	4296 (SD=366.115)	11.5480	0.0011
Vowel Allographs	3910.5 (SD= 318.943)	4085.1 (SD= 271.244)	6.9562	0.0101

Table 1. Mean and SD of RTs for each pair type

The given data indicates that the difference in RTs was maximum for type 2 words (C1C2–C1C3) words, i.e. 601.85ms and least for the fifth type which had dissimilarity in vowel

diacritics (174.6ms). Further, there is a significant difference between the mean RTs of the first three types of words (Mean=450.78ms, SD=131.407) from that of the last two types (Mean=229.105ms SD=77.081). The difference between these two groups was found to be statistically significant [$F(1,78) = 33.69$, $p < 0.05$].

In the case of the fillers, the accuracy rate was 91.25%. It was observed that there was a significant difference of 344ms between the RTs of Type 2 non-rhymes (where differences arose because of the nucleus) from that of Type 1 non-rhymes (which had a different onset) [$F(1,78) = 15.8478$, $p < 0.05$].

Filler Type	Mean RT (in ms)	Standard Deviation
Type 1: C_1V_1- C_2V_1	4091.19	404.7343
Type 2: C_1V_1- C_1V_2	4435.8	368.688

Table 2. Mean and SD of filler items

5.6 Discussion

What the results of the rhyme monitoring reveals is that there was a significant influence of orthography in spoken word processing in Bangla. The source of this orthographic effect is a question that needs to be investigated further.

Seidenberg and Tanenhaus (1979) provided two possible interpretations. According to one view, the influence of orthography can be found at the stage of comparison in cognitive processing. Since this was essentially a phonological task, the subjects had to access the phonological information encoded in the words in order for them to detect the acoustic matches required for rhyming judgement. However, the discrepancies in the RTs for similar and dissimilar pairs indicate that orthographic information was also being accessed. This entails that while making rhyme judgements, subjects accessed both the acoustic and orthographic information of words, and they detected the rhymes by trying to match the targets on both dimensions. When they encountered a mismatch at one level, in this case, the orthographic level, they were compelled to go through yet another processing stage such as checking for an acoustic match.

The other alternative claims that the effect of orthography takes place at the stimulus encoding stage. It suggests that the presentation of the stimuli causes the activation of similar words, as postulated earlier by several word recognition models. When the presented stimuli were similar in their orthography, the target words were primed by the cue words. In case they were dissimilar, no such priming occurred. Consequently, the primed words were detected faster than the unprimed words, leading to a stark difference in the RTs of each case.

However, the influence of orthography is significantly higher for the first three types of words discussed above than those pairs which have variations resulting from differences in the use of consonant allographs or vowel allographs. While this can be explained in

terms of the low phonemic density of these words, it is a phenomenon that requires further investigation. This is so because Bangla has undergone several spelling reforms over the years, as a result of which multiple spellings are allowed for words where differences arose from variations in single consonants or vowel allographs. Consequently, speakers have started to accept all the possible variants of these words as acceptable forms, as a result of which these pairs were less affected by the orthographic differences. Variations resulting from the use of different consonant clusters, however, were resistant to such changes resulting from the reforms. Thus, either of these factors could have been responsible for the difference in orthographic interference in the case of some word pairs.

6 Conclusion

Thus, we have concluded that there is an impact of the orthographic level on our speech perception. As discussed above, this effect can manifest itself at two stages: an intermediate stage of mapping between the various levels of lexical information; or at the stimulus encoding stage, which leads to an activation of the connected semantic or orthographic nodes. The question of the locus of orthographic effects in spoken word recognition is not the only interesting issue raised by the results presented in this paper, which future research may further investigate. One very important aspect of the current research and deserving of more attention is that it studies orthographic effects on perceptions of words for literate speakers in a literate society. However, it would be interesting to find out how preliterate children or adult nonliterate speakers responded to the monitoring tests. Logically, if the differences that we found in our results for similar vs. dissimilar/consistent vs. inconsistent pairs were indeed triggered by orthographic effects alone, such patterns should not be found in the case of preliterate children or illiterate speakers because the orthographic information is supposedly absent in their lexical entries. Further, we need to analyse why certain word pairs remained less affected by orthographic influence while others showed a significant influence. Though we have tried to attribute this different trend to the low phonemic density of these words, it has to be substantiated by further research. The factor concerning the acceptance of multiple spellings resulting from the spelling reforms also needs to be considered. Hence, though it may be concluded that orthography plays a significant role in word processing in Bangla, its influence on particular word types and its causes need further investigation.

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‘and-a-half’ Numeral constructions in Hindi

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ABSTRACT

Complex numerals combine via addition and multiplication in the syntax from a sequence of simplex numerals. In this paper, we investigate a novel class of numerals labeled ‘and-a-half’ numerals which can combine with simplex numerals via addition resulting in a simplex numeral. But across languages, the presence of ‘and-a-half’ limits the formation of complex numerals to only via multiplication. Further addition of another numeral in this structure considerably degrades the construction. This paper focuses on Hindi data and seeks to explain this restriction placed by ‘and-a-half’ by investigating its pragmatic role in setting standards of precision. The analysis presented here predicts that the planning component in communicating standards of precision is encoded at the phrasal level where once you set a low standard of precision you cannot arbitrarily raise it - which is exactly what happens when an additive component is introduced in the structure.

1 Introduction

While there are comprehensive accounts of Number systems in languages of the world (Hurford 1975 & 1987) as well as syntax-semantics of complex numerals (Ionin & Matushansky 2006 & 2018), there is a class of complex numerals across languages that has gone unnoticed. Present paper introduces this class in Hindi which will be called ‘and-a-half’ numerals *i.e.* complex numerals that typically feature an ‘and-a-half’ component as in 1a where *sāṛhe* is the corresponding ‘and-a-half’ expression in Hindi. These expressions are typically marked for counting and tend to have an approximate interpretation. Interestingly, ‘and-a-half’ numerals follow the syntax of complex numerals but they resist an additive component 1b.

(1) a. sāṛhe=tīn hazār
three=half thousand
‘3,500’

b. #sāṛhe=tīn hazār saat
half=three thousand seven
‘3,507’

In section 2, I present examples from various languages and show that blocking behavior in 1b is exhibited by ‘and-a-half’ numerals across languages. I also show that the existing account for ruling out illicit complex numeral constructions via PACKING STRATEGY as

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described in Hurford (1975) cannot explain this blocking behavior. In section 3, I make the case that *sāṛhe* stereotypically gets an approximate interpretation. I explain the ill-formedness of constructions like 1b via RNRI principle by Krifka (2007) as well as the inferences regarding precision/vagueness arising at the Sem/Prag interface. The analysis presented here applies to 'and-a-half' numerals that denote a precise number. Section 3.4 discusses the limitations of this analysis. Section 4 concludes the paper by summarizing the account presented. In the next subsection I discuss the syntax and semantics I will be assuming for complex numerals throughout the paper.

1.1 Our assumptions about Complex numerals

Following Zabbal (2005), I assume that a complex numeral consists of a sequence of simple numerals with optional or obligatory intervening material. The internal organization of these simplex numerals determines the meaning of a complex numeral. Numbers are infinite, so it is tedious and impossible to have an idiosyncratic name for each number - given this, it is natural that our grammar incorporates recursive rules to generate possible expressions for numbers. Throughout this paper, we will follow Hurford (1975) and assume the following PS rules that generate numerals across languages sufficiently:

$$\text{NUM} \rightarrow \text{DIGIT}$$
$$\text{NUM} \rightarrow \text{NUMP(NUM)}$$
$$\text{NUMP} \rightarrow \text{NUM M}$$

NUM here represents the category of all possible numerical expressions in a language. DIGIT represents any single numeral word up to the value of the base number *e.g.*, 'one', 'two',..., 'nine'. M represents the category of noun-like numeral forms that can be used as multiplicational bases like 'hundred', 'thousand' etc.

Bylinina & Nouwen (2020) present a semantics for numerals where they argue that numerals denote in the domain $\mathscr{D}_N \subset \mathbb{N}$. Given the presence of fractional cardinalities across languages that we are considering in this paper, I take the view that numerals denote in $\mathscr{D}_Q \subset \mathbb{Q}$ while assuming the same semantics. Thus, semantic composition simply corresponds with regular arithmetic operations like addition and multiplication:

$$[\![\text{seventeen}]\!] = 17$$
$$[\![\text{plus}]\!] = \lambda d \lambda d.d + d$$
$$[\![\text{times}]\!] = \lambda d \lambda d.d \times d$$

2 'and-a-half' numerals

Languages employ various means to construct complex numeral expressions which exhibit a regular pattern for counting. The same numeral can be expressed in a variety of ways as well. Consider 2 in Hindi and 3 in English where 3,500 can be expressed differently:

(2) Hindi
   a. tīn hazār pānch sau
      three thousand five hundred
      '3,500'
   b. sāṛhe=tīn hazār
      half=three thousand
      '3,500'

(3) English
   a. three thousand five hundred
      '3,500'
   b. three and a half thousand
      '3,500'

sāṛhe and *and a half* in 2 & 3 are examples of 'and-a-half' expressions that we will be concerned with in this paper. Recall that in section 1, I briefly mentioned that 'and-a-half' expressions are present across languages. Here, I present examples of the same. Consider the following contrast for Hindi, English, Malayalam, and Russian featuring their respective 'and-a-half' expression. Notice that the 'and-a-half' numerals are degraded when there's an additional syntactic component as in b in each example:

(4) Hindi
   a. sāṛhe=tīn hazār
      three=half thousand
      '3,500'
   b. #sāṛhe=tīn hazār saat
      half=three thousand seven
      '3,507'

(5) English
   a. three and a half thousand
      '3,500'
   b. #three and a half thousand eighteen
      '3,518'

(6) Malayalam
   a. mūn-ara laksham
      three-half lac
      '3,50,000'
   b. #mūn-ara lakshathi irupathi
      three-half lac twenty
      '3,50,020'

(7) Russian

a. tr'i s polov'in-oj tys'ac-i
three with half-INS.SG thousand-GEN.SG
'3,500'

b. #tr'i s polov'in-oj tys'ac-i sorok sest
three with half-INS.SG thousand-GEN.SG forty six
'3,546'

Why are constructions in b in each example above unacceptable? Given the distribution discussed so far, *'and-a-half'* complex numerals form using the same syntax as their counterparts. The difference between a & b in the paradigm above is that constructions in b feature an additional layer of complexity in the structure. We can fine-tune our observation by noting the following contrast in Hindi:

(8) a. sāṛhe=tīn sau hazār
three=half hundred thousand
'3,50,000'

b. #sāṛhe=tīn hazār saat
half=three thousand seven
'3,507'

8a involves stacking of multipliers exploiting the multiplicative syntax but the construction itself is grammatical. As opposed to this, 8b involves an additive component. Stacking multipliers results in a number that is round thus, one can say that 'and-a-half' expressions are licensed in complex numerals that only exploit the multiplicative syntax and denote a round number but they are anti-licensed in expressions that involve an additive component. This is the contrast we want to explain in this paper.

2.1 Properties of Hindi *sāṛhe*

Hindi has two lexical entries *sāṛhe* and *ādhā* that stand for 'half'. [2] Distribution of *sāṛhe* is very limited in that it occurs only in numeral phrases combining with a NUM as in 9a while *ādhā* occurs in measure phrases (see 10a) or as a nominal modifier as in 10b, 10c. Thus, they are in complementary distribution.

(9) a. sāṛhe=tīn
half=three
'3.5'

[2] *ādhā* has its origins in Sanskrit (much like the rest of the Hindi numeral system) and it is likely that *sāṛhe* was incorporated into Hindi at a later point in history from Prakrit *saḍḍhe* - which itself perhaps came from Sanskrit *sārdh*.

b. *ādhā tīn
half three
'3.5'

(10) a. ādhā litre dūdh
half litre milk
'half a litre milk'

b. ādh-e kāgaz
half.PL paper.[PL]
'half of the papers'

c. ādh-i kitāb
half.F book.[F]
'half of the book'

As seen in 9a, *sāṛhe* prefixes to a numeral root and it is bound to it. It cannot occur independently like *ādhā*. Moreover, *sāṛhe* does not inflict for number or gender whereas, *ādhā* will often inflict for number and gender (see 10b & 10c). The combination *sāṛhe* + NUMX results in a NUM but *sāṛhe* itself doesn't seem to fit in any of the syntactic categories given by Hurford[3]. *sāṛhe* has an extremely low degree of selectivity. It only attaches to a syntactically simplex NUM. Even among these, the combination of *sāṛhe* with a simplex NUMX is acceptable for NUMX till *nineteen* but expressions for simplexes beyond that are uncommon and speaker judgments for them vary. Safely speaking, the upper bound is *ninety-nine*. In Hindi complex numerals, all multipliers can occupy the complement position of *sāṛhe* + head NUMX in a NUMP. This is significant given that not all languages allow this. See for example, in English *#three and a half hundred* is quite degraded. Now, consider the cross-linguistic paradigm in 11. We see that there is variation in how 'and-a-half' expression combines with the head NUMX. In Malayalam, there seems to be suffixation while Russian seems to resort to adpositioning and English confirms with the known coordination pattern in its numeral system. The puzzling observation is that in all the languages, there's a uniform pattern of 'and-a-half' following the head NUMX but in Hindi, this pattern is reversed. Why is this the case?:

(11) a. Hindi
sāṛhe=tīn hazār
three=half thousand
'3,500'

b. Malayalam
mūn-ara laksham
three-half lac
'3,50,000'

[3]The issue regarding the exact syntactic location of *sāṛhe* is noted but will not be addressed in this paper.

c. Russian
tr'i s polov'in-oj tys'ac-i
three with half-INS.SG thousand-GEN.SG
'3,500'

d. English
three and a half thousand
'3,500'

In the next section I will argue that *sāṛhe* is a pro-clitic thus explaining this deviation.

2.2 Explaining the word order difference in Hindi

In the previous section, we saw that *sāṛhe* doesn't confirm to the cross-linguistic pattern of 'and-a-half' following the NUMX. In Hindi, *sāṛhe* precedes the Head NUMX. See the representative examples in Hindi and Malayalam reproduced here in 12:

(12) a. Hindi
sāṛhe=tīn hazār
three=half thousand
'3,500'

b. Malayalam
mūn-ara laksham
three-half lac
'3,50,000'

I will now argue that *sāṛhe* has clitic-like properties. It doesn't seem to belong to any discernible syntactic category given by Hurford at all. Distribution-wise it falls with syntactically simplex but morpho-phonologically complex numerals motivating the position that it is perhaps a pro-clitic.

I will use criteria provided by Zwicky (1985) as well as Zwicky & Pullum (1983) to do so. They provide a host of criteria to distinguish a clitic from a particle as well as from an affix. The criteria are not meant to be exhaustively satisfied as no lexical item could exhaustively satisfy all of them but rather serves as a diagnostic to discern whether something is a clitic or an affix or an independent word.

sāṛhe forms a prosodic unit with the head NUMX. Stress and prosody pattern dictates that in a complex numeral, *sāṛhe* cannot carry stress (13a). Only the head NUMX (13b) or the multiplier (13c) can be stressed.

(13) a. #SĀṚHE=tīn hazār
half=three thousand
'3,500'

b. sāṛhe=TĪN hazār
half=three thousand
'3,500'

c. sāṛhe=tīn HAZĀR
half=three thousand
'3,500'

Earlier we noted that *sāṛhe* cannot feature independently without a host and it is bound to the head NUMX. Thus, it cannot move independently of its host either and it does not block further affixation or clitics from attaching to the host numerals as seen in 14.

(14) sāṛhe=tīn=hī
half=three=EMPH
'three and a half only'

Word order for *sāṛhe* + Head NUMX is fixed and does not change. In the previous section, we noted that *sāṛhe* exhibits extremely low selectivity for its host numerals - it only attaches to a limited set of syntactically simplex NUM. Even among these, the combination of *sāṛhe* with a simplex NUMX is acceptable for NUMX till *nineteen* but expressions for simplexes beyond that are uncommon and speaker judgments for them vary. We see in 15b that *sāṛhe* cannot modify the embedded complex numeral at all and the intended interpretation is unavailable.

(15) a. [sāṛhe=tīn] hazār
half=three thousand
'three and a half thousand'

b. #sāṛhe [tīn hazār]
half three thousand
'three thousand and a half'

Given these facts, it suffices to say that *sāṛhe* is perhaps a clitic. Now, to explain word order deviation in Hindi, Note the following pattern for syntactically simplex but Morpho-phonologically complex Hindi Numerals.

(16) a. sāṛhe=tīn
half=three
'three and a half '

b. ekkīs
one-twenty
'twenty-one'

c. chautīs
four-thirty
'thirty-four'

We see that Hindi simplexes have an underlying 'small before big' order. This is the same order found in Sanskrit where simplexes are made out of base numerals and the smaller numeral precedes the bigger one *e.g., dvādash* (twelve) = *dve* (two) + *dasham* (ten). From the point of distribution, *sāṛhe* + NUMX falls in line with this pattern - lending weight to the hypothesis that *sāṛhe* is a pro-clitic thus, explaining the word order deviation in Hindi. In the next section, we will see that the linguistic universal proposed by Hurford (1975) fails to explain why *sāṛhe* resists an additive component in Hindi complex numerals.

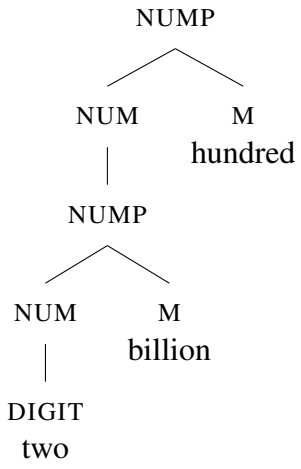
2.3 Packing Strategy and 'and-a-half' numerals

The PS rules given in section 1.1 of course might over-generate possible numeral expressions in a language. To account for this, Hurford (1975) introduces a constraint called PACKING STRATEGY as a way to block illicit complex numeral constructions in a language. The constraint states that

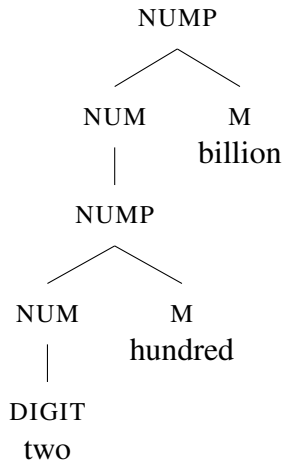
> 'Within any part of a numeral structure, the sister of NUM node must have the highest possible value given the denotation of the node that immediately dominates it.'

Hurford introduces this constraint not as a principle or a rule but rather as a linguistic universal - thus, its grammatical status is not obvious. He provides ample cross-linguistic evidence to make the case for such a universal. Packing strategy explains why expressions such as *three billion hundred* are blocked in favor of *three hundred billion*. We have the following two contesting structures corresponding to these expressions:

(17) a.



b.

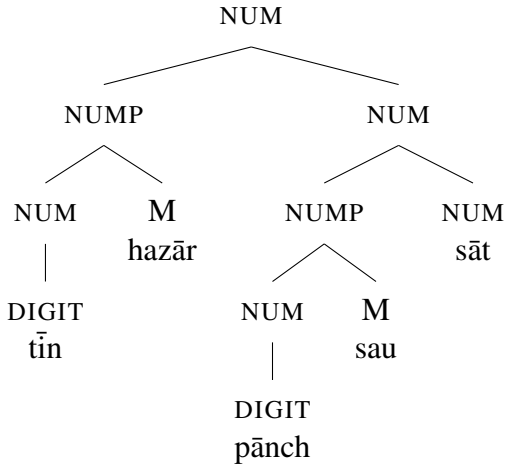


Note that packing strategy can be applied if the node immediately dominating the NUM node has the same denotation. In this case, we will be checking the constituents [NUM M] of the highest NUMP which has the same denotation in both structures. The M node in 17b has a higher value (billion) than the M node in 17a (hundred) thus the expression that corresponds to structure in 17a *i.e. three billion hundred* is ruled out. The intuition is that the strategy to construe possible numeral expressions is similar to the strategy that is used to stack books of different sizes. It would be desirable to stack the books in ascending or descending order according to their sizes. Moreover, One would club together books that are of the same size in chunks and stack the chunks according to the preferred order. Now, let's see if packing strategy helps us block constructions as in 18b against their unblocked counterparts in 18a. The corresponding structures are represented in 19b and 19a respectively:

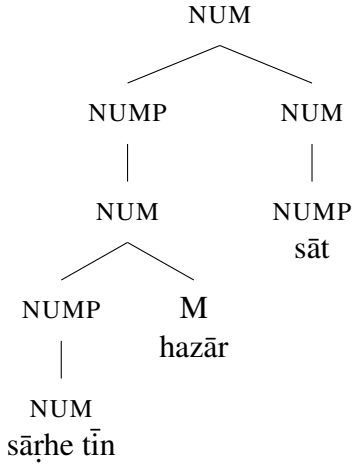
(18) a. tīn hazār pānch sau sāt
three thousand five hundred seven
'3,507'

b. #sāṛhe=tīn hazār saat
half=three thousand seven
'3,507'

(19) a.



b.



Given that only the highest NUM node in both structures has the same denotation (3,507), we will evaluate at the immediate constituent [NUMP NUM] in both structures. The [NUMP [tīn hazār]] node in 19a has the denotation 3000 while the [NUMP [sāṛhe tīn hazār]] node in 19b evaluates to 3500. Thus, the structure in 19b wins out as the denotation of the NUMP is higher than the denotation of the contesting NUMP in 19a. This is contrary to what we expect and it would seem that packing strategy makes wrong predictions. This is not ideal as the constraint itself has wide cross-linguistic empirical support and it makes sense that a constraint such as 'packing strategy' exists (cf. Hurford 1987 & 2007).

Hurford (2007) argues that the universal is justified by performed practice of counting objects. He provides two conceptual guidelines or maxims that are utilized - *go as far as you can with the resources you have* and *minimize the number of entities you are dealing with*. For a numeral system in a language, the basic numerals would form the resources at hand with the rules to combine them. Now, while counting one would try to use this resource exhaustively. we club objects in tens or hundreds and leave out the remainder, counting using the lexical sequence. A shift occurs when we encounter ten groups of hundreds and so on which motivates forming larger chunks of ten *hundreds* calling for a

separate lexical entry - which reflects the guideline of 'minimize the number of entities you are dealing with'. Assuming that *sāṛhe* entered into the numeral system in Hindi much later it stands to reason that 'and-a-half' numerals in Hindi fall outside the explanatory domain of packing strategy. By the time they entered the Hindi lexicon, the counting system was already in place and well-developed. as a performative practice, 'and-a-half' numerals are employed in contexts where high standards of precision are not required whereas counting is a precise activity. Thus, packing strategy does not apply to them meaning we must look for an alternative explanation. In the next section, I argue that *sāṛhe* has a stereotypically approximate interpretation and explain the blocking phenomenon.

3 Analysis

Our task is to explain why 'and-a-half' in Hindi resists environments that feature an additive component but an additional multiplicative component is not resisted. We saw in section 2.3 that packing strategy cannot rule out 'and-a-half' numerals with an additive component in Hindi over their contesting counterparts with the same denotation. In this section, I will argue that *sāṛhe* stereotypically gets an approximate interpretation and the additive component is blocked due to contradictory inferences arising at the Sem-Prag interface owing to the approximative nature of *sāṛhe* and precise interpretation forced by denotation of numeral expressions. Moreover, forms containing *sāṛhe* are optimal among contesting forms to communicate a low standard of precision in a context. Semantically *sāṛhe* has the denotation 0.5 and its approximative meaning will be modelled via 'pragmatic halos' (Lasersohn, 1999). But before that, I will survey an important tool required to address the main puzzle at hand.

3.1 Krifka on approximate interpretation of number words

Krifka (2007) building on his previous work in Krifka (2002) develops a pragmatic theory of approximate interpretation of numbers in terms of strategic communication. The aim of these papers is to model approximate vs. precise interpretation of expressions such as *one hundred* over *one hundred and three*. To this end, he states an empirical generalization called RNRI principle which states *'round numbers in measuring contexts tend to receive round interpretation while precise numbers get interpreted precisely'*. Given that approximate and precise interpretations serve different roles in communication, it would be incorrect to say that the former is preferred over the latter as a general preference by speakers. Which of the two can be selected needs to be derived from more general pragmatic principles. As a consequence of the Maxim of Quality or Q-principle in the neo-Gricean framework (Horn 1984), the principle INRANGE is proposed which states:

> INRANGE: The true value of a measure must be in the range of interpretation of the measure term.

He posits conditional speaker preference for cognitively salient values where shorter and economic expressions are preferred over complex expressions even if there's no general

bias towards them. Moreover, expressions that have approximate interpretation refer to more cognitively salient values - case in point, 'and-a-half' numerals. Thus, apart from simplicity of expressions, speakers also prefer simplicity of representations. Hence the preference for expressions such as *'the meeting lasted for an hour'* over stating the exact duration because an hour is a prominent conceptual unit. Simplicity of expressions and representations are both relevant to explain approximate interpretations where a bias for simpler representations can be correlated with a bias for coarse-grained scales - which refers to the level of granularity one assumes in measuring contexts. Krifka motivates a general principle named SER of which I will assume a modified and simplified version stated below - which, in the neo-Gricean tradition, correlates with R-principle.

SER : simple expressions/representation > complex expressions/representations

Simplicity of expressions can refer to phonological or syntactic simplicity. Ultimately it relates to the tendency to minimize cognitive load and Zipf's 'principle of least effort'. In the next section, we will see that INRANGE is built into our formalization and we do not need to assume it as a separate pragmatic principle. We will however require SER and RNRI to tackle the problem at hand.

3.2 Modelling approximate interpretation of *sāṛhe*

Recall that 'and-a-half' numerals in Hindi are typically used in contexts that allow for pragmatic slack and do not demand an exact answer. It is possible that in some contexts the speaker might have wrongly presumed that loose talk is warranted. In such cases, one can always demand more precision and a more informative answer can be provided - either by providing the actual measure as seen in 20a or by incorporating 'slack regulators' like *exactly* to reinforce a precise interpretation of the same 'and-a-half' numeral. We see in 20b that a similar discourse is infelicitous if a precise answer is provided and the questioner further presses on for more precision because rarely do we operate on precision levels in seconds.

(20) a. **Q:** anu-ke janam-kā samay kyā hai?
anu.GEN birth.GEN time what be
'what is anu's time of birth?'
A: dopahar sāṛhe=tīn
afternoon half-three
'three thirty in the afternoon'
Q': Nahi, sahi samay batao. kundali banani hai.
NEG exact time tell. star-chart make.F be
'no, tell me the exact time. I need it for the star chart'
A': tīn pachhīs ko
three twenty-five at

'at three twenty five'

b. **Q**: anu-ke janam-kā samay kyā hai?
anu.GEN birth.GEN time what be
'what is anu's time of birth?'

A: dopahar tīn pachhīs ko
afternoon three twenty-five at
'at three twenty five in the afternoon'

Q': #Nahi, sahi samay batao. kundali banani hai.
NEG exact time tell. star-chart make.F be
#'no, tell me the exact time. I need it for the star chart'

Lasersohn (1999) discusses several expressions that are not truth conditionally vague but are employed in contexts where exactitude is not necessary - as long as the actual value is *sufficiently close* to expressed value. Such expressions trigger a 'pragmatic halo' - which is a set containing values that are close to the denotation of the expression in pragmatically ignorable ways. Formally speaking, Given a context C, an expression α is assigned a partially ordered set $< H_C(\alpha), \leq_{\alpha,C} >$ called the pragmatic halo of α. Members of the Halo are objects which are of the same type as $[\![\alpha]\!]$ and differ from it in pragmatically ignorable ways. Moreover, it is necessary that $[\![\alpha]\!] \in H_C(\alpha)$.

This is the line of argument we adopt to model approximate interpretation of *sāṛhe*. Consider a context C where a person is looking to buy a piece of clothing in a shop. It is often the case that clothes are priced at prices like 999 Rs. or 3499 Rs. In such cases communicating the exact price is not necessary or even desired as long as we give a measure close to the actual value - in this case, *thousand* or *three and a half thousand* suffice. Thus approximating expressions like 'and-a-half' numerals are felicitous in a context if the actual measure is close to the measure expressed by the numeral expression. In terms of Halos, we have the following formalization which also ensures that INRANGE is obeyed as the requirement is built into the definition of pragmatic halos. Since we take the position that numeral expressions denote in the domain of Rational numbers, the pragmatic halo of *sāṛhe* will be an open interval containing rational numbers close to the denotation of *sāṛhe*.

$$[\![sāṛhe]\!] = 0.5$$
$$[\![H_C(sāṛhe)]\!] = (..,0.485,..,0.486,..,0.499,..,0.5,..,0.501,..,0.53,..)$$

The resultant complex halo of *sāṛhe tīn hazār* can be obtained by point-wise composition with each element in the halo of *sāṛhe*. Since the semantic rules for the composition of complex numerals mentioned in Section 1.1 correspond to simple arithmetic operations of addition and multiplication, this composition becomes quite straightforward. One might argue that each element in the complex numeral might trigger a halo. This isn't wrong but I will gloss over this fact as it does not affect the analysis presented here in a significant way.

$$[\![sāṛhe\ tīn\ hazār]\!] = 3500$$
$$[\![H_C(sāṛhe\ tīn\ hazār)]\!] = (..,3485,..,3486,..,3499,..,3500,..,3501,..)$$

We now have a **felicity condition for 'and-a-half' in Hindi**: Let α be an 'and-a-half' expression in Hindi being used in a context C. let x be the actual value that is being approximated. Then an utterance U containing α is felicitous in C in pragmatically ignorable ways iff $x \in H(\alpha)$.

This formalization also explains why 'and-a-half' numerals in Hindi are optimal forms for approximation among contesting forms that denote the same numeral. Consider a context where the actual measure x being approximated is 3,53,000. Now, in Hindi, we have the following forms available to approximate this apart from the form that expresses x.

(21) a. tīn lākh pachās hazār
three lac fifty thousand
'3,50,000'

b. sāṛhe=tīn lākh
half=three lac
'3,50,000'

Given the formalization sketched above, we see that $0.53 \in H(sāṛhe)$ and it follows that $3,53,000 \in H(sāṛhe\ tīn\ lākh)$. Moreover, following Krifka, SER predicts that 21b is a simpler expression/representation than 21a. Thus, 'and-a-half' expressions are optimal expressions to convey low standards of precision against their contesting counterparts in Hindi. We are now in the position to explain why *sāṛhe* blocks additive components in complex numerals.

3.3 Deriving blocking of additive components in Hindi 'and-a-half' numerals

We set out to explain the following contrast in Hindi:

(22) a. sāṛhe=tīn sau hazār
three=half hundred thousand
'3,50,000'

b. #sāṛhe=tīn hazār saat
half=three thousand seven
'3,507'

From the formalization discussed so far, we get the following denotation for 22b as well as the resultant complex halo. The presence of the additive component results in a kind of 'shifting' of the halo from where it starts in the composition.

$$[\![sāṛhe]\!] = 0.5$$
$$[\![H(sāṛhe)]\!] = (..,0.485,..,0.486,..,0.499,..,0.5,..,0.501,..,0.53,..)$$
$$[\![sāṛhe\ tīn\ hazār]\!] = 3500$$
$$[\![H_C(sāṛhe\ tīn\ hazār)]\!] = (..,3485,..,3486,..,3499,..,3500,..,3501,..)$$
$$[\![sāṛhe\ tīn\ hazār\ sāt]\!] = 3507$$
$$[\![H(sāṛhe\ tīn\ hazār\ sāt)]\!] = (..,3492,..,3493,..,3506,..,3507,..,3508,..)$$

We established in section 3.2 that *sāṛhe* gets a stereotypically approximate interpretation. Therefore, the resultant complex halo of *sāṛhe tīn hazār sāt* gives us an R-implicature regarding the precision scale of the speaker *i.e. the speaker is operating with a low degree of precision*. But the semantics of the expression denotes a precise number. Recall that RNRI principle states 'round numbers in measuring contexts tend to get round interpretations while precise numbers tend to get precise interpretation'. Thus, given RNRI, we get a Q-implicature regarding the precision scale of the speaker *i.e. speaker is operating at a high degree of precision*. It is impossible for one to operate at both a low and high degree of precision. Moreover, a numerical measure cannot be both precise and vague simultaneously! Thus, we get two contradictory inferences at the Sem/Prag interface as the hearer concludes that the speaker is being uncooperative. This explains why 'and-a-half' expressions in Hindi block addition.

This account also captures why stacking of multipliers as in 22a is not blocked by *sāṛhe*. As a numerical measure becomes higher and higher, one is bound to lower their expectations regarding precision in stereotypical contexts. Multipliers only aid in casting a wider pragmatic halo while the number stays round - an ideal environment for *sāṛhe*. Moreover, no contradictory inferences arise as RNRI dictates that the denotation anyway gets a round interpretation.

Another advantage of formalization in terms of pragmatic halos is that it also captures the gradation in judgments Hindi speakers have regarding 'and-a-half' expressions with an additive component. The difference between 23a and 23b presented below is that the former features a smaller additive component than the latter. the Hindi speakers have sharp judgments ruling out constructions like 23a (hence the '#' mark) but judgments for constructions like 23b vary across speakers (represented here with '??').

(23) a. #sāṛhe=tīn hazār sāt
three=half thousand seven
'3,507'

b. ??sāṛhe=tīn hazār pachpan
half=three thousand fifty-five
'3,555'

(Lasersohn, 1999, p. 545) argues that Halos are structured sets that have a central member - namely the denotation, where members of the halo are ordered according to their relative closeness to the central member. Moreover, the formalism does not provide a clear-cut distinction between members and non-members and there is no hard cap on the size of the halo. It varies from context to context whether certain distinctions are ignorable or not. Therefore, farther elements in the halo would give us looser judgments like 23b. For some speakers, the additive element in 23b is not that far and the distinction is pragmatically ignorable hence the construction is judged to be unproblematic but for others, this is not the case. Thus, the variation in judgment regarding 23b can be explained based on whether the speaker finds pragmatic distinctions ignorable or not.

Our analysis also predicts that *sāṛhe* only blocks additive component that gets added from *below*. Constructions such as 24 where the additive component is added from *above* are felicitous as their denotation is round - which, based on the analysis so far, does not give us any inference regarding high precision levels that contradicts with low precision inference associated with *sāṛhe*.

(24) chār lākh sāṛhe=tīn hazār
four lac three=half thousand
'4,03,500'

An important consequence of this is that the planning component in strategic communication seems to be encoded at the phrasal level *i.e.* even within a phrase, once you set a low degree of precision you cannot arbitrarily raise it. But in cases like 24, you only go to a lower degree of precision[4].

3.4 Problems with the account

One limitation of the account presented here is that expressions like 25 will be predicted as felicitous as they are round in their denotation even though they have an additive component. Thus, we need to improve our existing account to explain data like 25. In this section, I provide an informal sketch of another possible approach.

(25) ?sāṛhe=tīn hazār chālīs
three=half thousand forty
'3,540'

So far, we are using notions such as degree/standard of precision which can be either high or low. Note that Numerals have various scales available to them which might be used to approximate a value close to the numeral. What scale one chooses to operate on depends on the context. For a number like *thirty*, There might be a context where measurements turn out to be in decimals close to 30 and the speaker might choose to approximate them with 'thirty'. In another context, if the true measure is 28 or 29, it might be felicitous to

[4]Thanks to Ashwini Deo for bringing this to my attention

approximate that with *thirty*. Thus, a number like 'thirty' has at least two scales on which we might approximate. But a number like *fifty-seven* may only have one scale (decimals) on account of not being a cognitively salient measure. Round numbers like *hundred, thousand, five hundred, etc.* on account of being cognitively salient and round have many more scales available than *fifty-seven*. below I show some of the possible scales associated with *thousand*. Cognitively salient measures like *thousand* naturally operate on coarse-grained scales and have multiple scales available to them

$$\ldots, 999.7, 999.8, 999.9, 1000, 1000.1, 1000.2, 1000.3, \ldots$$
$$\ldots, 997, 998, 999, 1000, 1001, 1002, 1003, \ldots$$
$$\ldots, 970, 980, 990, 1000, 1010, 1020, 1030 \ldots$$

Multipliers play a role in casting a wider halo. The composition of the multiplier with *sāṛhe* + NUMX makes a wide range of scales available to *sāṛhe*. This is an ideal environment for sāṛhe to live in to fulfill its pragmatic role of providing inferences regarding low standards of precision. Additive components can be conceived as Slack regulators in the step-by-step composition of the tree and attenuation of the Halo. This means that the resultant denotation will have a lesser number of scales to vary on. Perhaps the role of the slack regulator here is to limit the number of scales available. A lower number of scales means higher precision.

As *sāṛhe* + NUMX combines with the Multiplier in 25, we get a high number of scales to vary on. But further composition down the tree results in a number whose denotation (which is 3520) will give us a lesser number of scales to access. Thus, the Hearer fails to determine whether the speaker operates on High variation on scales or low variation on scales. Operating on two different scales simultaneously is not possible Thus we get the contradiction and perhaps this is a way to explain data such as 25 where having an additive component still results in a round number. There is a failure in being able to set the right expectations regarding standards of precision for a context. A key component of this approach would perhaps require establishing the exact syntactic relationship between *sāṛhe* and the immediate multiplier it will combine with. I leave this issue open for further research. As such, the account presented in this paper is only meant to explain why complex numerals that involve *sāṛhe* and denote a precise number are unacceptable which the present paper has been able to achieve.

4 Conclusion

A new class of Complex numerals labeled 'and-a-half' Numerals was introduced. 'and-a-half' numerals resist additive components in their structure but allow further multiplication. Present paper focuses on Hindi *sāṛhe* - which is shown to be a pro-clitic using diagnostics provided by Zwicky (1985) thus explaining the word order deviation in Hindi against the

cross-linguistic pattern. It was shown that the universal named 'packing strategy' fails to rule away such constructions. 'and-a-half' numerals are marked for counting thus they fall outside the explanatory domain of packing strategy. We established that *sāṛhe* has a stereotypically approximate interpretation which is modelled via Pragmatic Halos (Lasersohn, 1999). Hindi 'and-a-half' expressions with an additive component give us two contradictory inferences. The pragmatics of sāṛhe triggers an R-inference that the speaker is being vague while, owing to RNRI principle given in Krifka (2007), the semantics of the 'and-a-half' numeral triggers a Q-inference that the speaker is being precise. This is contradictory as a number cannot be both precise and approximate at the same time. Thus explaining the contrast for the set of data on Hindi complex numerals that denote a precise number. The upshot of this analysis is that, planning component in communicating standards of precision is encoded at the phrasal level in 'and-a-half' numerals - once you set a low standard of precision you can only go lower, arbitrarily raising the standard of precision within a phrase results in illicit constructions and violates the cooperative principle.

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Number morphology on honorific nouns

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ABSTRACT

Singular honorific nouns in Hindi, Punjabi and Marathi show interesting behavior with respect to number morphology. While they uniformly trigger plural agreement, we find that certain plural affixes occur on these nouns, but others do not. I propose a morphosyntactic analysis for this asymmetry. I argue that the two types of plural affixes realize different syntactic heads: the plural affixes that occur on singular honorific nouns realize n, while the others realize Num. Building on Bhatt & Davis (2021) and using a mechanism for feature copying within the nominal phrase, I propose a structure for singular honorific nouns that can capture this generalization.

1 Introduction

Languages often co-opt plural morphology to express honorificity of/politeness towards the referent of a pronoun. This phenomenon is most common in second person pronouns, as illustrated by the French example in (1), but it is also found in the third person in some languages like Persian (Ghomeshi & Massam 2020).

(1) Vous êtes qui?
2.PL be-2.PL who
'Who are you (sg, polite)?' or 'Who are you (pl)?'

Western Indo-Aryan languages like Hindi, Punjabi and Marathi are interesting in this regard because this phenomenon is not just limited to pronouns, but is also found in nouns too. In (2)-(4), we can see that in all three languages, singular honorific nouns trigger plural agreement .

(2) mer-e pɪta ay-e
my-M.PL father come.PST-M.PL
'My father (hon) came.' Hindi

(3) mer-e fʊffəʈ a-e
my-M.PL uncle come.PST-M.PL
'My uncle (hon) came.' Punjabi

(4) majh-e vaɖil al-e
my-M.PL father come.PST-M.PL
'My father (hon) came.' Marathi

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The number morphology on these nouns with honorific singular reference (henceforth SG.HON nouns) however shows a puzzling asymmetry. Generally, plural affixes are disallowed with SG.HON nouns, despite the fact that they trigger plural agreement.[2]

(5) mer-i mã(#-ẽ) ay-ĩ
my-F mother(#-PL) come.PST-F.PL
'My mother (hon) came.' Hindi

(6) mer-e masi(*-ã) a-e
my-M.PL aunt(*-PL) come.PST-M.PL
'My aunt (hon) came.' Punjabi

(7) majh-ya aji(#-a) al-ya
my-F.PL grandmother(#-PL) come.PST-F.PL
'My grandmother(hon) came.' Marathi

However, not all plural affixes behave this way. All three languages under consideration have a class of masculine nouns ending in -a that form their plurals by changing the -a to -e. These nouns, when they are used with singular, honorific reference, always take the plural affix -e instead of the singular -a.

(8) ap=k-e bhətij-e/*-a ay-e
you-GEN-M.PL nephew-PL/*-SG come.PST-M.PL
'Your nephew (hon)/ nephews came.' Hindi

(9) twaɖɖ-e pə̀tij-e/*-a a-e
your-M.PL nephew-PL/*-SG come.PST-M.PL
'Your nephew (hon)/ nephews came.' Punjabi

(10) peʃw-e/*-a al-e
peshwa-PL/*-SG come.PST-M.PL
'The Peshwa (hon)/Peshwas came.' Marathi

This paper accounts for this asymmetry between the ability of different plural affixes to occur on SG.HON nouns. My account is framed within Distributed Morphology (Halle & Marantz 1993, 1994), a realizational theory of morphology in which morphology realizes the structures generated by the syntax.

The proposal is that the asymmetry between different plural affixes in these languages reflects an asymmetry in the syntactic heads realized by these affixes. More concretely, I claim that noun morphology in Hindi, Punjabi and Marathi realizes (at least) two syntactic heads – n and Num. The plural affix -e that occurs on SG.HON nouns realizes n, while the other plural affixes that do not occur on SG.HON nouns realize Num. Generally, the number

[2]While all three languages show number mismatch with honorifics (i.e., plural agreement with singular honorifics), Hindi also has a person mismatch and Punjabi also has a gender mismatch. The 2nd person honorific pronoun in Hindi (*ap*) triggers 3.PL agreement, and feminine honorifics in Punjabi trigger MASC.PL agreement. I leave open the question of how the gender and person mismatch should be analyzed.

features on n and Num are identical, but in SG.HON nouns, these differ, allowing us to see the asymmetry between different plural affixes. Building on Bhatt & Davis's (2021) syntax for SG.HON nouns and using a mechanism to allow for feature copying within a nominal phrase, I propose an analysis in which n ends up with a plural feature with these nouns, but Num ends up with a singular one, explaining the pattern of asymmetry.

The rest of this paper is structured as follows. In the next section, I introduce the core data, providing the relevant noun inflection paradigms and demonstrating the existence of the asymmetry between different plural affixes. In section 3, I propose a syntactic generalization about which plural affixes are (in)compatible with SG.HON nouns. Section 4 presents an account of this generalization, and section 5 deals with some complications associated with Marathi oblique cases. Section 6 concludes.

2 Noun inflection in Hindi, Punjabi and Marathi

Nouns in all three languages inflect for number, gender and case. All three languages have two numbers – singular and plural. Hindi and Punjabi have two genders – masculine and feminine. Marathi has a neuter in addition to masculine and feminine, but since I have not found any neuter nouns that can be honorific, and since our main focus is SG.HON nouns, I do not discuss Marathi neuter nouns any further. The role of case in noun morphology needs further comment. All these languages have a 'direct' case that is used in a variety of contexts, including for subjects of non-perfective clauses and perfective clauses with intransitive verbs, and non-DOM objects. All other cases – the so-called 'oblique' cases – are typically expressed by means of a clitic (in Hindi and Punjabi) or affix (in Marathi). Two examples are in (11)-(12), with the case affixes/clitics bolded.

(11) ghər **= mẽ**
house **= LOC**
'In the house.' Hindi

(12) ghoḍya - **ca**
horse **= GEN**
'Of the horse .' Marathi

With this background in place, we can discuss the relevant inflectional paradigms and the behavior of SG.HON nouns in individual languages. Let us start with Hindi.

The Hindi noun inflection paradigm is provided in (13). I use ø to represent null affixes.

(13) Hindi noun inflection paradigm

	MASCULINE class I	MASCULINE class II	FEMININE
DIRECT.SG	-a	-ø	-ø
DIRECT.PL	-e	-ø	-ã/ẽ
OBLIQUE.SG	-e	-ø	-ø
OBLIQUE.PL	-õ	-õ	-õ

Masculine nouns can be divided into two declension classes – class I and class II. Class I masculine nouns end in -a and form their DIRECT.PL and OBLIQUE.SG by changing this -a to -e, and replacing this -a with -õ in the OBLIQUE.PL. Class II masculine nouns do not change in the DIRECT.PL and OBLIQUE.SG and add -õ in the OBLIQUE.PL. To see this concretely, I have provided paradigms for a class I masculine in (14), and a class II masculine in (15).

(14) Paradigm for class I masculine noun

DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
ləʈk-a 'boy'	ləʈk-e	ləʈk-e	ləʈk-õ

(15) Paradigm for class II masculine noun

DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
bagh-ø	bagh-ø	bagh-ø	bagh-õ

An important point to note is that not all -a ending masculine nouns are necessarily class I. (16) provides an example of an -a ending class II masculine, (*pɪta*) 'father'. We know that this noun is class II because it remains *pɪta* (not **pɪte*) in the DIRECT.PL and OBLIQUE.SG, and it adds -õ instead of replacing it giving *pɪtaõ* (not **pɪtõ*) in the OBLIQUE.PL.

(16) Paradigm for a-ending class II masculine noun

DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
pɪta-ø	pɪta-ø	pɪta-ø	pɪta-õ

Feminine nouns behave straightforwardly. They do not change in the OBLIQUE.SG, and add -õ in the OBLIQUE.PL. In the DIRECT.PL, they add -ã or -ẽ. The choice between -ã and -ẽ is phonologically conditioned, with nouns ending in i taking the former affix and other nouns taking the latter affix. The final i becomes ɪy before affixes starting with a vowel by a regular phonological process in the language. Again for concreteness, the paradigms for two feminine nouns are provided in (17) and (18), one ending in i and another not ending in i.

(17) Paradigm for i-ending feminine

DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
ləʈki-ø	ləʈkɪy-ã	ləʈki-ø	ləʈkɪy-õ

(18) Paradigm for non-i-ending feminine

DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
ɔrət-ø	ɔrət-ẽ	ɔrət-ø	ɔrət-õ

Turning to the behavior of SG.HON nouns, plural affixes are generally disallowed with these nouns. We can see that this holds true for the OBLIQUE.PL affix -õ as in (19)-(20), regardless of gender, and for the FEM.PL affixes -ẽ and -ã in (21)-(22). In (21)-(22), we can also see that even though the noun itself does not show plural morphology, it still triggers plural agreement on account of it being honorific.

(19) əpn-e pɪta(#-õ) =ko dekhɪye
self.GEN-M.OBL father(#-OBLIQUE.PL) =DOM see.IMPER
'Look at your father (hon/non-hon).' Hindi

(20) əpn-i mã(#-õ) =ko dekhɪye
self.GEN-F mother(#-OBLIQUE.PL) =DOM see.IMPER
'Look at your mother (hon/non-hon).' Hindi

(21) mer-i mã(#-ẽ) ay-ĩ
my-F mother(#-DIRECT.PL) come.PST-F.PL
'My mother (hon) came.' Hindi

(22) ap=k-i bhətiji(#-ã) ay-ĩ
you-GEN-F niece(#-DIRECT.PL) come.PST-F.PL
'Your niece (hon) came.' Hindi

For class II masculines, the DIRECT.SG and DIRECT.PL are syncretic, making it impossible for us to tell what morphology we see in the direct case. For class I masculines, where we do not have this syncretism, we surprisingly get the DIRECT.PL form with -e, and not the DIRECT.SG form with -a, as illustrated in (23).

(23) ap=k-e bhətij-e/*-a ay-e
you-GEN-M.PL nephew-DIRECT.PL/*-DIRECT.SG come.PST-M.PL
'Your nephew (hon)/ nephews came.' Hindi

In this respect, the DIRECT.PL -e of class I masculines behaves differently from the oblique and feminine plural affixes -õ and -ã/-ẽ respectively. The class I masculine DIRECT.PL -e appears with SG.HON nouns, while the other plural affixes do not.

It is important to note that the exceptional behavior of class I masculine nouns is only limited to the direct case. In the oblique case, class I masculine SG.HON nouns cannot take the OBLIQUE.PL affix -õ, like all other nouns, and must appear in the singular. This is shown in (24).

(24) əpn-e bhətij-e/#-õ =ko dekhɪye
self.GEN-M.OBL nephew-OBLIQUE.SG/#-OBLIQUE.PL =DOM see.IMPER
'Look at your nephew (hon/non-hon).' Hindi

We can see that Punjabi also behaves the same way. The Punjabi paradigm is provided in (25), with an example of each type of noun.

(25) Punjabi noun inflection paradigm

	MASCULINE class I	MASCULINE class II	FEMININE
DIRECT.SG	mʊnɖ-a 'boy'	admi-ø 'man'	pèɳ-ø 'sister'
DIRECT.PL	mʊnɖ-e	admi-ø	pèɳ-ã
OBLIQUE.SG	mʊnɖ-e	admi-ø	pèɳ-ø
OBLIQUE.PL	mʊnɖ-eã	admi-ã	pèɳ-ã

Even though the phonological shape of some of the affixes is different from Hindi, SG.HON nouns show the same behaviors. Generally, the oblique and feminine plural affixes -eã̃/-ã̃ do not occur on SG.HON nouns as shown in (26)-(27).

(26) apɳ-e pə̀tij-e/#-eã̃ =nu vekho
self.GEN-M.OBL newphew-OBLIQUE.SG/*-OBLIQUE.PL) =DOM see.IMPER
'Look at your nephew (hon/non-hon).' Punjabi

(27) mer-e masi(*-ã̃) a-e
my-M.PL aunt(*-DIRECT.PL) come.PST-M.PL
'My aunt (hon) came.' Punjabi

However, once again like Hindi, class I masculines in the direct case appear with the DIRECT.PL affix -e, as shown in (28).

(28) twaɖɖ-e pə̀tij-e/*-a a-e
your-M.PL nephew-DIRECT.PL/*-DIRECT.SG come.PST-M.PL
'Your nephew (hon)/ nephews came.' Punjabi

One confound for both Hindi and Punjabi is that the DIRECT.PL affix -e is syncretic with the OBLIQUE.SG affix for class I masculines. This syncretism has led Bhatt & Davis (2021) to claim for Hindi that all SG.HON nouns appear in the OBLIQUE.SG form, even if they occur in a syntactic context that warrants the direct case. With other nouns, the DIRECT.SG and OBLIQUE.SG forms are syncretic, and so they cannot be used to verify if SG.HONs genuinely trigger the 'wrong' case morphology or not. At the very least however, Bhatt & Davis' analysis does not make any incorrect predictions for them. This analysis therefore avoids positing any asymmetry between different plural affixes, though we have to stipulate that in addition to honorifics triggering the 'wrong' number agreement, they also appear with the 'wrong' case morphology. Though this analysis is able to capture the Hindi and Punjabi facts, we will see that it is falsified by Marathi, where there is no syncretism between the DIRECT.PL and OBLIQUE.SG, and yet we still find the asymmetry between different plural affixes.

The noun inflection paradigm for Marathi is provided in (29), with an example of each type of noun. This paradigm has been constructed based on the description in Dhongde & Wali (2009), as well as native speaker judgements. This paradigm is not complete because Marathi has more than one declension class in the feminine too. However, all feminine plural affixes behave similarly, and therefore, for brevity, I use only one class of feminines as representative of all feminine nouns. Note that for the feminine noun *aji* 'grandmother', the final i becomes y before a vowel via a regular phonological process.

(29) Marathi noun inflection paradigm

	MASCULINE class I	MASCULINE class II	FEMININE
DIRECT.SG	peʃw-a 'peshwa'	vəɖil-ø 'father'	aji-ø 'grandmother'
DIRECT.PL	peʃw-e	vəɖil-ø	ajy-a
OBLIQUE.SG	peʃw-ya	vəɖil-a	aji-ø
OBLIQUE.PL	peʃw-yan	vəɖil-an	ajy-an

Let us consider the behavior of SG.HON nouns in Marathi. In this section, we will only focus on SG.HON nouns in the direct case, because their oblique case behavior is more complex and will be the subject of section 5. In the direct case, SG.HON feminine nouns in Marathi do not take their plural affix, as shown in (30). This is just like Hindi and Punjabi.

(30) majh-ya aji(#-a) al-ya
my-F.PL grandmother(#-DIRECT.PL) come.PST-F.PL
'My grandmother(hon) came.' Marathi

Again, like in Hindi and Punjabi, class I masculines take the DIRECT.PL affix -e and not the DIRECT.SG affix -a, as shown in (31).

(31) peʃw-e/*-a al-e
peshwa-DIRECT.PL/*-DIRECT.SG come.PST-M.PL
'The Peshwa (hon)/Peshwas came.' Marathi

Furthermore, as can be verified from (29), Marathi does not show the syncretism between the DIRECT.PL and the OBLIQUE.SG that is found in Hindi and Punjabi. Therefore, we can safely assume that the -e in (31) truly is the DIRECT.PL affix, and not the OBLIQUE.SG one. Bhatt & Davis' claim that honorifics are always oblique cannot account for the Marathi facts. Additional evidence that SG.HON nouns do not have to be in the oblique case comes from class II masculine nouns. (32) shows that in contexts that require the direct case, these nouns appear with the direct case affix -ø (syncretic for singular and plural), and not the OBLIQUE.SG -a or OBLIQUE.PL -an.

(32) majh-e vaɖil(*-a/*-an) al-e
my-M.PL father(*-OBLIQUE.SG/*-OBLIQUE.PL) come.PST-M.PL
'My father (hon) came.' Marathi

We can therefore rule out the hypothesis that SG.HON nouns must always appear in the oblique case. Having ruled out this analysis, we arrive at the conclusion that even though the feminine and the (Punjabi and Hindi) oblique plural affixes in these languages do not appear on SG.HON nouns, the DIRECT.PL -e of class I masculines does so. Now, our goal is to account for this pattern.

3 A syntactic generalization

In this section, I show that the class I masculine DIRECT.PL affix -e realizes a different syntactic head than the feminine and oblique plural affixes. The DIRECT.PL affix -e will be taken to realize an n head, while the other plural affixes will be taken to realize a Num head. This will allow us to restate the conclusion from the previous section in syntactic terms, using n and Num: plural affixes that realize n appear with SG.HON nouns, but plural affixes that realize Num do not.

Before considering this syntactic restatement, there is a more obvious (and perhaps less interesting) explanation for the differing behaviors of the plural affixes that needs to be ruled out. According to this null hypothesis, whether a plural affix occurs with SG.HON nouns is an idiosyncratic property of that affix, encoded into its feature specification. For concreteness, I provide a rough sketch of what this null hypothesis would look like.

We could, for example, say that there are two different kinds of 'plural' features – $\text{PL}_{semantic}$ that is only found with semantically plural nouns, and PL_{fake} that is found on both semantically plural and honorific nouns[3]. The feminine and oblique plural affixes are sensitive to $\text{PL}_{semantic}$, while the class I masculine DIRECT.PL -e is sensitive PL_{fake}. This would allow all types of plural affixes to occur with semantically plural nouns, but only the latter to occur with SG.HON nouns, explaining the data seen in section 2.

However, this analysis makes an incorrect prediction. Since tracking semantic plurality is a property of the feminine and oblique plural affixes themselves, we never expect to find these affixes associated with SG.HON nouns. I draw on some data from Marathi to show that this expectation is not met, making this null hypothesis untenable.

In Marathi, the feminine plural affix -a that occurs on feminine nouns is also found on adnominals and verbs that agree with any feminine plural noun. This can be seen by comparing the adjective and verb agreement in (33), where we have feminine singular agreement with a singular (non-honorific) feminine noun, with (34), where we have feminine plural agreement with a plural noun. The latter involves the addition of the affix -a after the general feminine affix -i, which becomes -y due to the phonological process mentioned above.

(33) mhatar-i aji al-i
old-F grandmother come.PST-F
'The old grandmother(non-hon) came.' Marathi

(34) mhatar-y-a ajy-a al-y-a
old-F-PL grandmother-DIRECT.PL come.PST-F-PL
'The old grandmothers came.' Marathi

As was mentioned in the introduction, all SG.HON nouns in all three languages trigger plural agreement, regardless of whether they appear with plural morphology or not. For

[3]This of course raises the question of what is the semantic content of PL_{fake} that allows it to occur with both semantically plural and honorific nouns, but this is a challenge for any account that seeks to explain why honorifics co-opt plural morphology, and not just this particular account.

Marathi, this means that when a feminine noun is SG.HON, the feminine plural marker -a still appears on adnominal/verb agreement even though it does not appear on the noun, as shown in (35).

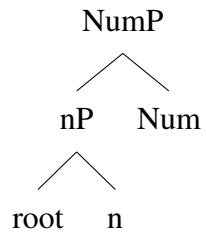
(35) mhatar-y-a aji(#-a) al-y-a
old-F-PL grandmother(-#DIRECT.PL) come.PST-F-PL
'The old grandmother (hon) came.' Marathi

Because the same affix on nouns is incompatible with SG.HON nouns, but on adnominals and verbs is compatible with them, it will not do to encode (in)compatibility with SG.HON nouns in the featural specification of the affix. (38) is showing us that the same affix, in different syntactic positions, behaves differently with respect to its compatibility with SG.HON nouns. [4]

I take this as evidence that a syntactic analysis that seeks to explain the (in)compatibility of different plural affixes with SG.HON contexts in terms of the syntactic position of the affixes is on the right track. I now present a proposal that moves us towards that goal.

I assume that nouns realize at least the structure shown in (36). Following much of the Distributed Morphology literature, I assume that nouns involve an acategorial root that attaches to a nominalizing head, n. Further, following Ritter (1991) and subsequent work, I assume that there is also a Num head that takes a noun (nP) complement. The crucial aspect of this structure is the presence of two functional heads, an inner n head and an outer Num head.

(36)



The next step is to show that oblique and feminine plural affixes realize an outer syntactic node than the class I masculine DIRECT.PL affix -e. We start by comparing class I and class II masculine affixes in Punjabi and Marathi. The relevant paradigms are repeated below in (37) and (38).

[4]The same point cannot be made by Hindi or Punjabi for independent reasons. In Hindi, the plural affixes -ã/-ẽ found on feminine nouns are never found on adnominals and verbs. In Punjabi, while the feminine plural affix -ã does occur on adnominals and verbs, feminine SG.HON nouns trigger masculine agreement, so we never get to see feminine agreement (singular or plural) with honorific nouns. In none of these languages do oblique arguments trigger agreement.

(37) Punjabi masculine inflection paradigm

	class I	class II
DIRECT.SG	-a	-ø
DIRECT.PL	-e	-ø
OBLIQUE.SG	-e	-ø
OBLIQUE.PL	-eã	-ã

(38) Marathi masculine inflection paradigm

	class I	class II
DIRECT.SG	-a	-ø
DIRECT.PL	-e	-ø
OBLIQUE.SG	-ya	-a
OBLIQUE.PL	-yan	-an

We can see that class I masculine affixes can be segmented as consisting of an affix specific to class I nouns, which I will call the inner affix, followed by an affix shared with class II nouns, which may be null. The proposed segmentations are shown in (39) and (40).

(39) Punjabi masculine inflection paradigm

	class I	class II
DIRECT.SG	-a-ø	-ø
DIRECT.PL	-e-ø	-ø
OBLIQUE.SG	-e-ø	-ø
OBLIQUE.PL	-e-ã	-ã

(40) Marathi masculine inflection paradigm

	class I	class II
DIRECT.SG	-a-ø	-ø
DIRECT.PL	-e-ø	-ø
OBLIQUE.SG	-y-a	-a
OBLIQUE.PL	-y-a	-an

In Punjabi, the OBLIQUE.PL affix for class I nouns consists of an inner affix -e, found in the DIRECT.PL and OBLIQUE.SG with these nouns too, followed by the general OBLIQUE.PL affix -ã, found also in class II. In Marathi, the OBLIQUE.SG and OBLIQUE.PL class I affixes, -ya and -yan consists of an inner affix -y followed by the general masculine oblique affixes, -a and -an, also found in class II. In the other cells of the above paradigms, the corresponding class II affix is -ø and so only the class I-specific part, which is -a or -e, receives overt realization.

This segmentation of class I masculine affixes can be explained using the claim that there are two syntactic heads at play. In class I nouns, the inner affixes -a/-e/-y realize the inner n head. For class II nouns, n is uniformly realized as null. The Punjabi OBLIQUE.PL -ã and the Marathi OBLIQUE.SG -a and OBLIQUE.PL -ã, that are not specific to class I masculines, can be taken to realize the outer Num head. In other instances (DIRECT.SG,

DIRECT.PL and Punjabi OBLIQUE.SG), Num is realized as null. When both n and Num are overt, we can see two affixes co-occur in the expected order.

(41) and (42) shows the exponents of both n and Num for each cell in the Punjabi and Marathi masculine paradigm. The affixes realizing n are shown in red, and the affixes realizing Num are shown in blue.

(41) Punjabi masculine inflection paradigm: exponents of n and Num

	class I	class II
DIRECT.SG	-a-ø	-ø-ø
DIRECT.PL	-e-ø	-ø-ø
OBLIQUE.SG	-e-ø	-ø-ø
OBLIQUE.PL	-e-ã	-ø-ã

(42) Marathi masculine inflection paradigm: exponents of n and Num

	class I	class II
DIRECT.SG	-a-ø	-ø-ø
DIRECT.PL	-e-ø	-ø-ø
OBLIQUE.SG	-y-a	-ø-a
OBLIQUE.PL	-y-an	-ø-an

This neat picture of segmentation in class I masculines does not translate as easily to Hindi. Consider the Hindi masculine paradigm, repeated in (43).

(43) Hindi masculine inflection paradigm

	class I	class II
DIRECT.SG	-a	-ø
DIRECT.PL	-e	-ø
OBLIQUE.SG	-e	-ø
OBLIQUE.PL	-õ	-õ

As we can see, the class I OBLIQUE.PL affix is not -e-õ as would be expected if Hindi behaved analogously to Punjabi and Marathi. However, in previous work (Sinha 2018), I posited that the OBLIQUE.PL affix of class I masculines in Hindi is in fact -eõ, and it surfaces as -õ due to a phonological process in the language that deletes e before round vowels. The existence of this process receives support from the fact that the language lacks the surface vowel sequences -eo, eu, eʊ etc. Further, this phonological process can explain why verbs that end in e in Hindi drop this final -e when they take the 2PL affix -o or the 1SG affix -ũ, as shown in (44)

(44) Dropping of e before round vowels in verb inflection

	2PL: -o	1SG: -ũ
le 'take'	l-o	l-ũ
	*le-o	*le-ũ
de 'give'	d-o	d-ũ
	*de-o	*de-ũ

If we say that the underlying form of the class I masculine affix is -eõ, the Hindi facts look almost identical to the Punjabi ones, with the only difference being that Hindi uses -õ instead of -ã as the exponent of Num for OBLIQUE.PL. The segmentation of Hindi affixes into exponents of n (red) and Num (blue) is in (45).

(45) Hindi masculine inflection paradigm: exponents of n and Num

	class I	class II
DIRECT.SG	-a-ø	-ø-ø
DIRECT.PL	-e-ø	-ø-ø
OBLIQUE.SG	-e-ø	-ø-ø
OBLIQUE.PL	-e-õ	-ø-õ

Let us examine the status of different plural affixes under the current analysis. In all three languages, the DIRECT.PL affix of class I masculines realizes n. It appears in red in (41), (42) and (45). In contrast, the oblique plural affixes realize Num, appearing in blue.

We can also show that feminine plural affixes realize Num, though the argument for that is more complex. We begin by observing that for many roots in all three languages, the -a affix found in class I masculines is in complementary distribution with a feminine affix -i [5]. As shown in (46)-(48), in all three languages, many class I masculine nouns have corresponding feminines that are formed by replacing the -a with -i in the feminine.

(46) Hindi masculine-feminine alternations

MASCULINE	FEMININE
ləʈk-a 'boy'	ləʈk-i 'girl'
ghoʈ-a 'horse'	ghoʈ-i 'mare'
bhətij-a 'nephew'	bhətij-i 'niece'

(47) Punjabi masculine-feminine alternations

MASCULINE	FEMININE
pot-a 'grandson'	pot-i 'granddaughter'
kòʈ-a 'horse'	kòʈ-i 'mare'
pə̀tij-a 'nephew'	pə̀tij-i 'niece'

(48) Marathi masculine-feminine alternations

MASCULINE	FEMININE
bhac-a 'nephew'	bhac-i 'niece'
ghoɖ-a 'horse'	ghoɖ-i 'mare'
kutr-a 'dog'	kutr-i 'bitch'

Since this -i is in complementary distribution with -a, it is reasonable to assume that it realizes the same morphosyntactic head as it, i.e., n. Next, we observe that when these nouns are pluralized, the plural affix (both in the direct and oblique case) is added after this -i. This is shown in (49)-(51) for the DIRECT.PL in all three languages.

[5]The alternation between the affixes -a and -i to indicate gender is also found on adnominals and participles in all three languages.

(49) Hindi: plural of feminines with -i

DIRECT.SG	DIRECT.PL
ləʈk-i ‘girl’	ləʈk-ɪy-ã
ghoʈ-i ‘mare’	ghoʈ-ɪy-ã
bhətij-i ‘niece’	bhətij-ɪy-ã

(50) Punjabi: plural of feminines with -i

DIRECT.SG	DIRECT.PL
pot-i ‘granddaughter’	pot-i-ã
kòʈ-i ‘horse’	kòʈ-i-ã
pə̀tij-i ‘niece’	pə̀tij-i-ã

(51) Marathi: plural of feminines with -i

DIRECT.SG	DIRECT.PL
bhac-i ‘niece’	bhac-y-a
ghoɖ-i ‘mare’	ghoɖ-y-a
kutr-i ‘bitch’	kutr-y-a

The addition of a vowel after -i leads to some changes due to previously mentioned regular phonological processes in Hindi (i → ɪy) and Marathi (i → y), but abstracting away from these processes, it is clear that the feminine plural affixes realize a head that is distinct from and further away from the root than n. It is therefore reasonable to assume that this head is Num.

It is worth remembering that not all feminine nouns take this affix -i, and presumably for these nouns, like with class I masculines, the exponent of n is null and we only get overt exponents of Num. For illustration, (52) shows paradigms for two feminine nouns in Punjabi: one with the overt feminine affix -i and one without. Henceforth, I use the terms i-feminines and non-i-feminines to refer to these two classes of feminines. As before, exponents of n are shown in red and exponents of Num are shown in blue.

(52) Punjabi i-feminines and non-i-feminines: exponents of n and Num

	i-feminine pə̀tiji ‘niece’	non-i-feminine ɔrət ‘woman’
DIRECT.SG	pə̀tij-i-ø	ɔrət-ø-ø
DIRECT.PL	pə̀tij-i-ã	ɔrət-ø-ã
OBLIQUE.SG	pə̀tij-i-ø	ɔrət-ø-ø
OBLIQUE.PL	pə̀tij-i-ã	ɔrət-ø-ã

Taking stock of the discussion so far, we arrive at the conclusion that the overt feminine and oblique plural affixes in these languages realize Num, while the class I masculine DIRECT.PL affix -e realizes n. Setting aside the Marathi oblique affixes which we have not yet discussed, the former affixes are incompatible with SG.HON nouns, but the class I masculine DIRECT.PL -e occurs with SG.HON nouns. This allows us to restate the generalization from section 2 in syntactic terms: plural affixes that realize n appear with SG.HON nouns,

but plural affixes that realize Num do not appear with SG.HON nouns. The next step is to provide an account for this generalization, which I do in the next section.

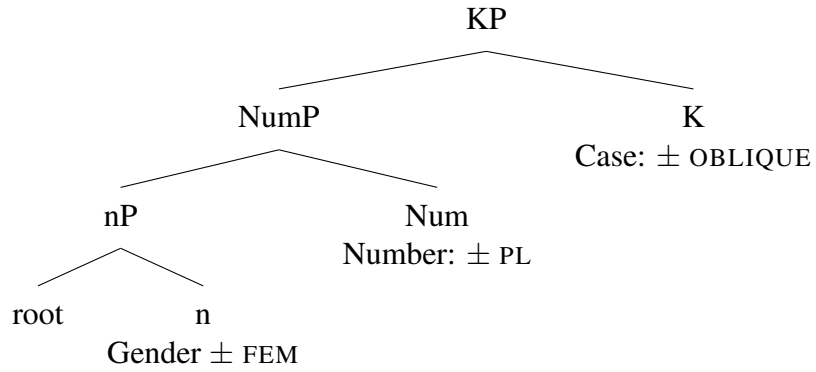
4 Explaining the generalization

Our goal now is to explain why plural affixes that realize n are compatible with SG.HON nouns, but affixes that realize Num are not. In addition, our account must also be able explain why SG.HON nouns uniformly trigger plural agreement.

I will first present my analysis for how noun morphology works for non-honorific nouns, and then extended it to account for the behavior of honorific nouns, using Bhatt & Davis' (2021) proposal for Hindi honorifics.

As stated in the previous section, I assume that the nominal structure involves an n head and a Num head. Gender features are introduced on n (Lecarme 2002, Ferrari 2005, Kramer 2009, 2014, 2015), while number features are introduced on Num (Ritter 1991). The number feature on Num determines the semantic number interpretation – semantically singular noun have –PL, while semantically plural nouns have +PL. Further, there is also a K head that carries case features. The relevant structure is shown in (53).

(53)



In the previous section, I proposed that noun affixes realize both n and Num, with SG.HON nouns taking the plural affixes that realize n, but not the plural affixes that realize Num. Let us consider the n- and Num-realizing affixes separately. For space reasons and concreteness, I illustrate how these affixes work for Hindi. Marathi and Punjabi behave analogously, except for Marathi oblique case, discussed in the next section. Once we undo phonological changes, the Hindi n-realizing affixes are as in (54). I continue the convention of using red to indicate n-realizing affixes.

(54) n-realizing affixes in Hindi

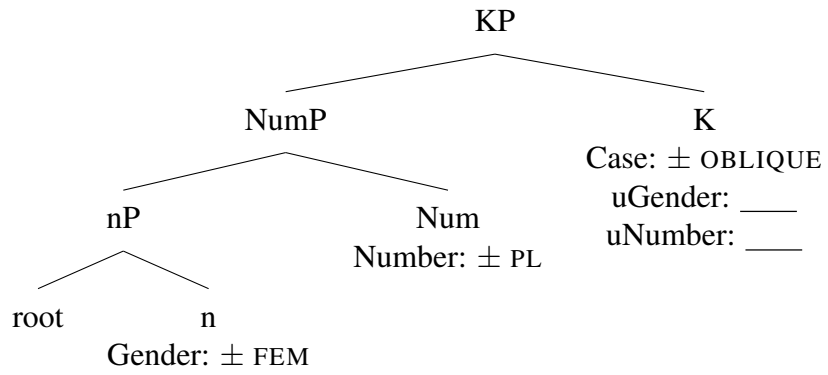
	MASCULINE class I	MASCULINE class II	FEMININE with -i	FEMININE without -i
DIRECT.SG	-a	-ø	-i	-ø
DIRECT.PL	-e	-ø	-i	-ø
OBLIQUE.SG	-e	-ø	-i	-ø
OBLIQUE.PL	-e	-ø	-i	-ø

While the realization of n is invariant across case and number for most nouns, for class I masculines, it is not. We get -a in the DIRECT.SG, -e in the DIRECT.PL, and -e in the oblique case. But in the proposal so far, n only starts with gender features, which raises the question of how n gets to be sensitive to features that do not arise on it.

To account for this, I propose that the ϕ-features (number and gender) inside a KP are first collected on the K head, and then the ϕ-features and case features on K are copied onto every head within that KP. The idea that ϕ-features within a nominal phrase are first collected on some high projection (like K or D), and then distributed on different heads within the phrase is common in analyses of concord (e.g., Baker 2008, Norris 2012, Pesetsky 2013, Toosarvandani & Van Urk 2014, Baier 2015), though different proposals differ in how exactly these two steps are implemented. I sketch out my implementation of these two steps below.

The first step of this process, which is collecting ϕ-features on K, is implemented via Agree. I assume that K has unvalued number and gender features, as shown in (55). K probes downwards and copies gender and number features from the closest (in this case, the only) heads that have those features, i.e. n and Num respectively.

(55)



The second step of copying features from K is due to the rule in (56). This rule is inspired by Pesetsky's (2013) *Feature Assignment*.

(56) When a K head merges with its complement and has valued all its unvalued features via Agree, for every feature f on K, and for every head H in the complement of K, the value of f on K is copied onto H, provided that H does not already have a value for f.

The idea is that the case, gender and number features on K acquired via Agree, get copied onto different heads in the complement of KP, including n and Num, provided that the head in question does not already have a gender or number feature. Number and case features get copied onto n from K because n lacks any number and case value. However, since n does already have gender features when K merges, gender features from K are not copied. Along similar lines, gender and case features get copied onto Num from K, but number features do not.

For non-honorific nouns, the number feature on n is identical to the one on Num. So, n has –PL when the noun is semantically singular, and it has +PL when the noun is semantically plural.

At this moment, we may ask why we did not chose a simpler explanation and say that n gets to be sensitive to features other than the ones that arise on it via contextual allomorphy. For instance, we could have said that the realization of n is subject to contextual allomorphy triggered by the number feature on Num. For non-honorific nouns, this proposal is indistinguishable from mine because under my proposal, for non-honorific nouns, the features on n end up being identical to the ones on Num. But we will see that in SG.HON nouns, my proposal allows n and Num to have different number features. This will allow us to explain why we get plural n-realizing affixes on SG.HON nouns, but not plural Num-realizing affixes. The alternative account based on Num-triggered number allomorphy on n has no way to make the number feature that determines the realization of n be distinct from the feature on Num. As such, it will not be able to explain the number morphology on SG.HON nouns.

The relevant Vocabulary Items for n in Hindi are in (57). I assume that these Vocabulary Items are subject to Paninian ordering, with more specific Vocabulary Items blocking less specific ones.

(57) VIs for n in Hindi
  a. [ ] ⟷ -ø / class II masculine, non-i-feminine _
  b. [+FEM] ⟷ -i
  c. [–FEM +OBLIQUE] ⟷ -e
  d. [–FEM +PLURAL] ⟷ -e
  e. [ ] ⟷ -a

Let us see how these VIs derive the distribution for n-realizing affixes. For class II masculines and for non-i-feminines, n is realized as null, per (57a). For the other nouns, we get -i for feminines per (57b). For class I masculines in the oblique case, we get -e per (57c). We can see that (57a)-(57c) are unspecified for number, and number plays no role in determining the choice of the n-affix for feminines, class II masculines, and class I masculines in the oblique case. Only in class I masculines in the direct case do we see an effect of number. Here, the choice is between the affixes in (57d) and (57e), since all other affixes are inapplicable. We get the affix -e for plural, per (57d) and the underspecificied affix -a for non-honorific singulars, per (57e).

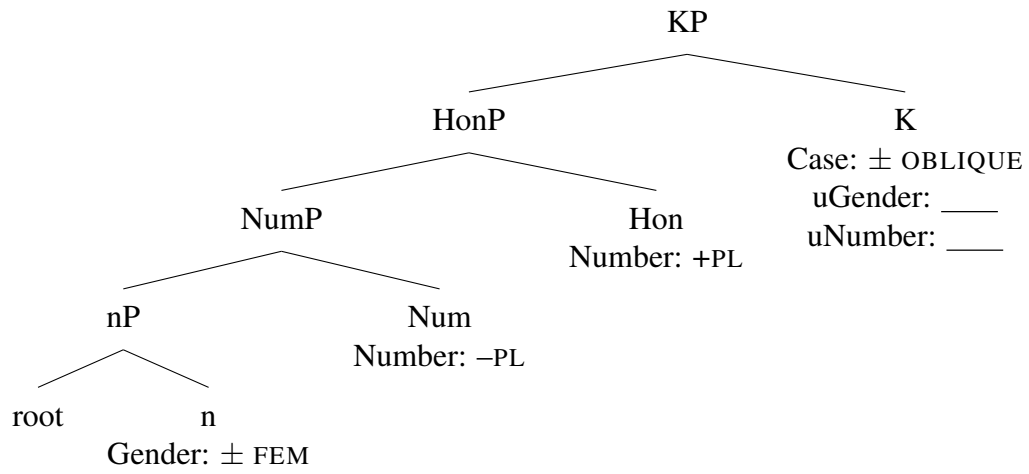
Coming to the exponents of Num, the Hindi Vocabulary Items for Num are provided in (58). (58a) ensures -õ with all plural nouns in the oblique case and (58b)-(58c) ensures -ã or -ẽ with feminine plural nouns in the direct case, depending on whether the immediately preceding segment is an i or not. Elsewhere, (58d) applies. As a result, singulars and masculine plurals in the direct case take no overt exponent of Num. Recall that even though the Num head does not start out with gender and case features, it acquires them via the feature copying process described above, which allows the realization of Num to be sensitive to gender and number.

(58) VIs for Num in Hindi
a. [Num, +PL, +OBLIQUE,] ⟷ -õ
b. [Num, +PL, +FEM, −OBLIQUE] ⟷ -ã / i _
c. [Num, +PL, +FEM, −OBLIQUE] ⟷ -ẽ
d. [Num] ⟷ -ø

This analysis can therefore capture how the realization of both n and Num is sensitive to number, gender and case, and why, for non-honorific nouns, the number features on both of them end up being the same.

Now, we can consider SG.HON nouns. I adopt Bhatt & Davis' (2021) proposal that they involve an Hon head with a plural feature. The plural (+PL) feature on Hon gets interpreted as honorificity (and not semantic plurality) by a rule of contextual allosemy. This Hon head takes a NumP complement with a singular (–PL) feature, since the number feature on Num determines semantic number. The Hon head intervenes between the Num and K head, as shown in (59).

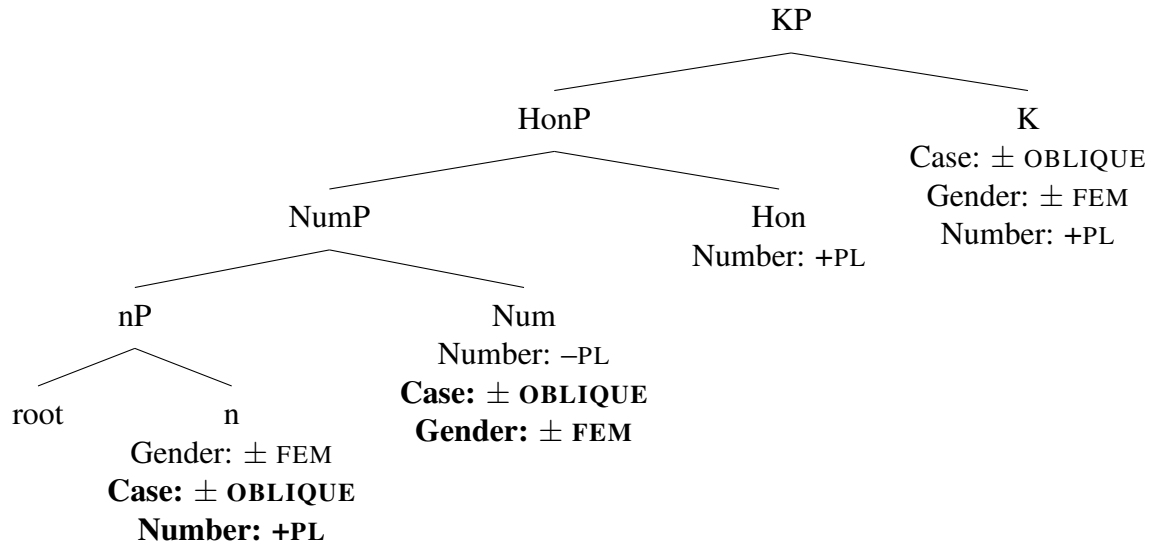
(59)



We can account for all the relevant facts if we assume that all elements that show agreement with the noun merge above the Hon head. For such an element, the closest number feature is the +PL feature on Hon and not the –PL feature on Num. This ensures that for all elements that agree with this noun for number will have plural agreement because they will copy the +PL feature from Hon, rather than the –PL feature from Num. This is also true for K.

Moreover, since the number features copied onto n come from K, n ends up with a +PL feature in these nouns, meaning that the number features on n and Num are different for SG.HON nouns, as illustrated in (60). The features on n and Num copied from K are shown in bold in (60). This asymmetry between n and Num ensures that with SG.HON nouns, we get the plural n-realizing affix but not the plural Num-realizing affixes.

(60)



To see how this works, let us look at some examples from Hindi. Consider class I masculines first, which have the DIRECT.PL -e instead of the DIRECT.SG -a, when they occur as SG.HON nouns. In SG.HON nouns, n has the feature +PL, and consequently (57d) applies, giving -e as the exponent of n. On the other hand, Num has the feature –PL, but in the direct case for masculine nouns, Num is realized as ø regardless of the number feature on Num. So, even though a SG.HON noun differs from a semantically plural noun in terms of the number feature on Num, this difference ends up being inconsequential for the inflection of masculine nouns in the direct case. Consequently, the SG.HON ends up looking like the plural.

On the other hand, for class I masculines in the oblique case, and class I masculines and feminines in general, the realization of n is invariant across both numbers, but the realization of Num is not. In these instances, with SG.HONs, we get the singular exponent of Num -ø, instead of the plural -õ/-ẽ/-ã. As a result, the SG.HON noun ends up looking like the singular rather than the plural.

Our analysis therefore is able to capture the asymmetry between n- and Num-realizing plural affixes with respect to their ability to occur with SG.HON nouns. The only issue left to be discussed is the oblique case affixes of Marathi.

5 Marathi oblique case

Setting aside the n-realizing affixes, the Marathi paradigm looks like (61). Distinctions between different classes in the same gender become irrelevant, because these classes only differed in their n-realizing affix.

(61) Marathi inflection without n-realizing affixes

	DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
MASCULINE	-ø	-ø	-a	-an
FEMININE	-ø	-a	-ø	-an

If Marathi behaved like Hindi and Punjabi, then these affixes would be expected to realize Num. Then, it follows that we should get the singular, rather than the plural versions of these affixes in SG.HON nouns. We saw that this was true for feminine nouns in the direct case: SG.HON versions of these nouns did not take the plural affix -a.

Things are more complicated in the oblique case however. If the above affixes realized Num, we predict the singular -a for masculines and -ø for feminines, instead of the plural -an. These predictions prove to be incorrect. For SG.HON masculines in the oblique case, we get plural -an instead of the singular -a, as shown in (62).

(62) vaḍil-an-na boləw
father-OBLIQUE.PL call.IMPER
'Call the father (hon)/fathers.' Marathi

For feminines, we find something more unusual. The SG.HON form does not take the singular -ø or the plural -an, but a different inflection altogether -n, as shown in (63). For now, I gloss this -n as '?' to indicate that we do not know what it is.

(63) aji-n-na boləw
grandmother-? call.IMPER
'Call the grandmother (hon).' Marathi

To make sense of these facts, I propose to further segment OBLIQUE.PL affix -an, as consisting of -a, which realizes Num, followed by -n. I claim that the various -a in (61) realize Num, while -n realizes K. This is consistent with -n occurring further away from the root than -a. Outside the OBLIQUE.PL, K is realized as null. The revised paradigm with Num and K-realizing affixes segmented is in (64). Num-realizing affixes are in blue, while K-realizing ones are in black.

(64) Marathi inflection without n-realizing affixes

	DIRECT.SG	DIRECT.PL	OBLIQUE.SG	OBLIQUE.PL
MASCULINE	-ø-ø	-ø-ø	-a_1-ø	-a_1-n
FEMININE	-ø-ø	-a_2-ø	-ø-ø	-a_2-n

Even though both masculines and feminines have -a as an exponent of Num in the OBLIQUE.PL, these are different affixes, as indicated by distinct subscripts for these affixes. Crucially, for masculines, -a_1 is an oblique affix that is not specified for number, because it also occurs in the OBLIQUE.SG of masculine nouns. For feminines, -a_2 is an plural affix that is not specified for case, because it also occurs in the DIRECT.PL of feminine nouns. This difference will explain the difference between masculine and feminine SG.HON nouns in the oblique case.

Recall that under our analysis for SG.HON nouns, Num has a singular feature, but K ends up with a plural feature. Therefore, we predict a singular exponent of Num and a plural exponent of K with singular honorific nouns. Given the segmentation in (64), this is exactly what happens. For SG.HON masculines in oblique case, we always get -a_1 (since

it is underspecified for number), followed by a plural exponent of K, which is -n. As a result, SG.HON nouns look identical to plural ones, as in (62). For SG.HON feminines in the oblique case, the plural exponent of Num -a_2 is ruled out, but we still get the plural exponent of K, -n. Consequently, this form of the noun looks distinct from both its (regular) singular and plural forms.

The behavior of feminine nouns in the oblique case is particularly supportive of the general approach we have adopted of segmenting noun inflection into smaller affixes because we can see that a part of the feminine OBLIQUE.PL inflection -an is incompatible with SG.HON nouns (-a), and a part of it is compatible (-n). If these were not decomposed into smaller affixes, we would have no way to capture this variable behaviors of different parts of the inflection.

6 Conclusion

This paper has proposed an account for the varying behavior of different plural affixes with respect to their ability to occur in SG.HON nouns. This account relies on a specific morphosyntax for noun inflection in these languages, which makes use of three heads in the nominal spine, n, Num and K. Aside from accounting for the facts in these three languages, the account developed here makes claims that have implications beyond these languages.

Along with Bhatt & Davis (2021), I proposed that the plural morphology associated with honorifics from a dedicated Hon head, which hosts a +PL feature. It is worthwhile to consider if this proposal provides any insight in analyzing other honorificity-related phenomena cross-linguistically. A particularly insightful avenue for this research would be the so-called hybrid agreement patterns associated with honorific pronouns (Puškar-Gallien, 2019).

I also proposed a rule of feature copying that allows features from the K head to be copied onto different heads within the nominal phrase, including n and Num. Another interesting avenue for future work would be to see if this rule can be understood as a consequence of some more general syntactic (or potentially post-syntactic) process. Analysis of different kinds of concord patterns seems to me to be an area that will yielf fruitfut results.

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