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Editorial Statement

We are happy to bring to you the first, inaugural issue of the *Journal of South Asian Linguistics*. This Journal was first conceived of just over a year ago and we are extremely pleased to watch it now become a reality. The journal grew out of a conviction that we found we shared with other colleagues working on South Asian languages, namely that there should be a forum for a broad spectrum of linguistic work devoted to South Asian languages. There is a decently sized community of people working on South Asian languages, but at this point there is no journal devoted to the linguistics of these languages. In contrast, the Germanic languages, the Romance languages, the Slavic languages, and East Asian languages, to name a few, have successful high quality linguistics journals devoted to them. A related concern we had was that this new forum should be freely accessible to all scholars, in particular also scholars based on the Subcontinent, where access to published material is often a problem.

This led us to explore the idea of an on-line journal. Traditional print scholarly journals are based on an arrangement that involves the editors and authors doing all of the work and then being unable to freely disseminate their intellectual property. This arrangement has been increasingly recognized as obsolete and is being successfully challenged in a number of disciplines such as Computer Science, Physics and, more recently, Linguistics. We hope that the on-line nature of our journal will indeed be able to make work on South Asian languages more freely available to a wide community; we also hope to be able to exploit the flexibility afforded us by the online format. At the same time, with CSLI Publications standing behind the journal, we also have access to the more long-time guarantee of paper-publishing, as CSLI will publish the issues of each year in paper format and archive them in the library.

We would like to thank Dikran Karaguezian at CSLI Publications for taking on board on-line journal publication as part of the activities of CSLI and for working with us on making this journal a reality. Indeed, quite a number of people helped us along the way to this first issue. Lauri Kanerva at CSLI Publications provided us with a first version of the style sheet. Sebastian Sulger, a research assistant at the University of Konstanz, installed the Open Journal Systems which the LSA recommends for On-Line journals and which the *Journal of South Asian Linguistics* now relies on. He continues to provide computational support for the journal. Melanie Seiß, also a research assistant at Konstanz, did most of the typesetting into L^AT_EX. And finally, there are, of course, the reviewers, without whom nothing would have been possible. We would like extend our heartfelt thanks to all of them.

This first inaugural issue consists of three papers. The first by Eystein Dahl derives the constraints on the morphosyntax of performatives in Archaic Vedic, in particular their aspectual specification, from the semantics of performativity. The second by Alice Davison points out a case constraint that distinguishes between control environments and raising environments in Hindi-Urdu and explores the implications of this constraint for various theories of control within the GB and Minimalist traditions. The final paper by Patil et al. brings experimental techniques to bear upon the interaction of focus, word order, and intonation in Hindi. Together these papers are a fine illustration of the vigor, depth, and diversity of linguistic work on South Asian languages. They bring together methodologies drawn from the various subfields of linguistics: syntax, semantics, phonology, historical linguistics, and phonetics. The papers exemplify a wide range of data sources: historical corpora, introspective judgements, and experimental techniques. The range of linguistic investigation and analysis represented by these papers is exactly what we were aiming for in founding this journal, namely, theoretically well grounded papers addressing a broad range of linguistic issues from the perspective of South Asian languages, but whose results and analyses are nevertheless crosslinguistically motivated, ensuring that the impact of each of the papers goes well beyond the analysis of the language in question.

For the continued success of this journal, we would like the help of you, our readers. Please send us your papers and if you see a paper that will be relevant, please tell us about it and the author about the journal. Many a paper on South Asian languages lies lost in the author's filing cabinet for want

of a proper venue. We hope that JSAL will provide a venue for dissemination of theoretical proposals inspired by data from the South Asian languages as well as theoretically informed descriptive work on the South Asian languages. So please look into your filing cabinets and help us get the word out!

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Performative Sentences and the Morphosyntax-Semantics Interface in Archaic Vedic

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ABSTRACT

Performative sentences represent a particularly intriguing type of self-referring assertive clauses, as they constitute an area of linguistics where the relationship between the semantic-grammatical and the pragmatic-contextual dimension of language is especially transparent. This paper examines how the notion of performativity interacts with different tense, aspect and mood categories in Vedic. The claim is that one may distinguish three slightly different constraints on performative sentences, a modal constraint demanding that the proposition is represented as being in full accordance with the Common Ground, an aspectual constraint demanding that there is a coextension relation between event time and reference time and a temporal constraint demanding that the reference time is coextensive with speech time. It is shown that the Archaic Vedic present indicative, aorist indicative and aorist injunctive are quite compatible with these constraints, that the basic modal specifications of present and aorist subjunctive and optative violate the modal constraint on performative sentences, but give rise to speaker-oriented readings which in turn are compatible with that constraint. However, the imperfect, the present injunctive, the perfect indicative and the various modal categories of the perfect stem are argued to be incompatible with the constraints on performative sentences.

1 Introduction

Performative sentences represent a particularly intriguing type of self-referring assertive clauses, as they constitute an area of linguistics where the relationship between the semantic-grammatical and the pragmatic-contextual dimension of language is especially transparent. Hence our understanding of the interface between semantics and pragmatics may be significantly enhanced by studying the morphosyntactic peculiarities of performative utterances in different languages.¹ This paper examines the system of performative sentences in Archaic Vedic, the oldest stage of Indo-Aryan, which belongs to the Indo-Iranian branch of the Indo-European language family. This language has a particularly rich inventory of distinct morphosyntactic types of performative sentences and thus provides a range of interesting data which may enhance our understanding of the semantics of performativity.

It should be noted from the outset that I take performative sentences to have three slightly different, yet interrelated properties. First, we may note that the utterance of a performative sentence results in what may be called a purely linguistic event, i.e. the addition of a new sentence to the Common Ground. Elaborating on a suggestion by Portner (2004, 2007), I take this to be the basic

¹I refer the reader to Bary (2007, 2008), Rogland (2001) and Weninger (2000) for a discussion of the peculiar morphosyntactic encoding of performative sentences in Classical Greek, Classical Syriac and Classical Ethiopic, respectively. A cross-linguistic study of the morphosyntax of performativity remains a desideratum.

function of assertive clauses in general and hence regard it as a defining characteristic of the general clause type of which performative sentences form a subtype. Second, performative sentences are self-referring, in the sense that they typically contain a first person form of a speech act verb or an equivalent construction which at the same time denotes the sentence and represents an instance of the sentence. Third, the utterance of a performative sentence simultaneously causes what may be called an extra-linguistic event, i.e. an event which is outside the realm of linguistics proper. Following scholars like Austin (1962), Ginet (1979), Harnish (1988/1993, 2007) and Searle (1989 and elsewhere) I take this latter function to be the defining characteristic of performative sentences as opposed to other types of self-referring, assertive clauses. Section 2 contains a brief overview of the Archaic Vedic sources and the system of performative sentences found in this language.

2 Performative sentences in Archaic Vedic

The primary data constituting the empirical basis of the discussion in the present paper are gathered from the two oldest attested stages of Indo-Aryan, which are commonly referred to as Old and Early Middle Vedic (cf. Witzel 1989, 1995). In the present context, I take Old Vedic to be represented by the language of the oldest books (books II-IX) of the Rigveda (RV), whereas Early Middle Vedic is understood as the language of the later books of the Rigveda (books I and X) and the language of the Atharvaveda (AVŚ, AVP). As there is a close correspondence between these two stages of Vedic, I chose to treat them as one linguistic unit here, for which I have chosen to adopt the label ‘Archaic Vedic’.²

The primary sources considered here exclusively consist of metrically composed hymns. The hymns constituting the Rigveda are mostly addressed to one or more of the various gods belonging to the Vedic pantheon and therefore typically consist of a praise of their mythical deeds, an invitation to come and participate in the sacrificial ritual, a request to grant a wish of the speaker or an emphasis on the previous merits of the speaker with respect to the addressee. The hymns constituting the Atharvaveda, on the other hand, mostly comprise magical spells for various non-ritual purposes, including charms against various types of diseases, incantations for luck in love or erotic affairs and various sorts of curses. As indicated by the nature of these sources performative sentences represent a particularly well attested sentence type and one may therefore reasonably assume that the actually attested sample of performative sentences in Archaic Vedic is fairly comprehensive, reflecting the synchronic grammar of these stages in a reliable manner, so that, say, the absence of a given category in performative sentences may be taken as a reflection of the fact that it is incompatible with the semantic notion of performativity rather than a reflection of an accidental gap in the corpus.

We may distinguish at least seven morphologically distinct types of performative sentences in Archaic Vedic, which may be illustrated by the examples in (1a) through (1g) respectively.

- (1) a. prá tát te adyá śipiviṣṭa náma
 forth this.ACC you.GEN.SG today pervaded.by.rays.VOC.SG name.ACC
 aryáḥ śaṃsāmi vayúnāni vidvān
 pious.man.GEN extol.1SG.PRS sacred.customs.ACC knowing.NOM.SG
 ‘O you who are pervaded by rays, knowing the sacred customs of a pious man I extol your name’ (RV VII 100.5)
- b. námo divé bṛhaté ródasibhiyām
 reverential.salutation.ACC heaven.DAT great.DAT.SG two.earths.DAT
 mitrya vocaṃ varuṇāya mīlhūṣe
 Mitra.DAT address-1SG.AOR.INJ Varuṇa.DAT bountiful.DAT.SG
 sumṛīkāya mīlhūṣe
 gracious.DAT.SG bountiful.DAT.SG
 ‘I address a reverential salutation to the great heaven, to the two earths, to Mitra, to Varuṇa, the bountiful, the gracious, the bountiful’ (RV I 136.6)

²There are in fact a few morphosyntactic differences between Old and Early Middle Vedic, but as they do not seem to have impact on the system of performative sentences, they can be safely disregarded in the present context.

- c. *yāvati* *dyāvāpṛthivī* *varimṇā*
 as.great.as-NOM.DU heaven.and.earth-NOM.DU width.INS
yāvāt *saptá síndhavo* *viṭaṣṭhiré*
 as.much.as seven rivers.NOM spread.out.3PL.PRF
vācam *viśasya* *dūṣaṇīm* *tām* *itó* *nír avādiṣam*
 spell.ACC poison.GEN destroying.ACC.SG this.ACC from.here out speak-1SG.AOR
 ‘As great as heaven and earth are by their width, as much as the seven rivers have spread
 out, I speak out from here this poison-destroying spell’ (AVŚ IV 6.2)
- d. *índram* *stavā* *nṛtamaṃ* *yásya* *mahnā*
 Indra.ACC praise.1SG.PRS.SBJ most.heroic.ACC who.GEN greatness.INS
vibabādhé *rocanā* *ví* *jmó* *ántān*
 drive.asunder-3SG.PRF bright.skies.ACC asunder earth.GEN ends.ACC
 ‘I will praise the most heroic Indra, who with his might has driven asunder the bright skies,
 (has driven) asunder the ends of the earth’ (RV X 89.1)
- e. *tá* *vām* *adyá* *sumatábhīḥ* *śubhaspatī*
 these.ACC you.two.ACC today devotion.INS lords.of.splendor.VOC.DU
áśvinā *prá* *stuvīmahi*
 Aśvins.VOC.DU forth praise.1PL.PRS.OPT
 ‘With devotion we wish to praise the two of you today, o Aśvins, lords of splendor’
 (RV VIII 22.6)
- f. *prá* *nú* *vocā* *sutéṣu* *vām*
 forth now call-1SG.AOR.SBJ soma.libation.LOC.PL you.two.GEN
vīriyā *yáni* *cakráthuḥ*
 heroic.deeds.ACC which.ACC.PL make-2DU.PRF
 ‘With soma-libations I will now call forth the heroic deeds of you two, which you have
 done’ (RV VI 59.1)
- g. *áchā* *voceya* *śúsucānám* *agním*
 hither call-1SG.AOR.OPT shine-PRF.PRT.ACC.SG god.of.fire.ACC
hótāraṃ *viśvábharasaṃ* *yájiṣṭham*
 sacrificial.priest.ACC all.nourishing.ACC.SG most.worshipping.ACC.SG
 ‘I wish to call hither the shining god of fire, the all-nourishing, most worshipping sacrificial
 priest’ (RV IV 1.19)

In all these cases, the sentences represent self-referring, declarative statements which denote a situation partly consisting in the very utterance of the sentence and partly in some extra-linguistic change of state and the sentences may accordingly be characterized as performative.

The seven inflectional categories found in performative sentences have fundamentally different aspectual, temporal and modal properties, something which poses a serious challenge for any attempt to give a unified semantic analysis of performative sentences, at least in Archaic Vedic. The remainder of this paper attempts to clarify how a single, well-defined clause type can have up to seven alternating morphosyntactic expressions in one and the same language. In section 3, I propose some general constraints on performative sentences, examining how lexical semantics, morphosyntax and pragmatics interact in sentences of this type. In section 4, I examine how the various Archaic Vedic inflectional categories satisfy these constraints. Section 5 contains a summary and a conclusion.

3 Lexical and Sentential Components of Performativity

This section aims at clarifying the notion of Performativity which will be assumed to consist of a lexical and a sentential dimension. I will first discuss some elements of meaning which are relevant at the level of verb phrase meaning and then distinguish some elements of meaning which are relevant at the level of the clause.

As a preliminary, we may note that the definition of performative sentences as self-referring and assertive entails that the speaker must be included in the reference of the subject argument, that

the situation must take place at speech time and that the sentence has a neutral or unmarked modal force. This cluster of properties represents a necessary, but not sufficient condition for a sentence to qualify as performative. Consider the following examples:

- (2) a. I hereby name this ship 'Queen Elizabeth'.
 b. We hereby name this ship 'Queen Elizabeth'.
 c. *I hereby persuade you that he is innocent.

I take it as uncontroversial that sentences like those in (2a) and (2b) are typically used with the intention of bringing about a unique change of state in the world by their very utterance according to a set of extra-linguistic conventions. In contrast, the sentence in (2c) clearly cannot be used with this intention and hence appears to be semantically ill-formed on the performative reading. It is reasonable to assume that the difference between the two sets of sentences may be traced to a semantic difference between the verbal predicates *name this ship 'Queen Elizabeth'* and *persuade you that he is innocent* and in order to understand the semantics of performativity we need to identify the lexical semantic features that determine whether a given verbal predicate may be used with a performative meaning or not (cf. McCawley 1977 for a similar view).

It is well-known that the English Simple Present has a performative as well as a habitual reading, but it appears that individual verbs vary considerably as to whether both these readings are available or not and to which of the readings is most natural. Thus this particular morphosyntactic category seems to provide a useful heuristic tool for delimiting the class of verbal predicates which may be used in performative sentences in English. Consider for instance the following sentences:

- (3) a. I (hereby/?always) name this ship 'Queen Elizabeth'.
 b. I (hereby/?always) sentence you to four years in prison.
 c. I (hereby/always) invoke the name of the holy God.
 d. I (hereby/always) curse him.
 e. I (?hereby/?always) build this house.
 f. I (?hereby/always) injure you.
 g. I (*hereby/always) persuade you that he is innocent.
 h. I (*hereby/always) hate you for that.

First, sentences like those cited in (3a) and (3b) may under given circumstances assume a habitual reading, but nevertheless appear odd when combined with habitual adverbs like '*always*'. Sentences of this type rather tend to receive a performative interpretation by default. On the other hand, sentences like those in (3c) and (3d) are perfectly compatible with either a performative or a habitual reading and it is not evident that either of these readings is more natural. In contrast, the sentences in (3e) and (3f) are decidedly odd when coerced into a performative reading, although they do seem better than the sentence in (3g) and (3h). It is likely that the acceptability differences can be traced to lexical semantic differences between the different verbal predicates and in the following I attempt to identify some properties which appear to be particularly relevant in this respect.

As the performative reading represents the default reading of first person simple present forms of verbal predicates like *name the ship 'Queen Elizabeth'* and '*sentence you to four years in prison*', these predicates may be regarded as prototypically performative. It is generally accepted that predicates of this kind presuppose that the speaker intends the utterance of the sentence to cause a unique change of state in the world of evaluation by some extra-linguistic convention (cf. e.g., Austin 1962, Ginet 1979, Searle 1989, Bach and Harnish 1992, Reimer 1995). Note that I intend the notion of extra-linguistic convention to have a fairly strict meaning here, representing the particular lexical property of verbs like *name*, *sentence* and others like them which renders an utterance of the type 'I hereby name/sentence' forceless unless the speaker has the proper authority to carry out the situation named by the verb. For instance, unless the speaker of (3a) is the owner of the ship or is appointed by the owner of the ship, his mere utterance of the sentence will not have any practical consequences — at least not with regard to the ship's name. In this respect, these verbal predicates

differ from other speech act verbs like *invoke* or *curse*, which clearly presuppose that the speaker intentionally uses the sentence to accomplish a change of state in the outer world, but the event thereby denoted need not be unique nor need it be licensed by any extra-linguistic conventions. As the verbs under discussion lack these features, they do not qualify as prototypically performative, but they are perfectly compatible with a performative reading.

Consider now the verbal predicates *build* and *injure* which are definitely odd on the performative reading. An important semantic difference between these verbs and those just discussed is that they do not denote a speech act, but only a change of state in the outer world. It is tempting to ask, however, whether these verbs tend to defy a performative reading because of a particular lexical semantic property or because of world knowledge (cf. also Searle 1989, 554). For instance, a performative reading of a sentence like (3e) or (3f) would be more readily acceptable if uttered in a world where the speaker were capable of building a house or injuring somebody just by stating the very sentence, for instance in a world of magic. This is exactly the kind of world which forms the cultural background of the Atharvaveda and it is therefore not surprising that we do indeed find some examples of performative sentences where the predicate does not denote a speech act, but only a change of state. Consider the following examples:

- (4) a. *tám tvā yaumi*
 this.ACC you.ACC bind.1SG.PRS
bráhmaṇā divya deva
 mantra.spell.INS heavenly.VOC.SG god.VOC
 ‘You here I bind with a mantra spell, o heavenly god’ (AVŚ II 2.1)
- b. *saptá prāṇā aṣṭáu majjñás*
 seven vital.organs.ACC eight marrows.ACC
tāms te vṛścāmi bráhmaṇā
 those.ACC you.GEN cut.off.1SG.PRS mantra.spell.INS
 ‘The seven vital organs, the eight marrows, those I cut off from you with a mantra spell’
 (AVŚ II 12.7)

In themselves, the verbal predicates *tvā yaumi* ‘I bind thee’ and *tāms vṛścāmi* ‘I cut them off’ only denote extra-linguistic events. However, in the above contexts the situations denoted by the verb are clearly taken to be caused by the mere utterance of the sentence, as indicated by the instrumental-marked noun *bráhmaṇā* ‘with a mantra spell’. The speaker clearly presupposes that there is a causal relationship between the utterance of the sentence and some lexically specified, extra-linguistic event. If this interpretation of the above passages is correct, it is reasonable to assume that sentences like those cited in (3e) and (3f) may lend themselves to a performative reading under given circumstances and therefore seem slightly better on the performative reading than (3g) and (3h). This begs the question, however, as to how this difference may be accounted for in a principled way.

As far as I can see, one may distinguish two mutually independent reasons why the predicates *persuade you that he is innocent* and *hate you for that* both fail to get a performative reading. Recall that a prototypically performative verb presupposes that the speaker intends the utterance to cause a change of state in the outer world. Among other things, this definition may be taken to imply that a situation eligible to be picked out by a performative sentence must be conceptualized as a change of state and as being within the realm controlled by the speaker. Although the verbal predicate *persuade you that he is innocent* clearly denotes a situation consisting in a change of state, it is equally clear that the speaker cannot strictly speaking control whether the change of state obtains or not. I suggest that the semantic oddity of a sentence like **I hereby persuade you that he is innocent* may be traced to this lack of speaker control. The predicate *hate you for that*, on the other hand, denotes a type of situation which is conceptualized as a more or less permanent state in which the speaker happens to be and thus does not entail a change of state.³ In view of the above

³This is not to say, however, that state predicates like *hate you for that* are incompatible with a change-of-state reading. For instance, punctual adverbs like *suddenly* tend to induce a reading of this kind, as illustrated by a sentence

discussion it is tempting to suggest that the semantic inacceptability of a sentence like **I hereby hate you for that* may be traced to the lack of the change of state feature.

In the course of the previous discussion I have identified four distinct lexical semantic features which may be taken to constitute prototypical performativity. Prototypically performative verbs lexically entail that the speaker intends an utterance of the type specified by the verb to cause a change of state in the outer world by some extra-linguistic convention, i.e. they denote a speech act [+VERBUM DICENDI], a change of state [+CHANGE OF STATE], which is unique [+EVENT UNIQUENESS], speaker control [+CONTROL] and some extra-linguistic convention [+EXLING CONV]. The data discussed above suggest that a verb lacking one or more of these features nevertheless may assume a performative interpretation. A straightforward way of accounting for this fact would be to assume that these four features are binary and privative, in the sense that a verbal predicate lacking a given feature is in principle compatible with that feature, so that the feature could be supplied by the context. On this assumption, one might further suggest that verbal predicates are organized in a hierarchical manner with prototypically performative verbs in the most prominent position and other verbs ordered downwards according to their respective lexical entailments. Along the lines of Dahl (2008a) I would like to propose that their hierarchical ordering assumes the form of a lattice structure, as illustrated in Figure 1.

I assume as a working hypothesis that a structure of the kind represented in Figure 1 underlies the semantic domain of performativity which I take to be universal. Moreover, I assume that verbal predicates which are situated at the top end of the lattice assume a performative reading by default in all languages. However, one may expect languages to differ with regard to what other types of predicates they allow in performative sentences - at which level of the lattice they draw the line, so to speak. We have already seen that Archaic Vedic is more inclusive than Present-Day English in this respect and it would be surprising if this proved to be the only pattern of variance to be found in this field. However, a more thorough typological investigation along these lines is far beyond the scope of the present paper.

Having distinguished a set of lexical semantic features which are relevant for the complex notion of performativity, I now turn to a discussion of the more general semantic constraints on performative sentences distinguished above. I noted that sentences of this type entail that the speaker is included in the reference of the subject argument, they are typically modally neutral and express that the change of state denoted by the verbal predicate takes place at speech time. I will discuss each of these properties in turn.

The first constraint follows directly from the claim that performative sentences represent a subtype of self-referring clauses, a general clause type which at the very least presupposes that the speaker at the same time denotes and performs a situation of the type specified by the verbal predicate. The sentences in (5) are not self-referential and are therefore excluded from assuming a performative interpretation, although the verbal predicates qualify as prototypically performative:

- (5) a. You hereby name this ship ‘Queen Elizabeth’
 b. He hereby sentences you to four years in prison.

Turning now to the second constraint, we need to clarify exactly what the modal neutrality of performative sentences consists in. Searle (1989, 539) notes that ‘performative utterances are self-guaranteeing in the sense that the speaker cannot be lying, insincere or mistaken about the type of act being performed’, although he adds the proviso that this does not necessarily entail that the speaker is not lying or insincere about the propositional content of the speech act. In other words, it is possible to use a performative utterance like ‘I apologize’ without being sincere about the full lexical content of the verb, which in the present case among other things typically implies an acknowledgement of the impropriety of one’s behaviour. Nevertheless, by uttering a sentence of

like *Suddenly, I hated him*. The fact that state predicates in general seem to be excluded from performative sentences, at least in English, might rather reflect that they represent a semantically underspecified predicate type which lack too many of the relevant lexical semantic features characteristic of prototypically performative verbs.

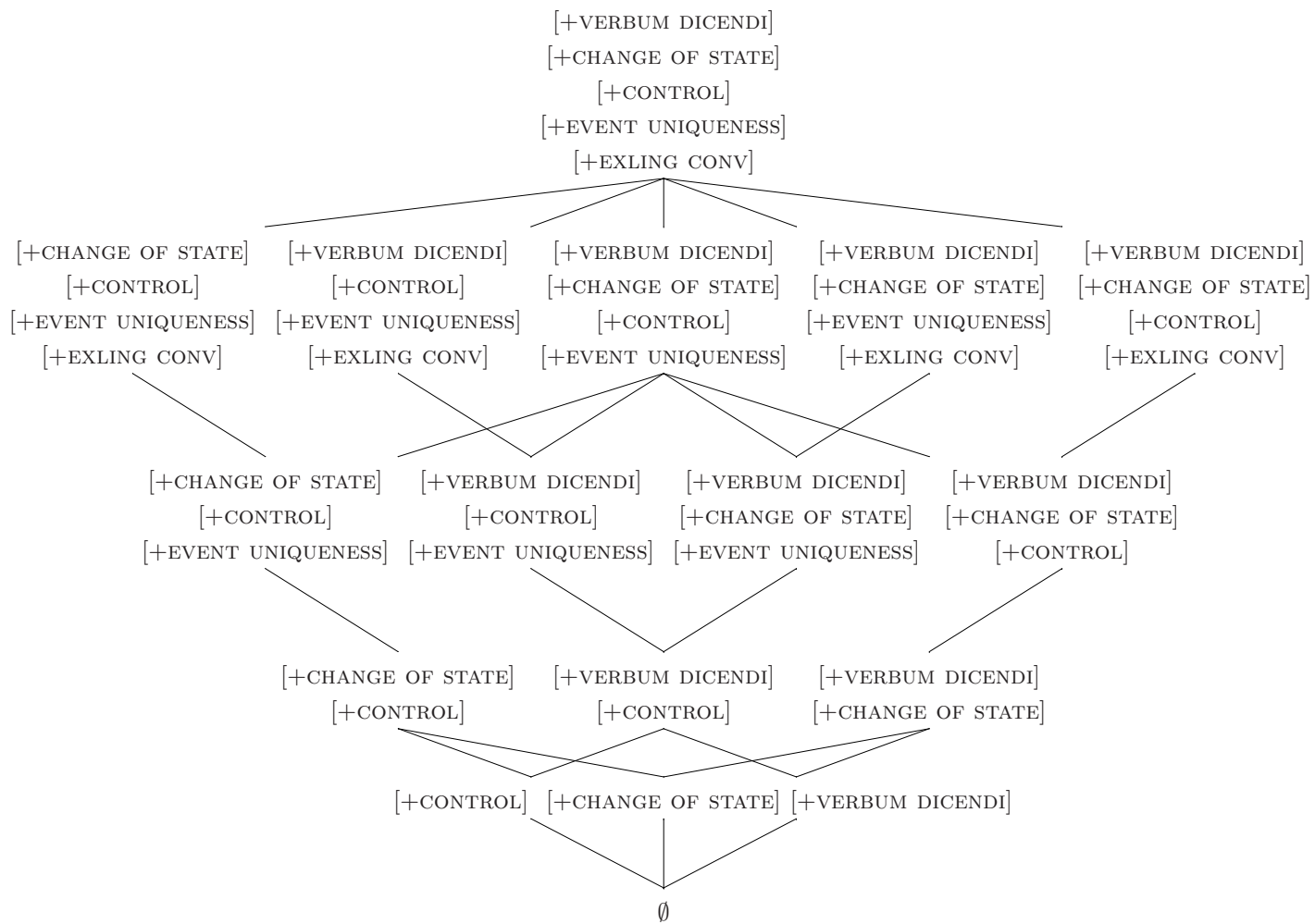


Figure 1: Performativity properties organized via a lattice

this type the speaker implicitly takes for granted that the sentence represents a token of the situation type labelled by the verb, irrespective of whether he sincerely means what he says or not.

The semantic domain of modality comprises a set of notions specifying the speaker's attitude to the content of the proposition denoted by the sentence. Along the lines of Kratzer (1981) I assume that the interpretation of epistemic modals may be understood in terms of different relations between a so-called *Modal Base* and an *Ordering Source*. The Modal Base (MB) represents a conversational background which determines the worlds or sets of propositions which are partly or fully compatible with the discourse context. It comprises the set of background presuppositions which the speaker assumes to be shared by himself and the audience, the so-called *Common Ground* (CG). The Ordering Source (OS), on the other hand, represents the stereotypical background, which imposes an ordering on the set of accessible worlds by implementing the CG as the default standard of measure, thus qualifying other worlds or sets of propositions as more or less distant from this standard. Within this framework, Realis may be defined as a relation between MB and OS which qualifies a proposition p as fully in accordance with CG. Irrealis, on the other hand, may be defined as a relation between MB and OS which qualifies a proposition p as compatible with, but more or less distant from the CG. If the proposition p is relatively close to the CG, the Irrealis relation may be labelled 'probability'. If it is relatively distant from the CG, on the other hand, the Irrealis relation may be labelled 'possibility'. Given that these considerations are correct, one may characterize Realis as a neutral or unmarked type of modality notion, whereas Irrealis may be characterized as a marked type of modality notion. Keeping Searle's claim about speaker sincerity in mind, we may hypothesize that performative sentences in general cannot contain Irrealis markers, as the occurrence of a marker of this type would signal that the speaker did not regard the content of the proposition as in accordance with the Common Ground and hence that he were explicitly insincere about the type of act being performed. This constraint would provide a straightforward explanation of the fact that sentences like ones cited in (6a) and (6b) cannot assume a proper performative reading, even though they contain prototypically performative verbs. The sentences in (6c) and (6d), on the other hand, seem ok, although each of them contains a modal verb.

- (6) a. ?I might hereby name the ship 'Queen Elizabeth'
 b. ?I would hereby sentence you to four years in prison
 c. I will hereby express my gratitude
 d. I hereby wish to apologize

The difference between the above sentences may reflect the fact that the modal verbs cited here give rise to different ranges of speaker-oriented uses. By stating a sentence of the type illustrated by (6a) or (6b) the speaker implies that it would be possible for him to carry out the situation, given that some other condition holds. Sentences like (6c) or (6d), on the other hand, do not carry any implications of this type and can be used simply to express the present intention of the speaker, which among other things may involve carrying out a certain situation at speech time. Performative sentences of the latter type are often referred to as 'hedged performatives', a term I shall adopt in the following.

Finally, performative sentences typically express that the change of state denoted by the verbal predicate is completed at the time of utterance. It should be noted, however, that this constraint concerns two distinct semantic dimensions, namely a temporal and an aspectual dimension. The temporal dimension of this constraint demands that a performative sentence must have present time reference, whereas the aspectual dimension demands that the change of state denoted by the verbal predicate must be represented as completed.

In order to clarify the relationship between these two semantic dimensions we need a model for analyzing temporal and modal notions. The two-dimensional framework developed by Hans Reichenbach (cf. Reichenbach 1947) has proven illuminating for the study of tense and aspect categories in many languages and in the present context I will rely on a modified version of his framework. For one thing, I assume that sentences in natural language refer to four distinct temporal parameters,

namely speech time (t_S) or the time of the utterance, event time (t_E) or the run time of the situation, reference time (t_R) or the time spoken about and perspective time (t_P) or the temporal perspective of the speaker. In the default case, speech time and perspective time coincide, but in cases like the historical present perspective time is clearly distinguished from and located prior to speech time. As the main topic of this paper is performative sentences, where speech time and perfective time coincide, this distinction, albeit theoretically important, will not play any great role in the following (cf. also Kamp and Reyle 1993).

Moreover, I assume that the values of the four temporal parameters are intervals, points being regarded as minimal intervals, and that various relations may hold between them, for instance precedence, coextension, inclusion, proper inclusion and overlap for which I use the symbols ($-$), ($=$), (\subseteq), (\subset) and (\otimes) respectively. Following Klein (1995), Kiparsky (1998), Kratzer (1998) and others I define *tense* as a relation between perspective time and reference time and *aspect* as a relation between reference time and event time.

This brief discussion enables a more precise characterization of the temporal and aspectual constraints on performative sentences. The temporal constraint may be taken to demand that the reference time, the time spoken about is located at speech time and not at some other time. The aspectual constraint, on the other hand, may be taken to demand that reference time and event time are coextensive. This aspecto-temporal relation may be schematically represented as follows:

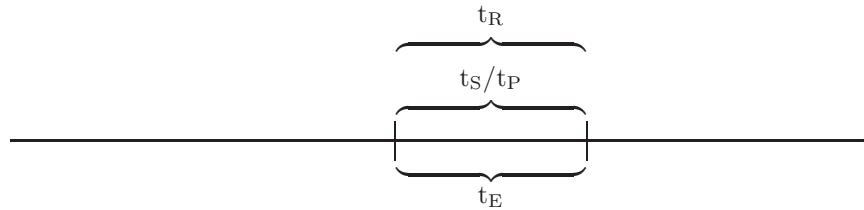


Figure 2: The time-relation underlying performative sentences

This constraint rightly precludes sentences like the following from having a performative reading:

- (7) a. *I hereby named this ship ‘Queen Elizabeth’
- b. ?I shall hereby sentence you to four years in prison
- c. ?I am hereby naming the ship ‘Queen Elizabeth’

The semantic oddity of the last example in (7) illustrates an intricate problem regarding the morphosyntax of performative sentences in English. Whereas performative sentences as a rule have the simple present, the progressive present is sometimes, though not always, acceptable as well, as shown by the following examples:

- (8) a. I am hereby asking you
- b. ?I am hereby apologizing to you
- c. ?I am hereby naming this ship ‘Queen Elizabeth’

The preference of performative sentences for the simple present may be regarded as a consequence of the fact that the present progressive represent a semantically specific imperfective category which within the present framework may be taken to denote the aspectual relation ‘reference time properly included in event time’ ($t_R \subset t_E$), focussing a preterminal interval of the situation denoted by the verbal predicate. Hence the present progressive does not represent the change of state denoted by the verbal predicate as completed at reference time. Note, incidentally, that the hierarchical notion of performativity developed in this paper provides a straightforward way of accounting for the morphosyntactic divergence illustrated in (8), namely that the relative acceptability of the present progressive in performative sentences depends on the relative inherent performativity of the verbal predicate. For instance, a verb like ask is underspecified with regard to several of the relevant lexical semantic features, above all the change of state feature. Along the lines of Krifka (1998) and Rothstein (2004), I understand the change of state feature in terms of non-homogeneity. A homogeneous verbal

predicate like *fight* denotes a type of situation such that any subpart of the situation counts as a full instantiation of the situation, whereas a non-homogeneous verbal predicate like *defeat* denotes a type of situation such that a subpart of the situation does not necessarily count as a full instantiation of the situation. It is well known that past progressive forms of homogeneous predicates differ significantly in their entailments from the corresponding forms of non-homogeneous predicates (cf. e.g., Dowty 1979, Parsons 1990, Landman 1992 among others). For instance, a sentence like *he was fighting* entails the sentence *he fought*, whereas a sentence like *he was defeating his demons* does not entail the sentence *he defeated his demons*. In a similar manner, a present progressive form of a homogeneous predicate like *ask you* locates a subpart of the situation which at the same time represents a full instantiation of the situation at speech time, whereas a present progressive form of a non-homogeneous predicate like *name this ship 'Queen Elizabeth'* locates a proper subpart of the situation which does not represent a full instantiation of the situation at speech time.

In the course of this section I have argued that performative semantics partly involves a lexical dimension and partly a sentential dimension. As regards the lexical dimension, I claimed that verbal predicates which denote a speech act and entail that the speaker intends the utterance to cause a unique change of state in the world of evaluation by some extra-linguistic convention represent prototypically performative predicates. Moreover, I suggested that the lexical semantic domain of performativity may be understood as a lattice structure with prototypically performative predicates in the most prominent position and less inherently performative predicates organized downwards according to their relative inherent performativity. As regards the sentential dimension, I claimed that performative sentences must have a first person subject, that they are incompatible with irrealis modality in the sense that they presuppose that the proposition denoted by the sentence is fully in accordance with the Common Ground and that they denote the aspecto-temporal relation 'event time equals reference time, reference time equals speech time' ($t_E = t_R$, $t_R = t_P/t_S$). I assume as a working hypothesis that these constraints are universal in the sense that they reflect the core semantic properties of performative utterances. In the next section, I discuss to what extent this hypothesis can account for the variegated system of performative sentences in Archaic Vedic.

4 Morphosyntax and Performativity in Archaic Vedic

In the preceding section I claimed that performative sentences presuppose that the proposition is fully in accordance with the Common Ground and that a coextension relation holds between speech time, event time and reference time. In this section I examine to what extent the various verbal categories in Archaic Vedic satisfy these constraints, with particular emphasis on why just the present indicative, the aorist injunctive, the aorist indicative, the present subjunctive, the present optative, the aorist subjunctive and the aorist optative are found in performative sentences.

In general, the inflectional morphology of the Archaic Vedic verb has a strictly compositional semantics.⁴ The tense/aspect/mood system is based on a morphological distinction between three different stems, namely the present stem, the aorist stem and the perfect stem, each of which has a fixed aspectual meaning which combines with present tense, past tense and various modal notions in a synchronically transparent and predictable way, the present stem having a general imperfective meaning, the aorist stem a perfective meaning and the perfect stem an anterior meaning (cf. Dahl 2008a). Table 1 contains a survey of the tense and mood categories which are most relevant for our present purposes. I cite the third person singular active form of the indicative, injunctive, subjunctive and optative and the second person singular active form of the imperative. The bold-faced forms represent the categories which are alternately used in performative sentences.

⁴It should be noted that some of the claims about the semantics of the Archaic Vedic inflectional categories which I make in the following are, at least to some extent, controversial, in particular the claim that there is an aspectual difference between the present indicative and the aorist indicative (cf., e.g., Gonda 1962, Hoffmann 1967, Tichy 1997, Kiparsky 1998, Mumm 2002 and Dahl 2008a).

KAR- ‘do, make’

	Indicative		Injunctive	Imperative	Subjunctive	Optative
	Non-past	Past				
Present stem kr̥no-/kr̥nu	kr̥noti	akr̥not	kr̥not	kr̥nu	kr̥navati	kr̥nuyāt
Aorist stem kar-/kr-	-	akar	kar	kr̥dhi	karat	kriyāt
Perfect stem cakār-/cakar-/cakr-	cakāra	acakrat	cakrat	cakr̥dhi	cakarat	cakriyāt

Table 1. The inflectional categories of the Archaic Vedic verb

As illustrated by this table, Archaic Vedic has five modal categories, namely the indicative, the injunctive, the imperative, the subjunctive and the optative. The indicative is the default mood in neutral assertive clauses. The injunctive represents an underspecified modal category, which is compatible with a broad range of modal and temporal notions, including assertive and directive clauses. The imperative is exclusively used in directive clauses. The subjunctive expresses probability, whereas the optative expresses possibility. Both the latter categories are used in assertive and directive clauses alike.

Moreover, we may note that there is a morphological distinction between past and non-past tense in the indicative mood. Adhering to the convention in the philological literature I refer to the non-past form of the present stem of the type *kr̥noti* as ‘present indicative’, the past form of the present stem of the type *akr̥not* as ‘imperfect’, the past form of the aorist stem of the type *akar* as ‘aorist indicative’, the non-past form of the perfect stem of the type *cakāra* as ‘perfect indicative’, the past form of the perfect stem of the type *acakrat* as ‘pluperfect’ and the various non-indicative modal categories of the various stems as ‘present injunctive’, ‘aorist injunctive’ and so forth. The pluperfect represents a rather marginal category in the verbal system and will be left out of the following discussion. The imperative, on the other hand, is generally restricted to directive clauses and is therefore irrelevant for the following discussion as we are concerned with a subtype of assertive clauses here.

I briefly noted above that the present stem denotes the imperfective aspect, that the aorist stem denotes the perfective aspect and that the perfect stem denotes the anterior aspect. Moreover, I noted that the three aspect stems combine with temporal and modal notions in a compositionally transparent manner. In the following I elaborate on the framework outlined in section 4 to arrive at a coherent definition of the various temporal, aspectual and modal notions relevant in the Archaic Vedic verbal system.

Within the Reichenbachian framework adopted here the two-way distinction between past and non-past time reference may be defined in terms of precedence and overlap between reference time and speech time. More specifically, past tense may be understood as a precedence relation between reference time and speech time such that reference time precedes speech time ($t_R - t_P/t_S$). Non-past tense, on the other hand, may be understood as a general overlap relation between reference time and perspective time ($t_R \otimes t_P/t_S$).

In Table 1 the so-called present indicative is defined as a non-past indicative category of the present stem, i.e. it combines realis modality, non-past time reference and imperfective aspect. Just like the English present progressive, the present indicative often expresses that a situation is in progress at speech time. Above, I suggested that the progressive denotes the aspectual relation ‘reference time properly included in event time’ ($t_R \subset t_E$). It is significant, however, that the Vedic present indicative unlike the English present progressive can also be used to denote a habitually recurring situation and to denote a sequence of situations, each of which is completed at speech time, a reading akin to the so-called ‘sport-reporter’s present’ of the English simple present. These three readings may be illustrated by the following examples:

- (9) a. agnír jāgāra tám u sāmāni *yanti*
 Agni.NOM awake.3SG.PRF.IND he.ACC now hymn.NOM.PL go.3PL.PRS.IND
 ‘Agni is awake, the hymns are now going towards him’ (RV V 44.15)
- b. divé-dive dhúnayo *yanti* ártham
 day.by.day roaring.NOM.PL go.3PL.PRS.IND goal.ACC.SG
 ‘Day by day the roaring (rivers) go to their goal’ (RV II 30.2)
- c. prá rájā vācam janáyann asiṣyadad
 forth king.NOM speech.NOM produce-PRS.PRT.NOM flow.3.PL.AOR
 apó vāsāno abhí gā *iyakṣati*
 waters.ACC wear-PRS.PRT.NOM.SG towards cows.ACC go.3SG.PRS
ḡrbhṇāti riprám ávir asya tánuvā
 take.3SG.NOM dirt.ACC soma.strainer.NOM he.GEN woven.NOM.SG
 súddhó devānām *úpa yāti* niṣṅtám
 cleansed.NOM.SG gods.GEN to go.3SG.PRS meeting.ACC
 ‘The King (Soma) has flown forth, producing speech. Clothed in water he approaches the cows (i.e. the milk). The woven strainer removes his impurity. Cleansed he goes to a meeting with the gods’ (RV IX 78.1)

From a typological perspective, the fact that the present indicative can be used to express these three different time-relations strongly suggests that it cannot be characterized as a present progressive category, but that it rather has a general imperfective or ‘neutral’ meaning which within the present framework may be understood as a general overlap relation between event time and reference time ($t_R \otimes t_E$) (cf. Grønn 2004).

From this brief semantic description it is clear that the present indicative fully satisfies the proposed constraints on performative sentences. It has a neutral modal specification, the indicative representing the default expression of realis modality in Archaic Vedic. Moreover, it denotes present tense and general imperfective aspect, which within the framework developed in this paper amounts to saying that it expresses the aspecto-temporal relation ‘reference time overlaps with event time, reference time overlaps with speech time’ ($t_R \otimes t_E, t_P/t_S \otimes t_R$). As the coextension relation represents one subtype of the more general overlap relation, the performative reading of the present indicative may be straightforwardly analyzed as a context-dependent realization of its basic aspectual and temporal semantics ($[t_R \otimes t_E, t_P/t_S \otimes t_R] \subseteq [t_R = t_E, t_P/t_S = t_R]$).

The imperfect, on the other hand, is inherently encoded for past tense and imperfective aspect ($t_R - t_P, t_R \otimes t_E$). Among its typologically relevant readings we find a salient remote past reading, a past sequential reading, a past overlapping reading and a past habitual reading, as illustrated by the following examples:

- (10) a. índrāvaruṇā yád ṛṣībhyo manīṣā vācó
 Indra.and.Varuṇa.VOC when sages.DAT wisdom.ACC speech.ACC
 matīm śrutám adattam *ágre*
 determination.ACC sacred.knowledge.ACC bestow.2DU.PRS beginning.LOC
 yāni sthānāni aṣjanta dhírā
 which.ACC.PL regions.ACC spread.out.3PL.IPF wise.NOM.PL
 yajñam tanvānās tāsasā abhy ápaśyam
 sacrifice.ACC performing.NOM.PL religious.austerity.INS see.1SG.IPF
 ‘O Indra and Varuṇa, by religious austerity I saw to which regions the sages spread out when you two bestowed wisdom, speech, determination and sacred knowledge upon them in the beginning’ (RV VIII 59.6)
- b. ásataḥ sád *ajāyata* tád
 not.being.ABL.SG being.NOM.SG be.born.3SG.IPF that.ACC.SG

áśā́ ánv ajāyanta
 quarters.of.heaven.NOM.SG after be.born.3PL.IPF
 ‘From not-being, being was born. The quarters of the heavens were born after it’
 (RV X 72.3)

- c. tuvāḿ síndhūmŕ ávāsṛjo (. . .)
 you.NOM.SG river.ACC.PL release.2SG.IPF
 áhanń áhim
 kill.2SG.IPF dragon.ACC.SG
 ‘You killed the dragon, releasing the rivers’ (RV X 133.2)
- d. utá u ghā́ té puruśíyā́ íd āsan
 and also indeed they.NOM.PL human.NOM.PL indeed be.3PL.IPF
 yésāḿ pūrveśāḿ áśṛṇoŕ íṣṇāḿ
 who.GEN.PL earlier.GEN.PL listen.2SG.IPF Ṛṣi.GEN.PL
 dhā́ aháḿ tvā́ maghavañ́ johavīmi
 therefore I.NOM you.ACC.SG bountiful.VOC.SG invoke.1SG.PRS.IND
 ‘And also the earlier Ṛṣis whom you listened to were human, therefore I invoke thee, o bountiful one’ (RV VII 29.4)

Although the imperfect has the same basic modal and aspectual value as the present indicative and thus in principle satisfies the modal and aspectual constraints on performative sentences, its inherent past time reference clearly violates the temporal constraint, something which may be taken to explain why the imperfect does not occur in performative sentences in Archaic Vedic (see also the discussion around (12)).

The aorist indicative denotes realis modality, past tense and perfective aspect. Within the present framework, perfective aspect may be understood as a general inclusion relation between event time and reference time such that event time is included in reference time ($t_E \subseteq t_R$). Among the readings of the past perfective aorist indicative we find a salient recent past reading, a simple past reading. Furthermore, it should be noted that aorist indicative forms of state predicates may either be used to focus the entry into or the exit from the state named by the verb, two readings which may be labelled ‘inchoative-ingressive’ and ‘terminative-egressive’ respectively. These four readings may be illustrated by the following examples:

- (11) a. asmā́bhir ū́ nú́ pracákṣiyā́ abhūd
 we.DAT just now visible.NOM.SG.FEM become.3SG.AOR.IND
 ‘She (the goddess of dawn) has just now become visible to us’ (RV I 113.11)
- b. sá pravolhṛ́n parigátyā́ dabhíter
 he.NOM abductor.ACC.PL encircled.GER Dabhīti.GEN
 víśvaḿ adhā́g áyudham
 whole.ACC.SG burn.3SG.AOR.IND weaponry.ACC.SG
 ‘Having encircled Dabhīti’s abductors he burned the whole weaponry’ (RV II 15.4)
- c. ugrá́ iva praváhantaḥ́ samāyamuh́
 strong.NOM like carry.forwards-PRS.PRT.NOM.PL come.hither.3PL.AOR
 sākáḿ yukṭá́ víṣaṇó bíbhṛató dhúraḥ́
 together yoked.NOM.PL bulls.NOM carry-PRS.PRT.NOM.PL loads.ACC
 yác chvasántó jagrasāná́ áráviṣuḥ́
 when snort-PRS.PRT.NOM.PL eat-PRF.PTC.NOM.PL bellow.3PL.AOR
 śṛṇvá́ eśāḿ protháthó árvatāḿ iva
 be.heard.3SG.PRS they.GEN panting.NOM horses.GEN like
 ‘Like strong (draught animals) driving (the wagon) forwards the bulls who are yoked together have come hither carrying loads. Like panting of horses their panting is heard when they, breathing, have started bellowing after having eaten’ (RV X 94.6)

- d. hári nū ta indra vājáyantā
 bay.horses-NOM.DU now you.GEN Indra.VOC contending-NOM.DU
 ghṛtaścútam svārám asvārṣṭām
 ghee.dripping.ACC.SG sound.ACC sound.3DU.AOR
 ví samanā bhúmir aprathiṣṭa
 apart evenly earth.NOM spread.3SG.AOR
 áramsta párvataś cit sariṣyán
 be.calm.3SG.AOR mountain.NOM even move-FUT.PRT.NOM.SG
 'Your two bay horses, contending for the ghee-dripping (price) have quit their sound (lit.: 'sounded a/the sound'), the earth has spread out evenly, even the mountain which was about to move has become calm' (RV II 11.7)

From this semantic definition of the aorist indicative it is far from clear that it satisfies all the relevant constraints on performative sentences. Like the present indicative and imperfect, it represents a situation as fully in accordance with the Common Ground and thus satisfies the modal constraint. Moreover, the definition of the perfective aspect as 'event time included in reference time' ($t_E \subseteq t_R$) clearly satisfies the aspectual constraint on performative sentences, as the coextension relation represents a subtype of the more general inclusion relation ($[t_R = t_E] \subseteq [t_R \subseteq t_E]$). However, the inherent past time reference of the aorist indicative creates serious difficulties, as it is far from clear how a precedence relation could give rise to a coextension relation, as briefly noted in the above discussion of the imperfect.

At this point it seems appropriate to mention that there are relatively few examples of aorist indicative forms in performative sentences in Archaic Vedic.⁵ Even though the use of a past perfective category in this type of sentences at first glance may appear somewhat odd, the existence of parallel cases in other languages, for instance, the so-called tragic aorist in Classical Greek (cf. Bary 2007, 2008, 18–19), suggests that past perfective categories in fact are compatible with a performative reading and a theory about the semantics of performativity should be able to account for these cases as well. It remains unclear, however, to what extent the semantic properties of the aorist indicative may be taken to satisfy the proposed constraints and we therefore might need to reconsider the constraint that reference time must be coextensive with speech time. On the other hand, if this temporal constraint does not hold, we need to explain why the imperfect does not give rise to a performative reading.

I think, however, that the problem may be solved without discarding the assumption that performative sentences presuppose that reference time and speech time coincide. For instance, one could assume that performative sentences contain an implicit adverb picking out a reference time interval conceived of as a minimal interval or point. As the perfective aspect demands that the event time does not last longer than the reference time interval, the event time would be conceived of as a minimal interval as well. Moreover, the aorist indicative in some cases denotes a situation which has begun at some indefinite time in the past and ends exactly at speech time, as illustrated by (12).

- (12) bahvīḥ sámā akaram antár asmīn
 Many.ACC years.ACC work.1SG.AOR within this.LOC
 índram vṛṇānáḥ pitáram jahāmi
 Indra.ACC choose.PRS.PRT father.ACC leave.1SG.PRS
 'For many years I have worked here. Choosing Indra, I am leaving my father' (RV X 124.4)

In this example, the aorist indicative form *akaram* 'I worked, have worked' is modified by the durative adverbial phrase *bahvīḥ sámāḥ* 'for many years' yielding the reading that there is a coextension relation between event time and reference time and that reference time ends exactly at speech time.

⁵Apart from the form *avādiṣam* (*VAD*- 'speak') cited in (1c) above, the following aorist indicative forms may in my opinion be plausibly ascribed a performative reading in Archaic Vedic: *astoṣi* (*STAV*- 'praise, eulogize' RV I 122.1, RV VIII 39.1, possibly also RV V 41.10), *asṣkṣi* (*vacasyām*) (*SRAJ*- (*vacasyām*) 'pour forth (eloquence)' and *akāriṣam* (*KAR*²- 'praise, speak highly of' AVŚ VII 7.1).

In cases like this, an implicit punctual adverb might among other things give rise to the interpretation that speech time constitutes the endpoint of a reference time interval which only comprises a minimal interval, so that speech time and reference time are identified despite the inherent time reference of the inflectional category. The aspecto-temporal relation expressed by this constellation might be schematically represented in the following manner:

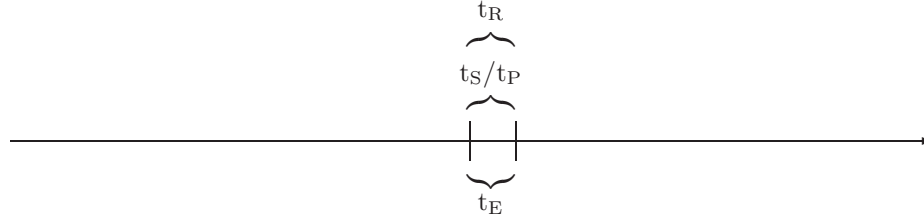


Figure 3: The time-relation expressed by the performative aorist indicative

If this explanation is correct, we still need to account for the fact that the imperfect does not occur in performative sentences, especially because its aspectual reference is perfectly compatible with a punctual interpretation, which would represent a subtype of the general overlap relation. I believe, however, that this fact is intimately related with the well-known remoteness distinction associated with the imperfect and the aorist indicative in Archaic Vedic (cf. also Delbrück 1876, 1888, Hoffmann 1967, Tichy 1997). I noted above that the imperfect has a salient remote past reading and that the aorist indicative has a salient recent past reading both of which I take to arise from the basic aspectual differences between the two past tense categories. It is likely that this remoteness system can be analyzed as a kind of blocking relation, where the semantically more specific aorist indicative blocks the semantically less specific imperfect (cf. Kiparsky 1998, Dahl 2008b). As the imperfect is generally excluded from recent past contexts, it is hardly surprising that it is not used to express the pragmatically rather marked relation illustrated in Figure 3, which among other things presupposes recent or immediate past time reference.

The perfect indicative denotes realis modality, non-past tense and anterior aspect (cf. Kümmel 2000, Mumm 2002). Within our Reichenbachian framework, the anterior aspect may be defined as a precedence relation between event time and reference time such that event time precedes reference time ($t_E - t_R$). Accordingly, perfect indicative forms can be used to express that a state resulting from a past event holds at perspective time, a reading which is commonly labelled ‘resultative’, to express that a situation has occurred at least once in the past or that a situation has extended through the past to the present and that it still holds at speech time/perspective time. The former reading is often referred to as *existential*, whereas the latter is referred to as *universal*. These readings may be illustrated by the following examples:

- (13) a. *úpa nūnám yuyuje vṛṣaṇā hārī*
 together now yoke.3SG.PRF.IND horse.ACC.DU bay.ACC.DU
á ca jagāma vṛtrahá
 hither and come.3SG.PRF.IND Vṛtrakiller.NOM.SG
 ‘Now the Vṛtrakiller has yoked his two bay horses and has come hither’ (RV VIII 4.11)
- b. *tám u stuṣa índaram (...)*
 he.ACC now praise.1SG.PRS.IND Indra.ACC
yásmín purá vāvṛdháh
 who.LOC.SG formerly thrive.3PL.PRF.IND
 ‘That Indra I indeed praise, that Indra I invoke, by whom people have formerly thrived’
 (RV II 20.4)
- c. *śásvad dhí vaḥ sudānava ádityā*
 continuously for you.GEN.PL bounteous.VOC.PL ádityas.VOC.PL

ūtíbhīr vayám purá nūnám *bubhujmáhe*
 help.INS.PL we.NOM formerly now prosper.1PL.PRF.IND
 ‘For both formerly and now we have continuously prospered with your help, o bounteous
 Ādityas’ (RV VIII 67.16)

Although the perfect indicative satisfies the modal and temporal constraints on performative sentences, its aspectual specification is in direct conflict with the aspectual constraint, as a precedence relation cannot give rise to a coextension relation. This may clearly be taken as the reason why the perfect indicative is excluded from performative sentences in Archaic Vedic.

Apart from the indicative, we find three modal categories which are used in assertive clauses in Archaic Vedic, namely the so-called injunctive, the subjunctive and the optative, each of which will now be discussed in turn. It has been shown elsewhere that the non-indicative categories of the aspect stems have the same basic aspectual values as their indicative counterparts and this will be tacitly assumed in the following, unless otherwise noted (cf. Dahl 2008a for a more thorough discussion of these matters).

From Table 1 it appears that there is a certain asymmetry in the distribution of the three relevant modal categories. Above all, non-indicative forms of the perfect stem are generally excluded from performative sentences. Moreover, somewhat surprisingly the present injunctive does not occur in this type of sentences either. Again I wish to stress that it is unlikely that the lack of a given category in the relevant type of sentence is due to an accidental gap in the corpus, as performative sentences represent the a particularly well-attested clause type in Archaic Vedic. On the other hand, injunctive forms of the aorist stem and subjunctive and optative forms of the present and aorist stems do occur in sentences of this type and in the following I will discuss to what extent the semantic properties of these categories satisfy the constraints on performative sentences.

The so-called injunctive may be regarded as a radically underspecified modal category which does not have any inherent temporal or modal value, but picks up its temporal and modal reference from the immediate discourse context (cf. Kiparsky 1995). In many respects, the injunctive simply represents a tense- and moodless aspect form. The aspectual difference between the aorist injunctive and the present injunctive is above all observable in prohibitive sentences, where the basically perfective aorist injunctive is typically used to exhort the referent not to let a given situation happen in the future, whereas the basically imperfective present injunctive is used to exhort the referent to discontinue a situation which holds at speech time (cf. Hoffmann 1967, 43ff.). Consider the following examples:

- (14) a. úruśaṃsa mā́ na áyuh *prá moṣīḥ*
 widely.praised.VOC.SG not we.GEN life.ACC.SG take.away.2SG.AOR.INJ
 ‘O you who are praised by many, do not take our lives away’ (RV I 24.11)
- b. ví uchā duhitar divo mā́
 forth shine.2SG.PRS.IMP daughter.VOC.SG heavens not
 cirám *tanuthā* ápaḥ
 longer protract.2SG.PRS.INJ work.ACC.SG
 ‘Shine forth, o daughter of heaven, do not longer protract your work’ (RV V 79.9)

The fact that the prohibitive present injunctive is almost exclusively used with a progressive-processual meaning, as illustrated by example (18b) is significant, as prohibitive sentences represent the only context type where the injunctive cannot be replaced by other morphosyntactic categories. Thus the progressive-processual reading of the prohibitive present injunctive may be assumed to be particularly entrenched compared with its other contextually determined readings, in the sense that this particular category is more strongly associated with a present progressive-processual reading than the other categories of the present stem. As the progressive relation ‘event time properly included in reference time’ generally does not give rise to a coextension relation, this could be the reason why the present injunctive tends to be excluded from performative sentences at this stage.

According to the above semantic description, the aorist injunctive only expresses the aspectual

relation ‘event time included in reference time’ ($t_E \subset t_R$), a relation which is perfectly compatible with the proposed aspectual constraint on performative sentences ($t_E = t_R$). As the aorist injunctive is inherently underspecified with regard to tense, it is perfectly compatible with the temporal constraint on performative sentences ($t_R = t_S/t_P$).

The subjunctive, on the other hand, denotes the probability relation, i.e. it expresses that the proposition is not fully in accordance with, but still fairly close to the Common Ground. This reading is common to the present and aorist subjunctive and may be illustrated by the examples in (15) (cf. also Tichy 2006).

- (15) a. *prajā́ te devā́n haviṣā́*
 offspring.NOM.SG you.GEN.SG god.ACC.PL oblation.INS.SG
yajā́ti suvargá u tvám
 sacrifice.3SG.PRS.SBJ heaven.LOC.SG indeed you.NOM.SG
ápi mādayāse
 but enjoy.2SG.PRS.SUBJ
 ‘Your offspring will be sacrificing to the gods, but you will be enjoying heavenly bliss’
 (RV X 95.18)
- b. *yán na índro jujuṣé yác ca váṣṭi*
 what.ACC we.GEN Indra.NOM enjoy.3SG.PRF what.ACC and want.3SG.PRS
tán no mahán karati
 that.ACC we.DAT great.NOM.SG make.3SG.AOR.SBJ
śuṣmí á cit
 strong.NOM to also
 ‘What of ours Indra has enjoyed and what he wants, that he will requite us, the great, strong one’ (RV IV 22.1)

Although both the present subjunctive and the aorist subjunctive in principle satisfy the aspectual constraint on performative sentences, their inherent modal specification is at apparent odds with the modal constraint. Interestingly, the basic probability meaning of the subjunctive not infrequently gives rise to a reading where the speaker expresses a present intention of his, as illustrated by (16).

- (16) *jyeṣṭhá āha camasá dvá karā íti*
 oldest.NOM speak.3SG.PRF ladle.ACC.DU two make.1SG.AOR.SBJ thus
kānīyān trín kṛṇavāma íti āha
 younger.NOM three.ACC make.1PL.AOR.SBJ thus speak.3SG.PRF
kaniṣṭhá āha catúras karā íti
 youngest.NOM speak.3SG.PRF four.ACC make.1SG.AOR.SBJ thus
 ‘The oldest spoke thus ‘I will make two ladles’. The younger spoke thus ‘Let us make three’.
 The youngest spoke thus ‘I will make four’. (RV IV 33.5)

The fact that the subjunctive may be used to express a present intention of the speaker provides a straightforward way of accounting for its use in performative sentences, in that the speaker may use a subjunctive form of a performative verbal predicate to express his intention to accomplish a situation of the type picked out by the predicate and at the same time perform an instance of the situation. The first element of meaning is provided by the subjunctive, the second element is specified by the verbal predicate. Thus the performative use of the subjunctive may be plausibly regarded as a kind of ‘hedged performative’, similar to the use of certain English modal verbs.

We may now turn to the optative which typically denotes the the possibility relation, i.e. it expresses that the proposition is not in accordance with and relatively distant from the Common Ground. This reading is found with optative forms of the present and aorist stems alike, as illustrated by the examples in (17).

- (17) a. *sómāpūṣaṇāv ávataṃ dhíyam me*
 Soma.and.Puṣan.VOC favour.2DU.PRS.IMP prayer.ACC I.GEN

yuvābhyāṃ vísvāḥ pṛtanā jayema
 you.two.INS all.ACC battles.ACC win.1PL.PRS.OPT
 ‘O Soma and Puṣan, favour my prayer. With you two we may win all battles’ (RV II 40.5)

- b. yuṣmākaṃ devīr ávasā sanema
 You.GEN.PL goddesses.VOC help.INS win.1PL.AOR.OPT
 sahasrīṇaṃ ca śatīnaṃ ca vājam
 thousandfold.ACC and hundredfold.ACC and booty.ACC
 ‘O goddesses, with your help we may win thousandfold and hundredfold booty’
 (RV I 124.13)

Now, both the present and aorist optative satisfy the aspectual constraint on performative sentences, but at the same time they apparently violate the modal constraint, expressing that the proposition is relatively distant from the Common Ground. It is significant, however, that the probability relation denoted by the optative in some cases gives rise to a reading where the speaker expresses a present wish, as illustrated by example (18).

- (18) bhadráṃ kárṇebhiḥ śṛṇuyāma devā
 good.ACC.SG ear.INS.PL hear.1PL.PRS.OPT god.VOC.PL
 bhadráṃ paśyema akṣábhīr yajatrāḥ
 good.ACC.SG see.1PL.PRS.OPT eye.INS.PL sacrifice.worthy.VOC.PL
 ‘May we hear good things with our ears, o gods, may we see good things with our eyes, o you who are worthy of sacrifice’ (RV I 89.8)

It is tempting to link the performative use of the optative to the use as an expression of a present wish of the speaker. In that case, one might assume that the speaker may use an optative form of a performative verbal predicate to express that he wishes to accomplish a situation of the type picked out by the predicate and at the same time perform an instance of the situation. The first element of meaning is provided by the optative, the second element is specified by the verbal predicate. Thus the performative use of the optative may be plausibly regarded as a kind of ‘hedged performative’, similar to the use of the subjunctive and of certain English modal verbs.

Finally, we need to consider why the non-indicative forms of the perfect stem are excluded from performative sentences in Archaic Vedic. I believe that this is at least partly due to the fact that they are inherently encoded for anterior aspect, a relation which is basically incompatible with the aspectual relation presupposed by performative sentences, as briefly noted above. It should also be noted that non-indicative modal forms of the perfect stem are extremely rare and that they tend to have a rather specialized function. For instance, the perfect optative is typically used with a counterfactual meaning, which arises from the combination of possibility and anterior aspect, as illustrated by the passage in example (19).

- (19) víśvo hí anyó arír ājagāma
 Every.NOM.SG for other.NOM.SG nobleman.NOM come.hither.3SG.PRF
 máma íd áha śvásuro ná á jagāma
 I.GEN indeed yet father.in.law.NOM not hither come.3SG.PRF
 jaksīyād dhānā utá sómam papīyāt
 eat.3SG.PRF.OPT grains.ACC and soma.ACC drink.3SG.PRF.OPT
 súāśitaḥ púnar ástaṃ jagāyāt
 well.saturated.NOM.SG again home.ACC go.3SG.PRF.OPT
 ‘Although every other nobleman has come hither, my father-in-law has not come yet. He could have eaten the grains and could have drunk the soma, he could have gone home well saturated’
 (RV X 28.1)

5 Summary and Conclusion

In this paper I have examined how the notion of performativity interacts with different tense, aspect and mood categories. One may use seven distinct morphosyntactic categories with fundamentally different temporal, aspectual and modal properties in performative sentences in Archaic Vedic, something which poses a serious difficulty for any attempt to provide a unified account of performative sentences. I claimed that one may distinguish three slightly different constraints on performative sentences, a modal constraint demanding that the proposition is represented as being in full accordance with the Common Ground, an aspectual constraint demanding that there is a coextension relation between event time and reference time and a temporal constraint demanding that the reference time is coextensive with speech time. These constraints are assumed to be universal and are taken to ensure that a sentence containing a first person form of a verbal predicate sufficiently highly located at the performativity lattice receives a performative meaning. Moreover, I argued that the Archaic Vedic present indicative, aorist indicative and aorist injunctive are quite compatible with these constraints, although I noted that the performative reading of the aorist indicative can only be accounted as a pragmatically marked interpretation of its basic aspecto-temporal properties, something which is also reflected in the fact that we only find very few aorist indicative forms with a performative reading in this language. However, the basic modal specifications of present and aorist subjunctive and optative violates the modal constraint on performative sentences, but they give rise to speaker-oriented readings which in turn are compatible with that constraint.

Moreover, the imperfect, the present injunctive, the perfect indicative and the various modal categories of the perfect stem were argued to be incompatible with the constraints on performative sentences. For one thing, the inherent past time reference of the imperfect violates the temporal constraint, but the crucial factor appears to be the fact that the imperfect is generally blocked from recent past contexts by the aorist indicative, so that a performative reading is excluded. I also claimed that the present injunctive is strongly associated with a present progressive-processual reading at this stage because of its salient prohibitive use, a reading which violates the aspectual constraint. As regards the perfect indicative and the various non-indicative categories of the perfect stem, I argued that their basic anterior value violates the aspectual constraint on performative sentences and that they therefore are excluded from sentences of this type.⁶ These observations may be taken to suggest that the satisfaction of the aspectual constraint on performative sentences in general is more important than the satisfaction of temporal and modal constraints. However, more detailed research is needed to substantiate the generality of the claims made in this paper.

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⁶A referee points out to me that anterior categories are not generally incompatible with a performative reading. For instance, a sentence like *I have (hereby) declared war on Schwarzenegger* seems perfectly ok. Nevertheless it appears to me that the use of the present perfect in performative sentences in English is restricted to cases where the verb lexically entails a change of state and that this change of state is represented as punctual and immediately preceding speech time. For instance, it is not clear to me that a sentence like *I have (hereby) asked you* is equally acceptable. This could be taken to suggest that the performative use of the present perfect is restricted to a particular area of the performativity lattice. Future research will show whether an explanation along these lines is viable.

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A Case Restriction on Control: Implications for Movement

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ABSTRACT

The proper analysis of control has been an active topic of research. Recent proposals by Hornstein (1999, 2001) and Boeckx and Hornstein (2004) advocate treating control as involving raising into theta-positions, eliminating the need for a special control module. This paper introduces a restriction which distinguishes control environments from raising environments: the covert subject in a control construction in Hindi-Urdu cannot have dative case while the covert subject in a raising construction may. This Case Restriction is shown to hold in a wide variety of unrelated languages, but is not universal. In particular, languages with both forward and backward control systematically lack the Case Restriction. Various theories of control are examined with respect to how well they can represent the Case Restriction. The paper concludes that there is no non-stipulatory way to represent the Case Restriction in Hindi-Urdu if control and raising are treated alike.

1 Introduction

Many if not most languages have control constructions, biclausal combinations with an obligatorily null embedded subject. The null subject is identified by coindexation with a matrix subject or object. Hindi/Urdu, a verb-final language, has a number of instances of this configuration and coindexing, which are discussed in this paper and contrasted with other non-finite complement and adverbial constructions. Control constructions in this language are subject to a constraint, illustrated by the ungrammatical control sentence in (1a):

- (1) a. * māĩ [PRO aisaa paisaa mil-naa nahĩ caah-tii hũũ
 I[Nom] such money[Nom] get-Inf not want-Impf.F am
 ‘I don’t want [PRO/*me to get such money].’
- b. mujhee aisaa paisaa mil ga-yaa
 I[Dat] such money get go.Pf.M.Sg
 ‘I got such money.’

The embedded subject corresponds to a dative subject in the single clause in (1b). The dative case is selected by the predicate *mil-naa* ‘get’, which assigns a goal theta role. It is like many other predicates with non-volitional experiencer subjects.

Recent proposals by Hornstein (1999, 2001) and Boeckx and Hornstein (2004) eliminate from syntactic theory a special set of principles which license null PRO subjects and define their antecedents. The anaphoric relations in the control, raising and binding constructions of the earlier Chomskyan theory (1981, 1986) are derived by a general application of A-movement compatible with a more recent set of constraints on possible theories of syntax (Chomsky 1995, 2001). Raising to Subject,

Raising to Object, Subject Control and Object Control sentences are all derived by movement of an embedded subject to a matrix position, then to higher functional projections.

In this paper, I consider how this account would explain raising and control constructions in Hindi/Urdu, a language which, unlike English, requires lexical, theta related case on the subject of certain predicates. These are predicates of psychological and physical states, and deontic necessity. There is a systematical pattern of ungrammaticality in Hindi/Urdu, which arises when (i) the embedded subject must have lexical case, and (ii) when no overt subject is possible, that is, in obligatory control constructions. Raising predicates show no constraint on embedded subject case. This difference suggests that control constructions are different from raising construction.

1.1 Non-finite complements: control and raising

Predicates in Hindi/Urdu select non-finite complements, which are marked with infinitive or participle inflection. Some select an infinitive with an overt subject marked as genitive, the default case for infinitive subjects (1).

- (2) [un=kaa samay=par na aa-naa] ajiib=see baat hai
 3Pl=Gen time=on not come-Inf strange=of matter be.Pres.3Sg
 ‘[Their not coming on time] is strange.’

Others include subject and object control complements, which do not allow overt embedded subjects (3)-(4):

- (3) Subject control
 māī [PRO/*meeraa/*apnaa wahāā jaa-naa nahī caah-tii hū
 I[Nom] *I[Gen]/*self [Gen] there go-Inf not want-Inf.F am
 ‘I don’t want [PRO/*my/*myself to go there].’
- (4) Object control
 ham_i=nee un=koo_j [PRO_{*i/j}/ *hamaree/ *un-kee wahāā
 we=Erg 3.Pl=Dat We[Gen].Obl 3.Pl.Obl there
 jaa-nee=kee liye majbuur nahī ki-yaa
 go-Inf.Obl=Gen for forced not do-Pf.M.Sg
 ‘We did not force them_i [PRO_i/*for us/*for them to go there].’

There are also non-finite complements which exemplify raising to subject and object position, marked as infinitives in Raising to Subject sentences (5) and Raising to Object sentences (6).

Raising to subject:

- (5) a. raam=nee kitaab paṛh-ii
 Ram=Erg book.F.[Nom] read-Pf.F
 ‘Ram read a book.’
 b. raam(=*nee/*kee) kitaab paṛh-nee lag-aa
 Ram.M.Sg.[Nom](=*Erg/*Gen.Obl) book.F.Sg.[Nom] read-Inf.Obl begin-Pf.M.Sg
 ‘Ram began to read a book.’
- (6) Raising to object ¹
 ham=nee raam=koo [~~raam~~ kitaab paṛh-tee hu-ee] deekh-aa
 1.Pl=Erg Ram=Dat Ram book.F.[Nom] read-Inf.Obl be-Pf.Obl. see-Pf
 ‘We saw Ram [~~Ram~~ reading a book].’

In perfective main clauses, the ergative case is required on a transitive subject (5a). In the perfective complement version of (5a), the subject of the infinitive form of ‘read’ must not be ergative (5b), but instead is nominative. In the non-finite perfective complement in (6), the embedded subject is dative, not ergative.

¹There is an alternative analysis of (5) as Exceptional Case marking (Chomsky 1981). The matrix verb directly assigns dative case to the embedded subject without movement. For the purposes of this paper, I will assume raising to matrix object position, as I know of no data from Hindi/Urdu which decisively distinguishes these two analyses.

In this paper, I explore the differences in Hindi/Urdu between control constructions and raising constructions, which are distinct in derivation in the PRO analysis (1a), but essentially the same in the Raising analysis (1b). The crucial distinction involves complements in which the predicate requires dative or other lexical case on the subject, as in (7). Control and Raising constructions differ in whether their complements allow embedded predicates of this type. Control complements disallow controlled dative subjects (8a), while raising complements allow them, with overt dative case (8b,c)

- (7) tum=koo bahut paisaa mil-aa/ mil-eegaa
 you=Dat much money.M.Sg.[Nom] receive-Pf/ receiveFut.3p.M.Sg
 ‘You got/will get a lot of money.’
- (8) a. * māī [PRO/ *mujhee aisaa paisaa mil-naa nahī caah-tii hūū
 I[Nom] I.Dat such money[Nom] get-Inf not want-Impf.F am
 ‘I don’t want [PRO/*me to get such money].’
- b. baccōō=nee duusree baceee=koo [~~duusree baceee=Dat~~
 child.M.Pl=Erg other child=Dat
 keek mil-tee hu-ee] deekh-aa
 cake get-Impf be-Pf see-Pf
 ‘The children saw another child [~~another child~~ getting cake].’
- c. baacee=koo [~~baacee=koo~~ keek mil-nee] lag-aa
 child.M.Obl=Dat cake get-Inf.Obl begin-Pf.M.Sg
 ‘The child began [~~the child~~ to get cake].’

This paper explores the difference between Raising and Control complements, especially obligatory control, as well as the language-internal and cross-linguistic properties of the restriction on embedded dative subjects. The restriction has some interesting implications for the analysis of obligatory control.

Languages like English and Hindi/Urdu have only forward control (3)-(4), with an embedded null subject. These language may have, or not have, the dative restriction (8a). A minority of languages allows both forward control and backward control, in which the embedded subject has overt case, including dative or ergative case (Polinsky and Potsdam 2002). This alternation favors the movement analysis, as a single chain of two copies is created, one of which is pronounced; it may be the matrix or embedded subject. An example of the alternation in Mizo, a Tibeto-Burman language, is given in (9):

- (9) a. Forward control (Mizo)
 zova-n [~~zova~~ tSutleng-ah *a tʃut] a-duh
 Zova-Erg Zova[Nom] bench-on 3Sg sit.Nonfin 3Sg-want
 ‘Zova wants [~~Zova~~ to sit on the bench].’ (Subbarao 2004, 2)
- b. Backward control (Mizo)
~~zova-n~~ [zova tSutleng-ah a tSu] (*a)-Duh
 Zova-Erg Zova[Nom] bench-on 3Sg sit.Fin 3Sg-want
 ‘~~Zova~~ wants [Zova to sit on the bench].’ (Subbarao 2004, 2)

In this paper, I will focus primarily on examples of forward control, referring briefly to languages which have backward control, in which overt case is possible on the embedded subject.

The case restriction found in Hindi/Urdu, though not universal, is found in a number of languages of various linguistic affiliations, which all have the property of having forward controlled arguments with lexical case. At least one language appears to have control without raising, which is not predicted if movement/raising is the basis for control. In sections below I contrast sentences in this language which show or do not show the dative restriction, arguing that the ones which do have the restriction are forward control sentences, while those which do not are examples of Raising. A broad range of analyses of both control and raising as movement does not explain this difference, even though

otherwise there are similarities which can be captured by changing assumptions about theta roles and the motivation for movement.

1.2 Obligatory control contexts in Hindi/Urdu

The main criterion for obligatory control is whether an overt subject is possible in the embedded clause, whether coreferent or disjoint from the matrix subject or object.

Subject control:

- (10) a. madhuu=nee [PRO baahar jaa-nee]=see inkaar ki-yaa
 Madhu=Erg outside go-Inf=from refusal.M.Sg do-Pf.M.Sg
 ‘Madhu refused [PRO to go outside].’ (Subbarao 1984, 36)
- b. *madhuu=nee [apnaa/ us=kaa baahar jaa-nee]=see inkaar ki-yaa
 Madhu=Erg self[Gen] /3Sg=Gen outside go-Inf=from refusal do-Pf.M.Sg
 ‘Madhu_i refused/denied [self’s_i/her_j going outside].’ (Cf. Subbarao 1984)
- c. madhuu=nee (is baat=see) inkaar ki-yaa [ki woo baahar ga-ii]
 Madhu=Erg this matter=from refusal.M.sg do-pf.M.sg that 3Sg outside go-Pf.F.
 ‘Madhu denied [that she went outside].’
- d. ham [PRO/ *apnee patang uṛaa-nee=kii kooshish kar rahee hāi
 We self.Gen kite[Nom] fly-Inf=Gen.F attempt.F.[Nom] do Prog.M.Pl are
 ‘We are trying [PRO to fly a kite/*our flying a kite].’ (Subbarao 1984, 62)
- e. lalita [PRO/ *rajnii=kee paṛh-nee=kii] sooc rahii hai
 Lalita Rajnii=Gen.Obl read-Inf=Gen think Prog.F.Sg is
 ‘Lalita is thinking of [PRO/*Rajnii reading].’ (Subbarao 1984, 62)

Matrix objects may control the null subject of a non-finite clause (11a), compared with the finite complement in (11b).

Object control:

- (11) a. māã_i=nee raam_j=koo [PRO_j/_{*i} apnee_j/_j=koo gumnaam patr
 Mother=Erg Ram=Dat self.Gen]=Dat anonymous letter[Nom]
 likh-nee]=kee liyee manaa ki-yaa
 write-Inf=Gen for forbidden do-Pf.M.Sg
 ‘Mother_i forbade Ram_j [PRO_j/_{*i} to write self_j/_j anonymous letters.]’ (Davison 2000, 425)
- b. māã_i=nee raam_j=koo manaa ki-yaa [ki woo_j apnee_i/_j=koo
 Mother=Erg Ram=Dat forbidden do-Pf.M.Sg that 3Sg self=Dat
 gumnaam patr likh-ee
 anonymous letters[Nom] write-Cont.3.Sg
 ‘Mother_i forbade Ram [that he should write self_i/_j anonymous letters].’

Obligatory control in Hindi/Urdu is also found in adjunct clauses marked by *-kar*, the ‘conjunctive participle’ suffix on the verb. The null subject is controlled only by the matrix subject (6). An overt subject is generally not possible, with the exception of a small number of ‘unaccusative’ verbs²

- (12) a. Control into *-kar* adjuncts
 [PRO_i/_{*j} / *woo is baat=koo sun-kar] pitaa_i=koo apnee;
 3Sg.[Nom] this matter=Dat hear-Prt father=Dat self’.Gen

²(i) [diwaar gir-kar] patthar gir ga-yee
 wall fall-Prt stone.M.Pl fall go.Pf.M.Pl
 ‘The wall having fallen, stones fell down.’ (R. Pandharipande, p.c.). See discussion in Haddad 2007, Chapter 6.

- beeṭee_j=par taras aa-yaa
 son=on pity[Nom] come.Pf.M.Sg
 (i) ‘[PRO having heard this matter], father felt pity for his son.’
 (ii) *‘Father felt pity for his son when the son heard this matter.’
- b. Overt subject, optional control into participle adjuncts
 [pro/us=kee is baat=koo sun-tee=hii] pitaa=koo beeṭee=par taras aa-yaa
 3.Sg=Gen this matter=dat hear-Impf.Obl=only father=Dat son-on pity come-Pf
 i. ‘As soon as father_i/_{*j}/_{*j} heard this matter, he_i felt pity for his son_j.’
 ii. ‘Father_i felt pity for his son_j as soon as the son_j heard this matter.’

The conjunctive participle *-kar* in (12a) differs from the imperfective participle used as an adverbial (6b) because the *-kar* participle requires a null subject. The imperfective participle may have a null or overt subject.

There are other criteria for obligatory control (Williams 1970, Hornstein 1999). The complement of ‘want’ and other control verbs shows only the sloppy identity reading (7a), and only the ‘de se’ reading (7b), characteristics of obligatory control.

- (13) a. raam_i [PRO_i hindii siikh-naa caah-taa hai, aur shyaam_j bhii
 Ram[Nom] Hindi learn-Inf.M.Sg want-Impf.M.Sg is and Shyam also
 ‘Ram_i wants [PRO_j to learn Hindi and Shyam_j [wants PRO_j/_{*i} to learn Hindi] also.’
- b. *yah biimaar aadmii_i [PRO_j maic jiiṭ-naa caah-taa hai
 this sick man[Nom] match win-Inf.M.Sg want-Impf.M.Sg is
 ‘This sick man [the ‘amnesiac’]_i wants [PRO_j to win the match’]; well formed if the amnesiac believes of himself that he should win the match.

In sum, Hindi/Urdu distinguishes obligatory from optional control contexts. Where there is optional control, a lexical subject is possible, shown in examples like (12b). Otherwise in obligatory control contexts, an overt subject makes the sentence ungrammatical, whether it is disjoint from a *c*-commanding antecedent or coindexed with it. Contexts of obligatory control include complement clauses, with matrix subject or matrix object control, determined by lexical selection properties of the matrix verb.

2 The Dative Restriction

In this section, I discuss the case restriction on the subjects of some but not all non-finite complements. Broadly, the restriction holds for the sentence types which reject an overt subject in the embedded clause. This restriction has some further ramifications: it serves as a test to distinguish among non-finite complements. I will propose that it applies only to contexts of obligatory control, not to subject and object raising nor to complements which allow optionally null subjects (represented as *pro*).

This restriction affects subject case. In addition to null-marked or nominative subjects (14a), Hindi/Urdu has subjects marked with case clitics (14b-d). Ergative subjects are required for most transitive verbs (14b), in perfective finite clauses. For many non-volitional predicates, the dative case clitic *-koo* marks the subject in all tense/aspect combinations (Davison 2004), as in (14c,d):

- (14) a. māĩ(*=nee) unhēē paisaa d-ũṅgii
 I[Nom]=erg 3.Pl=Dat money.M.Sg.[Nom] give-Fut.1.F.Sg
 ‘I will give them some money.’
- b. māĩ=nee/ *0 unhēē paisaa di-yaa
 I=Erg *[Nom] 3.Pl=Dat money.M.Sg.[Nom] give-Pf.M.Sg
 ‘I gave them some money.’
- c. mujhee sirdard hai/ hoo ga-yaa
 I=Dat headache.M.Sg.[Nom] is/ be go-Pf.M.Sg
 ‘I have/ have gotten a headache.’

- d. tum=koo bahut paisaa mil-aa/ mil-eegaa
 you=Dat much money.M.Sg.[Nom] receive-Pf.M.Sg/ receive-Fut.3.M.Sg
 ‘You got/will get a lot of money.’

The nominative/ergative choice in (8a,b) is subject to the tense/aspect of the main verb, as well as other structural and lexical conditions (Davison 2004). The dative and other lexically selected case clitics on subjects do not vary with verb aspect morphology (14c,d).

Verbs whose subjects would normally have nominative or ergative case on expressed subjects (14a,b) may freely occur in an embedded infinitive clause where the subject must be null. The example in (15) shows that the verb *siikh-naa* ‘learn’ creates an obligatory control context. Anticipating the conclusion about control for which I will argue below, I will represent the null subject as PRO. It is obligatory here, and cannot alternate with an overt subject, whether coindexed or disjoint.

- (15) māī [PRO/ *apnaa/ *meeraa/ *un=kaa saaikal calaa-naa] siikh-ūṅgi
 I.[Nom] self’s/ I.Gen.M.Sg 3.Pl=Gen.M.Sg bicycle.F.[Nom] ride-Inf.M.Sg learn-Fut.1Sg.F
 ‘I will learn [PRO/*self’s/*my/*them to ride a bicycle].’

But the same obligatory control contexts prohibit controlled (null) subjects which would have dative case if they were overtly expressed, the case which is lexically selected by the verb in the embedded clause. The verb *mil-naa* ‘get’ in (16) is a verb of this category.

- (16) a. *us=nee [PRO ghuus mil-nii] siikh-ii hai
 3Sg=Erg bribe.F.[Nom] get-Inf.F.Sg learn-Pf.F.Sg be.Pres.3.Sg
 ‘He has learned [PRO to get bribes].’ (cf. (15d))
 b. *māī [PRO sirdard hoo-nee]=kii nahī sooc rahaa hūū
 I[Nom] headache be-Inf.Obl=Gen.F.Sg not think Prog.M.Sg am
 ‘I am not thinking of [PRO getting a headache].’ (cf. (15c))

This ungrammatical sentence (16a) would be grammatical with *lee-naa* ‘take’, which has a nominative/ergative subject, and (16b) would be good in the meaning ‘I don’t want [PRO to be a headache/a bother].’

The case restriction is stated descriptively in (17):

- (17) The Dative Restriction

In contexts of obligatory control, the embedded verb may not assign its (null) subject dative case.

I will use the descriptive generalization (17) as a test for obligatory control, and as an argument that the embedded subject is represented in some way, independently of its coindexed antecedent.

In the contexts of object control and control into *-kar* adjuncts, we find the same restriction: dative subject verbs cannot occur in controlled complements (18) or adjuncts (19).

- (18) ham=nee un-koo_i [PRO_i aisaa paisaa *mil-nee/ lee-nee]=kee liyee
 we=Erg 3.Pl=Dat such money[Nom] get-Inf.Obl/ take-Inf.Obl=Gen for
 majbuur nahī ki-yaa
 forced not do-Pf.M.Sg
 ‘We did not force them_i [PRO_i to get/take such money].’
 (19) *[PRO_i kroodh aa-kar] raam_i beṭṭee=par cillaa-yaa
 anger[Nom] come-Prt Ram.M.Sg.[Nom] son=on shout-Pf.M.Sg
 ‘[PRO_i having gotten angry] Ram_i shouted at his son.’

Participles with *-kar* contrast with oblique imperfective participles, which may have an overt subject, as in (20) and (12b) above:

- (20) Participial adjuncts
 [(raam=koo)/pro_j/_j kroodh aa-tee= hii] woo_i cillaa-nee
 Ram=Dat anger[Nom] come-Impf.Obl=only 3.Sg.M shout-Inf.Obl

lag-aa
begin-Pf.M.Sg
‘[As soon as Ram/pro_j/j got angry] he_i began to shout.’

The Dative Restriction (17) is found only in non-finite clauses where a lexical subject is not possible.

There are, however, contexts where obligatory control is not possible, such as subject complements, where a lexical subject (2) or a null subject is permitted, the latter with an arbitrary reading:

- (21) Arbitrary null subject:
[pro(arb) paisaa dee-nee/ mil-nee]=kaa mauqaa hai
money[Nom] give-Inf.Obl/ receive-Inf.Obl=Gen.M.Sg opportunity is
‘It is an opportunity [(for one)[Dat] to give/receive money].’

2.1 Distinguishing control contexts from other complement types

The Dative restriction also allows us to distinguish obligatory control from other syntactic relations. For example, participial complements such as (22a) could be analyzed as instances of control (22b) or Raising to Object (22c):

- (22) a. swapan=mēē raam=nee apnee aap=koo paagalōō=kii tarah
dream=in Ram=Erg self self=Dat madman.Pl.Obl=Gen.F.Sg manner
naac-tee hu-ee deekh-aa
dance-Impf.Obl be-Pf.Obl see-Pf.M.Sg
‘In a dream, Ram saw himself dance like a madman.’
b. NP NP_i=Dat [PRO_i V-Impf.Obl] deekh-aa [Control analysis]
c. NP NP_i=Dat [~~NP_i=Dat~~ V-Impf.Obl] deekh-aa [Raising to Object Analysis]

In principle, a participial clause could be three ways ambiguous:

- (23) raam=nee moohan=koo kavitaā likh-tee hu-ee deekh-aa
Ram=Erg Mohan=Dat poem[Nom] write-Impf.M.Obl be-Pf.Obl see-Pf.M.Sg
(a) ‘Ram saw Mohan [~~Mohan~~ was writing a poem.] (Raising to object)
(b) ‘Ram_i saw Mohan_j [while PRO_j was writing a poem].’ (Object modifier)
(c) ‘Ram_i saw Mohan_j [while PRO_i was writing a poem].’ (Subject modifier)
(Subbarao 1984, 167)

The Raising analysis involves a propositional complement of the verb *deekh-naa* ‘see’ (23a). Otherwise adjectival participles modify the object (23b) or the subject (23c). Later in this section, I will offer evidence that adjectival participle clauses involve controlled PRO.

To choose between the two derivations (22b,c), we will insert in the participial clause a predicate which requires dative case on its subject. If the sentence is well-formed, the Dative Restriction is not violated. If the Dative Restriction is violated, then the sentence has an obligatory control relation between the embedded subject and a matrix constituent. The sentence in (24b) has the embedded predicate NP-*koo buxaar aa-naa* ‘to get a fever’ which selects a dative experiencer subject (24a):

- (24) a. baccee=koo buxaar aa-yaa
child=Dat fever.M.Sg.[Nom] come-Pf.M.Sg
‘The child got a fever.’
b. māā=nee baccee=koo buxaar aa-tee hu-ee deekh-aa
mother=Erg child=Dat fever[Nom] come-Impf.Obl be-Pf.Obl see-Pf.M.Sg
‘The mother saw the child getting a fever.’

The sentence (24b) is grammatical, meaning that the Dative Restriction is not violated. So I conclude that the sentence is not an example of obligatory object control (23b), but is a case of Raising to Object (22c). There should be a subtle difference in interpretation; (24b) should have just the propositional complement reading, rather than an assertion about merely seeing someone. The participle modifiers with PRO should be ungrammatical, meaning that the subject modifier interpretation is

absent. The object modifier interpretation is in principle entailed by the propositional reading, so it is hard to discern whether this interpretation is absent.³

There are some complications for the analysis of the verb *caah-naa* ‘want’ as an obligatory control verb. For many speakers whom I have consulted, *caah-naa* is an obligatory control verb, unlike English *want*, which is syntactically ambiguous between a control verb and a Raising to Object verb. The Hindi verb is an obligatory control verb (25a) which does not permit a lexical subject in the non-finite embedded clause, either with a nominative or genitive subject (25b). Only the finite complement allows an overt subject (25c):

- (25) a. māĩ_i [PRO_{i/*j}/ *meeraa jaa-naa] caah-tii hũũ
 I[Nom] I.Gen.M.Sg go-Inf.M.Sg want-Impf.F.Sg am
 ‘I_i want [PRO_{i/*j}/ *me to go].’
- b. *māĩ [vee/ un=kaa/ un=koo jaa-naa] caah-tii hũũ
 I[Nom] 3.Pl.[Nom]/ 3.Pl=Gen.M.sg 3.Pl=Dat go-Inf.M.Sg want-Impf.F.sg am
 ‘I want [they/ their/ them to go].’
- c. māĩ caah-tii hũũ [ki vee jaa-ẽẽ]
 I[Nom] want-Impf.F.Sg am that 3.Pl.Nom go-Cont.3.Pl
 ‘I want [that they should go].’

For other speakers, an overt disjoint subject is possible; (26) is due to an anonymous reviewer, see also Bhatt (2004):

- (26) māĩ [un-kaa [be-izzat hoo-kar]] ghar laut-naa] hargiz
 I[Nom] 3.Pl-Gen.M.Sg humiliated be-Prt house return-Inf.M.Sg certainly
 nahĩ caah-tii hũũ
 not want-Impf.F.Sg am
 ‘I certainly don’t want [for them to return home [PRO having become humiliated]].’

Sentences such as these suggest that at least for some speakers, *caah-naa* has two selection properties, one for obligatory control (24a), the other for non-obligatory control. If non-obligatory control were the only selection property, then we could not explain why the dative restriction still holds for like subjects, and disallows disjoint subjects:

- (27) a. *māĩ_i [PRO_{i/*j} kroodh aa-naa] nahĩ caah-tii hũũ
 I[Nom] anger[Nom] come-Inf.M.Sg not want-Impf.F.Sg am
 ‘I don’t want [PRO to get angry].’
- b. *māĩ_i [usee_j kroodh aa-naa] nahĩ caah-tii hũũ
 I[Nom] 3.Obl anger[Nom] come-Inf.M.Sg not want-Impf.F.Sg am
 ‘I don’t want [him/her to get angry].’
- (28) a. *māĩ [PRO sirdard hoo-naa] nahĩ caah-tii hũũ
 I[Nom] headache[Nom] be-Inf.M.Sg not want-Impf.F.Sg am
 ‘I don’t want [t to get a headache].’ (OK as ‘I don’t want to be a headache.’)

³Some evidence for a control analysis of participial modifiers comes from an anonymous reviewer, who distinguishes between a modifier with a nominative subject of *haNs-naa* ‘laugh’ (i) and one with a dative subject *bhuukh lag-naa* ‘feel hungry’ (ii) in participle adjuncts.

- (i) raam_i=nee siitaa_j=koo [PRO_j [PRO_{j/j} hās-tee hu-ee]
 Ram=Erg Sita=Dat laugh-Impf be-Pf
 ghar jaa-nee]=kee liyee kah-aa
 house go-Inf.Obl=Gen for say-Pf.M.Sg
 ‘Ram_i told Sita_j [PRO_i to go home] [PRO_{j/j} laughing].’
- (ii) *raam_i=nee siitaa_j=koo [PRO_j [PRO_{j/j} bhuukh lag-tee hu-ee]
 Ram=Erg Sita=Dat hunger strike-Impf be-Pf
 ghar jaa-nee]=kee liyee kah-aa
 house go-Inf.Obl=Gen for say-Pf.M.Sg
 ‘Ram_i told Sita_j [PRO_i to go home] [PRO_{j/j} feeling hungry].’

- b. mǎĩ [PRO aisaa paisaa *mil-naa /lee-naa] nahĩ caah-tii hũũ
 I-[Nom] such money[Nom] get-Inf.M.Sg / take-Inf.M.Sg not want-Impf.F.Sg am
 ‘I don’t want [PRO to *get/take such money].’

The dative-subject expression *sirdard hoo-naa* ‘to get a headache’ cannot be embedded in the complement of ‘want’, nor can a dative-subject verb like *mil-naa* ‘to get, receive’ (10b). Ordinary transitive verbs like *lee-naa* ‘take’ are possible in (28b) because this verb has a nominative or ergative subject.

Another construction which is disambiguated by the condition (17) involves participles used as nominal modifiers, much like relative clauses. The participle has a null constituent corresponding to the modified head, which for purposes of exposition I will represent as 0, coindexed with the modified DP head. There is a condition on modifying participles which is connected to the aspectual morphology of the clause. If the participle is imperfective, the subject is null. If the participle is perfective and transitive, the direct object is null (Subbarao 1984, Chapter 9). For grammatical relations other than subject and direct object, the participle modifier is ungrammatical, such as the indirect object in (31).

- (29) Imperfective participle with null subject

[0_i bijlii=see ɖar-tee hu-ee] baccee_i roo-nee
 lightning=from fear-Impf.M.Pl be-Pf.M.Pl child.M.Pl cry.Inf.Obl
 lag-ee
 begin.Pf.M.Pl
 ‘The children [who are afraid of lightning] began to cry.’

- (30) Perfective participle with null direct object

[mǎã=kee /*=nee 0_i ɖããt-ee hu-ee] baccee_i
 Mother=Gen.M.Pl /*=Erg scold-Pf.M.Pl be.M.Pl child.M.Pl
 roo-nee lag-ee
 cry-Inf.Obl begin-Pf.M.Pl
 ‘The children [whom mother scolded] began to cry.’

- (31) Perfective participle with null indirect object

*[mǎã=kee 0_i kitaab di-yee hu-ee] baccee_i is=see prasann
 mother=Gen.M.Pl book give-Pf.M.Pl be-Pf.M.Pl child.M.Pl 3.Sg=from pleased
 thee
 be-Pst.M.Pl
 ‘The children [to whom mother gave the book] were pleased with it.’

I conclude that the coindexed null category is actually PRO. The Dative Restriction shows up in (32b), in which the coindexed null element is a subject with dative case.

Dative-marked experiencers have subject properties, such as ability to bind subject oriented anaphors (Davison 2004).

- (32) a. baccee=koo bijlii=see ɖar hai
 child.Sg.Obl=Dat lightning=from fear.M.Sg.[Nom] is
 ‘The child is afraid of lightning.’
 b. *[PRO_i bijlii=see ɖar hoo-taa hu-aa] baccaa_i
 lightning=from fear [Nom] be-Impf.M.Sg be-Pf.M.Sg child.M.Sg
 roo-nee lag-aa
 cry-Inf.Obl begin-Pf.M.Sg
 ‘The child [who is a afraid of lightning] began to cry.’

The Dative restriction (17) also extends to other types of case clitics, such as *-see* ‘from’ in (32), which is selected by the predicate *ɖar(N) hoo-naa* ‘have fear, be afraid of’. If we combine a sentence like (33a) as a perfective modifier with a null (post-positionally marked) object, the results are, like (32b), very ungrammatical.

- (33) a. *baccee teez aawaaz=see dar ga-ee*
 child.M.Pl loud sound=from be frightened go-Pf.M.Pl
 ‘The children became frightened of the loud noise.’
- b. *[*baccaoN=kii PRO_i dar-ii hu-ii*] *aawaaz_i*
 child.M.Pl.Obl=Gen.F be frightened.Pf.F.Sg be-Pf.F.Sg noise.F.Sg.[Nom]
teez thii
 loud was.F.Sg
 ‘The noise [of which the children became frightened] was loud.’⁴

The relation between the null element in the modifying clause and the modified NP seems therefore to be obligatory control, by this test. This test for obligatory control allows us to distinguish between uses of participles as complements, as in (23c), versus controlled modifiers (29)-(31). The Dative condition holds only for modifier participle clauses, the prenominal modifiers shown here, and perhaps for the oblique modifiers cited in note 3. The complement use is not a special case of a modifier clause, with obligatory control, given that the Dative Condition is not violated in sentences like (17) (see also Subbarao 1984, 162).

Finally, the Dative Condition distinguishes between predicates with a variety of modal and aspectual meanings. There are two predicates in Hindi/Urdu for ‘begin’, *shuruu kar-naa* ‘begin, start’, and *lag-naa* ‘strike, begin’, *shuruu hoo-naa* ‘begin (intrans.)’. They behave differently with dative embedded subjects. The ergative is found in (34a) but not (34b). Only the dative is allowed in (35a,b,c).

- (34) a. *raam=nee kitaab parh-nii shuruu k-ii*
 Ram=Erg book.F.Sg read-Inf.F beginning.M.[Nom] do-Pf.F.Sg
 ‘Ram began/started to read a book.’
- b. *raam (=nee/*kee) kitaab parh-nee lag-aa*
 Ram.M.Sg.[Nom]/ *=Erg/*Gen.Obl book.F.Sg.[Nom] read-Inf.Obl begin.Pf.M.Sg
 ‘Ram began to read a book.’
- (35) a. **raam=nee/=kaa kroodh aa-naa shuruu ki-yaa*
 Ram=Erg/=Gen anger.M.Sg[Nom] come-Inf beginning.M do-Pf.M.Sg
 ‘Ram began to get angry.’
 NP_i [PRO_i VP-naa] *shuruu kar-* ‘begin’ (Control)
- b. *raam=koo kroodh aa-nee lag-aa*
 Ram=Dat anger.M.[Nom] come-Inf.Obl begin.Pf.M.Sg
 ‘Ram began to get angry.’
- c. *raam=koo kroodh aa-naa shuruu hu-aa*
 Ram=Dat anger.M.[Nom] come-Inf.M.Sg beginning be-Pf.M.Sg
 ‘Ram began to get angry.’
- d. [e [NP=dat VP-nee] *lag-/shuruu hoo-* ‘begin’ (Raising to subject)

The Dative restriction (17) is violated only in (35a). I conclude that the predicates for ‘begin’ have different selectional properties. The complex predicate *shuruu kar-naa* selects an object infinitive with a PRO subject, a construction of obligatory control. The predicates *lag-naa*, *shuruu hoo-naa* ‘begin’ are not control constructions; we may speculate that they require Raising to Subject (35d)⁵.

The control predicate (26a) is like other control predicates in Hindi, with a nominative infinitive complement; others include *siik-naa* ‘learn to’, *bhuul-naa* ‘forget to’, *xatam kar-naa* ‘stop, finish’. However, the raising versions *lag-naa*, *shuruu hoo-naa* ‘begin’ (25b) select a full clausal complement.⁶ The clause has an overt subject which may have a case clitic like *-koo*. It lacks a structural case;

⁵Perlmutter (1970) argues that the English sentences with the verb *begin* are structurally ambiguous between raising and control.

⁶A small number of aspectual verbs optionally select an oblique complement, including *paa-naa* ‘manage’. The ditransitive verb *dee-naa* ‘give, allow’ requires the oblique inflection on the infinitive complement.

the default structural case for infinitive subjects would be the genitive, which is ill-formed (35a). In all instances, the embedded subject raises to the matrix null subject position, where it may get nominative case from the matrix clause. It is unlikely that the matrix verb is responsible for the case clitic in (35b), because *lag-naa* ‘begin’ does not assign a case clitic. It takes a matrix dative experiencer only in the sense ‘seem’. The dative occurs in the ‘begin’ sense if and only if the embedded predicate selects the dative.

The Hindi-Urdu aspectual verbs corresponding to English ‘begin’ are lexically as well as syntactically distinct. The ‘begin’ verb *lag-naa* combines with non-volitional or unaccusative verbs as well as agentive verbs, while *shuruu kar-naa* ‘begin’ implies agentivity in its complement. It is odd with unaccusative *mar-naa* ‘die.’

- (36) a. woo mar-nee lag-aa
 3.M.Sg.[Nom] die-Inf.Obl begin-Pf.M.Sg
 ‘He began to die.’
 b. ?? us=nee [PRO mar-naa shuruu ki-yaa
 3.Sg=Erg die-Inf.M.Sg beginning do-Pf.M.Sg
 ‘He began [PRO to die].’

In the examples above, two lexically distinct verbs meaning ‘begin’ take different complements, one a control complement, the other a non-control raising complement. Some modal verbs with infinitive complements have two distinct syntactic complements. There are, however, some different semantic nuances. Modals have both deontic meanings, an obligation ascribed to an individual, and epistemic meanings, concerning possibility or necessity of a proposition. This kind of difference emerges in comparing similar constructions of obligation with and without the Dative Restriction. For example, the epistemic reading is found in (37a,b), without a violation of the Dative Restriction in (37b):

- (37) a. [baraf kal paṛ-nii] hai
 snow.F.[Nom] tomorrow fall-Inf.F.Sg is
 ‘Snow is likely to fall tomorrow.’
 b. aap=koo aisaa paisaa mil-naa nahī hai
 you=Dat such money[Nom] get-Inf.M.Sg not is
 ‘It’s not likely, it’s not in the cards for you to get such/so much money.’
 c. mariiz=koo buxaar aa-naa nahī caahiye
 ill=Dat fever.M.Sg.[Nom] come-Inf.M.Sg not ought
 ‘It is necessary that the patient not get a fever.’ (Not: ‘the patient is obliged not to get a fever’). (K.V. Subbarao, p.c.)

The deontic reading is found in (38a,b)

- (38) a. mujhee jaa-naa hai/ paṛ-taa hai/ caahiye
 I=Dat go-Inf.M.Sg is fall-Impf.M.Sg is / ought
 ‘I want/have/need to go.’
 b. *mujhee sirdard hoo-naa nahī caahiye
 I=Dat headache [Nom] be-Inf not ought
 ‘I don’t need [PRO to get a headache].’
 (Grammatical as ‘It ought not to be the case that I am getting a headache’ (R. Bhatt p.c.))
 (39) *aap=koo [PRO aisaa paisaa mil-naa] nahī paṛ-taa hai
 you=Dat such money[Nom] get-Inf.M.Sg not fall-Impf.M.Sg is
 ‘You ought (deontic) not [PRO get that kind of money].’

The deontic reading of verbs of obligation and necessity requires a matrix experiencer coindexed with embedded PRO, as in the structures (37). The epistemic reading does not require a matrix dative experiencer, as the subject need not have an animate referent (37a) or one which is under an

obligation (38a); the experiencer in (37c) cannot volitionally choose to have or not have a fever.⁷ This distinction argues that the obligation construction with the deontic reading is a control construction.

2.2 Summary of control constructions

The Dative restriction (17) applies to obligatory control constructions, independently defined as those which require coreference between an antecedent/controller and a null embedded subject. The restriction has been used to make distinctions among other constructions with non-finite complements. Where the dative embedded subject makes the sentence ungrammatical, I conclude that the sentence is a control sentence. The grammaticality of lexically cased embedded subjects in the propositional complement of *deekh-naa* ‘see’ indicates that this construction involves raising, not object control.

For some though not all speakers, complements of the verb *caah-naa* ‘want’ show mixed properties. For all speakers I have consulted, embedded dative subjects are ungrammatical, suggesting that this verb selects an obligatory control complement. For some speakers, this verb also selects an infinitive complement which requires a disjoint subject with genitive case, perhaps the equivalent of the English ‘for -to’ complementizers, a non-control complement.

Perfective and imperfective participles are used as nominal modifiers. A nominal head is coindexed with a null subject (if the participle is imperfective) or null object (if the participle is perfective). This null element must be controlled PRO, because it cannot have dative or other case selected by the verb in participle form.

There are distinct transitive and intransitive verbs meaning ‘begin’, which differ both in the effect of the Dative restriction and in congruence with volitional-subject complements. The transitive verb ‘begin’ is a control construction, showing the Dative restriction, while other inceptive verbs are Raising to subject predicates. Modal constructions show a semantic distinction between deontic and epistemic readings, which is correlated with control and raising syntax; the Dative restriction applies to deontic readings, but not to the epistemic reading. I assume two subcategorization properties, with a theta-marked matrix subject (experiencer or locus of obligation) for the deontic reading, which is absent in the epistemic version. The Dative restriction serves to distinguish control from raising constructions, distinctions of case correlated with other syntactic features, such as the possibility of an overt disjoint embedded subject, and also semantic differences.

3 Assumptions about case licensing

The Dative restriction involves case clitics on subjects and certain objects. The case forms which violate the Dative restriction are different in nature from the ones which can occur on overt arguments with nominative or ergative case. This distinction would appear to be the distinction between structural case and lexical case. Structural case is valued by the formal features on functional heads such as T and v. Lexical or inherent case is selected by specific predicates. The basic distinction carries over from Principles and Parameters (Chomsky 1981, 1986). Structural cases are licensed in specific syntactic contexts, as defined by functional projections, such as v and T; cases selected by lexical items are lexical or inherent (Chomsky 1986, 1995, Ura 2000, 2006, Woolford 2007). The lexical case requirement is expressed as a category selection feature for a particular case clitic, associated with an argument of the predicate. This category feature is checked when the argument discharges a theta role (or is identified in some way with an argument position of the predicate) (Chomsky 1995, Ura 2000).

⁷This distinction is associated here with the difference between raising and control. It is not quite the same distinction associated with the presence or absence of clitic climbing in Romance languages. Paula Kempchinsky (p.c.) points out that in Spanish, clitic climbing is possible with both the deontic and epistemic readings. See accounts of ‘restructuring’, the absence of embedded PRO, with a variety of verb classes (Wurmbrand 2003).

I will partition the cases of Hindi/Urdu as follows:

Structural cases

- (40) a. Nominative, unmarked or zero case.
 b. Ergative *-nee* on transitive subjects of perfective, finite clauses.
 c. Dative *-koo* on direct objects with specific/animate reference.
 d. Genitive *-kaa* on possessors and subjects of some non-finite clauses.

Inherent and lexical cases

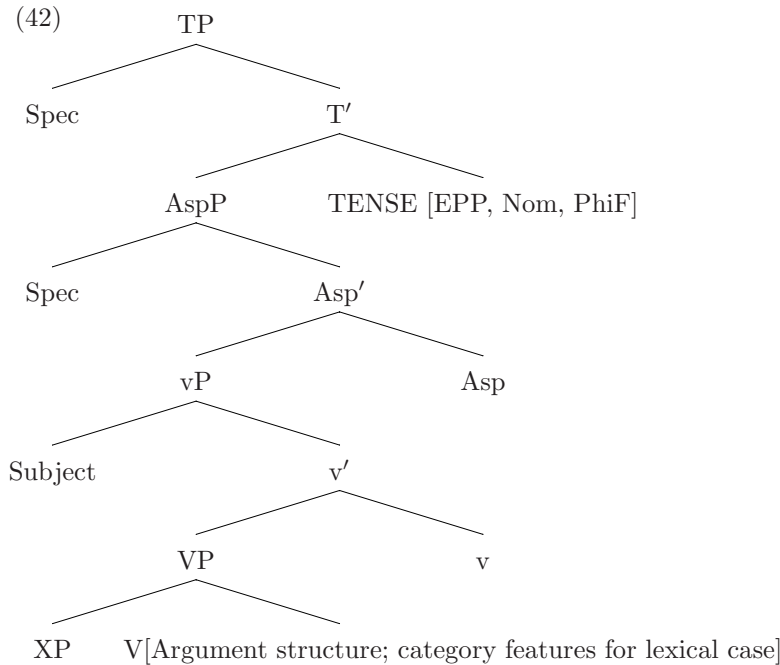
- (41) a. Dative *-koo* on goals and experiencers, associated with these theta roles.
 b. Locatives *-mēē* ‘in’, *-see* ‘with, from’, *-par* ‘on’, *-kee liyee* ‘for’, etc, selected by the predicate for its object.

This classification is not uncontroversial. Woolford (2007) and others argue that ergative is an inherent case associated with the theta role of agent or cause. Polinsky (2007) concludes that ergative is a structural case. Ergative case in Hindi/Urdu is an example of morphological and ‘split’ergativity (see comparison and discussion in Ura 2000, 2006). It is licensed under a set of conditions: the predicate must be transitive and unexceptional, the sentence aspect must be perfective and the tense finite (for other language particular conditions and arguments, the reader is referred to Davison 2000, 2004). Ergative subjects like nominative subjects originate in vP, and are licensed not just by the lexical V, but also by perfective aspect and finite tense, higher functional projections. I take this fact to mean that ergative case is licensed in relation to functional projections of tense and aspect.

On the other hand, the case clitics selected by predicates are checked in close association with the selecting predicate, within VP. This is true for dative experiencer/goals which have subject properties; they originate in VP, and like ergative and nominative subjects, they are raised, successively, through specifier positions to the Specifier of Tense. The motivation for movement is the Extended Projection Principle (EPP), which requires a phrase of a nominal category to be in the Spec/TP. While this motivation for movement originated under different theoretical assumptions in the Principles and Parameters theory, it is generalized in Minimalism to motivate movement. The Agree relation between functional heads and DPs is sufficient to value case, but does not account for overt position and the grammatical function associated with Spec/TP. This position contains the antecedent of a subject-oriented anaphor (Mohanani 1994, Davison 2000), and the controller of a *-kar* participle.

The dative *-koo* has two identities. It is an inherent case on indirect objects, associated with the goal thematic role. It is an inherent case on dative subjects, associated with the experiencer and goal roles. The *-koo* on direct objects is an example of Differential Object Marking (Aissen 2003), equivalent in some ways with accusative case. It contrasts with unmarked nominative case on objects. It is found with DP direct objects with animate or specific reference, including Raising to Object subjects (8b). There are some interesting questions about how differential object case for specific DPs is related to the dative on indirect objects, which have a position above vP (Bhatt 2007). The *-koo* dative on a direct object would be relevant for the imperfective participial modifiers, such as (30) above. Here the direct object is a well-formed PRO; it’s not possible to say whether the object is underlyingly nominative or dative. In any case, the null direct object is well-formed, suggesting that the case of the direct object is a structural case. The only kind of object case which violates the restriction (17) is the lexically-selected locative in (33b).

I assume the general clause structure in (42). Lexical cases are licensed within VP and vP. Structural case on subjects is licensed in projections above vP, including the special null case on PRO (Chomsky and Lasnik 1993). Subject arguments originate in vP and are raised to value the EPP feature on TENSE. The Dative restriction could be seen as a clash between the requirements of Spec TP and the case features valued in vP. It is rephrased as (43).



(43) Obligatory controlled subjects cannot be assigned a lexical case within VP/vP.

This condition could be specific to Hindi/Urdu, required in all languages with control, or a parametric option in Universal Grammar found in some languages and not others.

4 Evidence from other languages

In this section, I survey a selection of other languages, some historically related to Hindi/Urdu, others not, in order to show that the Case Restriction (43) is not an isolated idiosyncrasy of just one language, nor a universal.

4.1 The Case restriction in other languages

A number of languages with non-nominative subjects show a version of the Case Restriction (43), including other Indic languages such as Marathi (44) and Maithili (45):

(44) a. ravi=laa mini aavd-te [Marathi]
 Ravi=Dat Mini [Nom] like-Pres
 ‘Ravi likes Mini.’ (Rosen and Wali 1989, 15)

b. *ravi=ni [PRO mini aavdaay-caa] prayatna kelaa
 Ravi=Erg Mini [Nom] like-Inf attempt do.Pf
 ‘Ravi tried [PRO to like Mini].’ (Rosen and Wali 1989, 15)

(45) *raam harii=kii [PRO dar nahi ho-baak-lel] kaha-l-ak [Maithili]
 Ram [Nom] Hari=Dat Dat fear not be-Inf-for say-Pst-3N
 ‘Ram told Hari_i [PRO_i(Dat) not to be afraid].’ (Bickel and Yadav 2000, 357)

Nepali is very similar to Maithili (Bickel and Yadav 2000).⁸

Some Dravidian languages of South Asia also have the Case Restriction (43):

⁸Bangla, with both genitive and nominative experiencer subjects, may not show the Case Restriction unambiguously (Bayer, p.c., 2004, 56). Sinhala has a variety of non-nominative cases with involitive forms of verbs; it appears that these forms cannot be embedded in the complement of ‘want’ (J. Paolillo p.c.)

- (46) a. shiila-Lige aapareeshan aayitu [Kannada]
 Shila-Dat operation[Nom] become.Pst
 ‘Shila had an operation.’ (Sridhar 1976, 141)
 b. * avaru shiila-Lige [PRO aapareeshan aagalu] heeLidaru
 they[Nom] Shila-Dat operation become.Inf tell.pst.3.Pl
 ‘They told Shila_i [PRO_i to have an operation].’ (Ibid)
- (47) ?* en-ikkə [PRO avan-ooḍə deeSyam var]-aṇam [Malayalam]
 I-Dat1 he-Dat2 anger[Nom] come-want
 ‘I don’t want [PRO to be angry with him].’ (K.A. Jayaseelan, p.c.)⁹

Outside of South Asia, other languages with dative subjects have the Case Restriction:

- (48) gustatu nahiko nuke [Basque]
 like want aux.1
 ‘I want [PRO to be liked by someone(Dat)].’ NOT ‘I want [PRO(dat) to like someone.]’
 (J. Ortiz de Urbina, p.c.). See also Davison 2004, 160.
- (49) a. mne ne zdorovitsia [Russian]
 I-Dat not feel.well.3.Sg
 ‘I do not feel well.’
 b. *tebe khochetsia [PRO/ tebe ne zdorovitsia]?
 you-Dat want.3.Sg you-Dat not feel well.3.Sg
 ‘Do you want [PRO to get sick]?’ (E. Gavrusseva, p.c.)

In Basque, there are dative subjects, but in embedded infinitives, they are not coreferential with the matrix subject (48). In Russian, there is a large class of dative subject predicates, as in (49a), which may not be embedded in control constructions (49b).¹⁰

In German, the verb *interessieren* ‘to be interested in’ requires an accusative experiencer. A control construction like (50) is ungrammatical:

- (50) *Er hoff-te [PRO der neue Roman zu interessier-en] [German]
 He.Nom hope-Pst (Acc) the new novel [Nom] to be.interested-Inf
 ‘He hoped the new novel would interest him.’ (Bayer 2004, 55)

The sentence may be ill-formed in any case because non-nominative experiencers are not subjects in German. But Icelandic famously contrasts with German in that non-nominative experiencers are clearly subjects, and also there is no Case Restriction (Sigurðsson 1991). The PRO subject is dative in (51), and the sentence is well-formed:

- (51) Hann vonast [til að PRO leiðast ekki] [Icelandic]
 he.Nom hope.Pst for to (Dat) bore.Pres not
 ‘He hoped [PRO not to be bored].’ (Bayer 2004, 54)

4.2 Languages without the Dative restriction

In the examples above, we see that the Case Restriction (43) is found in many related and unrelated languages, but is far from being universal. Where it does occur, it applies uniformly to complement clauses as well as conjunctive participle adjunct clauses (see Rosen and Wali 1989 for detailed analysis of these clause types in Marathi).

⁹The equivalent sentence in Telugu requires a finite complement with the quotative, and is not grammatical (K.V. Subbarao, p.c.)

¹⁰These dative predicates are very similar to the psychological predicates found in Hindi/Urdu and other Indic languages, as well as in Slavic languages. Moore and Perlmutter (2000) note that similar dative predicates are found in Russian, Polish, Slovenian, Serbo-Croatian and Slovak, with the properties that the dative experiencer does not control agreement nor occur as controllee subjects. They do have other subject properties, binding subject oriented anaphors and perfective participle subjects. They argue that true dative subjects are found only in another modal construction found only in Russian and Polish. My discussion of Russian focuses on the more general Slavic (and Indo-European) datives, which I take to have dative syntactic subjects, *pace* Moore and Perlmutter.

Telugu differs from the related languages Kannada and Malayalam in not having the Case Restriction. Telugu has dative subjects (52a), which occur in infinitive complements (52b), and in a controlled conjunctive participle (53a):

- (52) a. pratima-ki mamata-miida koopam waccin-di [Telugu]
 Pratima-Dat Mamata-on anger[Nom] come.Pst-3.Sg
 ‘Pratima became angry at Mamata.’ (Subbarao and Bhaskararao 2004, 167)
- b. siita-ki ramaṇa-miida koopam raa-(v)āḍam iṣṭaam leedu [Telugu]
 Sita-Dat Ramana-on anger come-Gerund liking not
 ‘Sita did not like to get angry at Raman.’ (K.V. Subbarao p.c)

Conjunctive participles also allow dative subjects. Telugu has both forward control (53a) and backward control (53b), in which the matrix coreferent subject is null rather than the embedded subject. By definition, this matrix null subject cannot be PRO. The existence of backward control has been used to argue for the Movement Theory of Control (Polinsky and Potsdam 2002), which will be discussed in more detail below.

- (53) a. Forward control
 maalati [~~maalati-ki~~ koopam wacc-i] weLLipooyan-di [Telugu]
 Malti[Nom] Malti=Dat anger[Nom] come-CPrt leave.Pst.3.Sg
 ‘[PRO_i having gotten angry] Malti_i left.’ (Subbarao and Bhaskararao 2004, 173)
- b. [maduri_i-ki talanoppi gaa und-i] ~~maduri_i~~ ippuḍee paḍukondi [Telugu]
 Maduri-Dat headache Adjv have-CPrt Maduri[Nom] just.now sleep.Pst
 ‘[Maduri_i having had a headache, Δ_i slept just now.’
 (Subbarao and Bhaskararao 2004, 173)

The subject of the non-finite participle in (53b), *maduri-ki* ‘Maduri-Dat’ is overt and has the dative case required by the predicate ‘have a headache’¹¹. Backward control is correlated with the ability of the embedded clause to have case on the subject (Polinsky and Potsdam 2002, Potsdam 2008). It appears that languages which have both backward and forward control are exempt from the Dative restriction, a hypothesis which needs to be further investigated. Languages with forward control only are subject to the Dative restriction with the perhaps singular exception of Icelandic, which also seems to allow various cases on the embedded subject (Sigurðsson 1991).

4.3 Raising is independent of control

Hornstein (1999) proposes to derive control constructions as instances of raising to subject or object position in the matrix clause. The Hornstein account generalizes across control, reflexive binding and A-movement, which includes clause-internal passive movement as well as raising across clause boundaries. Cross-clausal raising is therefore a logical consequence of A-movement, and control is not syntactically distinct from raising, as the only difference is in the number of theta roles assigned in the matrix clause. A-movement and raising would seem to be logically prior to control, in that control is a sub-case of raising. If control is not distinct from A-movement, then a language which has control (assigning multiple theta roles to the matrix subject) should imply the existence of raising, which moves a DP without assigning an additional theta role. The Indic language Sinhala robustly has control constructions in complements and adverbial participles (54):

- (54) a. mamə [PRO ee wæḍə iwəṛə kər-annə] nal-annang [Sinhala]
 I [Nom] this work[Nom] finish do-Inf look-Vol.Opt
 ‘I will try [PRO to finish this work].’ (Gair and Paolillo 1997, 47)

¹¹While complement and adjunct control sentences in Telugu do not show a lexical case restriction on the embedded clause subject, there is a case restriction on the matrix subject in adjunct clauses. The sentence is degraded if the matrix subject is dative:

- (i)?? sarita=ki [~~sarita~~ aa maaTaa win-i] koopamu waccin-di
 Sarita=Dat Sarita[Nom] that matter hear-CPrt anger come.Pst.3.N.Sg
 ‘Having heard the news, Sarita got angry.’ (Haddad 2007, 75)

- b. mamə gunəpaalə-ʔəi [PRO_{i/*j} wəɖə kər-annə] balə-ker-uwa [Sinhala]
 I[Nom] Gunapala-Dat work[Nom] do-Inf force-do.Pst
 ‘I forced Gunapala [PRO to work].’ (Gair and Paolillo 1997, 48)
- c. [mamə_i [PRO_{i/*j} gedərə gihil-la] kəæmə kəæ-wa [Sinhala]
 I[Nom] home[Nom] go-Prt food[Nom] eat-Pst
 ‘[PRO_i having gone home], I_i ate.’ (Gair 1998, 275)
- d * [mamə [kalyaani gedərə gihil-la] kəæmə kəæ-wa [Sinhala]
 I [Nom] Kalyani home[Nom] go-Prt food[Nom] eat-Pst
 ‘[Kalyani having come home] I ate. (Gair 1998, 275)

In Colloquial Sinhala, there is no syntactic (periphrastic) passive involving raising of a direct object to subject position. Instead, the verb has involitive form, and the agent is marked with an oblique case (Gair 1998, 69).

- (55) a. mamə ee wacane kiwwa [Sinhala]
 I.Nom that word.Nom say.Pst
 ‘I said that word.’ (Gair and Paolillo 1997, 38)
- b. maʔə ee wacane kiyəwuna [Sinhala]
 I.Dat that word.Nom say.invol.Pst
 ‘I blurted out that word, I said that word inadvertently.’ (Gair and Paolillo 1997, 38)

Sinhala does not have Raising to Object, which would require accusative case on the embedded subject; instead the complement subject in (56) must be nominative, and the embedded verb is marked for present tense, instead of being a participle or infinitive.

- (56) mamə [gunəpaalə /*gunəpaalə -wə paare duwənəwa] dækka
 I[Nom] Gunapal[Nom] Gunapala-Dat road[Nom] run-Pres see.Pst
 ‘[I saw [Gunapala running on the road]].’ (Gair 2005)¹²

This sentence looks like an instance of a general pattern in Sinhala, according to which tensed clauses are allowed in case-marked complement position. (Gair 2005). Otherwise, there seems to be no evidence for any kind of raising.¹³ The ‘Raising’ class of verbs in Sinhala would select tensed complements, which may preclude movement in some way. Control verbs select infinitive complements, as in many other languages.

If Control is a variant of Raising, differing only in the number of distinct theta roles assigned by the matrix and embedded predicates in Hornstein’s analysis, then it should be quite unexpected that a language would have obligatory Control but no Raising to Subject or Object. Yet this seems to be what the evidence from Sinhala shows.

In this and preceding sections, I have made two empirical arguments against Control as Raising. Control, but not Raising, is subject to a Case Restriction (43) in some but not all languages which have non-nominative, lexically cased subjects. This restriction differentiates control sharply from Raising, and it cannot be in a sense added on to or derived from Control as Raising except in the form of a stipulation applying just to control contexts. Second, Hornstein’s generalization of

¹²There is a version of this sentence with an accusative case, as well as different word order and constituent structure. The accusative represents the object of ‘see’, modified by a subjectless finite clause:

(i) mamə gunəpaalə-wə_i dækka [0_{i/*j} paare duwənəwa]
 I[Nom] Gunapala-Acc see-Pst road[Nom] run-Pres
 ‘[I saw Gunapala [0 running on the road]].’ (Gair 2005)

¹³Sinhala also has non-verbal independent clauses with a NP or AP instead of a verb (Gair and Paolillo 1998, 87–110). (i) may be an embedded example with accusative case on the embedded subject. Note the use of the quotative *kiyəla*, typically used on embedded clauses in Sinhala, though not exclusively. It is not clear if (i) is an example of Raising to Object from a small clause.

(i) mamə [malliwə ugətek kiyəla] hitənəwa
 I[Nom] younger.brother-Acc learned.person [Nom] Quot think.Pres
 ‘I consider younger brother a learned person.’ (Gair 2005)

de se relations should be incorporated into the way Universal Grammar defines possible human languages. It should not be the case that a language could have Control, but not Raising, if Control is an instance of Raising. Yet it seems on the evidence in Gair (2005) that Colloquial Sinhala has Control but not Raising or Passive movement. Control involves non-finite complement morphology, while only finite complements are found where other languages have Raising to Object. The same is true for Madurese (W. Davies, p.c.).

The dissociation of raising and control in these languages would imply that the two processes are in principle independent in UG. The prior existence of raising is not necessary for there to be control constructions, nor does Control imply Raising. In the next section, I sketch briefly analyses of control as raising/movement. Then I discuss the problems posed for movement analyses by the case restriction and independence of raising and control in some languages. Movement is motivated by a need to check formal features, but whatever the formal features, they do not account in themselves for the case restriction which I have discussed above.

5 The movement analysis of control

Universal grammar would seem to include as a common option in languages the occurrence of a null subject coindexed with an identifying antecedent. Various control constructions are found in both finite and non-finite embedded clauses under a variety of syntactic and semantic conditions (Landau 2004). The analysis of control has taken many forms in the evolution of grammatical theory, such as Control Theory in Chomsky (1981, 1986). This analysis assumes a null pronominal anaphor PRO, which must have an antecedent as a reflexive does, but is not locally bound, like a pronoun. PRO is a special lexical entity with no phonological form. It occupies subject position, satisfying the Extended Projection Principle requiring a subject in a minimal clause. It antecedes subject oriented reflexives in languages like Hindi/Urdu. It is subject to something like the binding conditions, requiring a c-commanding antecedent in a governing category (Manzini 1983). In all versions of Control theory, some special assumptions are required to regulate where PRO occurs, what its antecedent(s) may be, and how it expresses an argument with a thematic role. Questions arise about whether it has case or not (Chomsky and Lasnik 1993), and whether it satisfies the EPP requirement for a specifier/subject of TP.

With the evolution of syntactic theory away from notions such as government, as Hornstein (1999) and Boeckx and Hornstein (2004) argue, the assumptions of Minimalist theories do not allow for a special null entity PRO, which requires special assumptions and a special kind of null case, distinct from the cases found on overt constituents. If so, this case would be anomalous, as many writers have pointed out.

Hornstein's response is to eliminate PRO and Control Theory, and to reduce obligatory control to a movement process which is formally like raising. Local A movement creates a chain akin to anaphoric binding. Control into adjunct clauses is achieved by 'Sideways' movement, construction of separate clausal projections sharing a constituent, the raised DP. Non-obligatory control involves coindexing with a null pronominal *pro* (Hornstein 1999). In obligatory control, the subject of the infinitive receives a theta role from vP in the embedded clause, but no case. The motivation for A movement of an embedded subject is to discharge a theta role assigned by vP of the matrix clause, to discharge the EPP feature of the subject position in T, and to check case in the matrix clause. This case could be nominative, for subject control such as (57), or accusative for object control (58).

(57) John wants [to make a film]. *John* [Nom]: experiencer, agent

(58) John persuaded them [to make a film] *Them* [Acc]: theme, agent

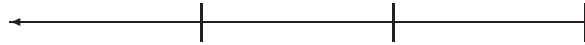
The moved DP ultimately gets multiple theta roles, violating the Theta Criterion, a basic assumption of both Principles and Parameters theory and many versions of the Minimalist program. Hornstein makes a major revision to the Theta Criterion, relaxing the prohibition of more than one theta role on an argument (chain). He retains the condition that theta roles must be checked/discharged, on the analogy of morphological features. The crucial difference between Raising and Control construc-

tions is in the number of theta roles which the moved DP discharges; Raising creates an A chain with one theta role linked to the complement predicate, as in other accounts, while Hornstein's Raising/Control produces a chain with multiple theta roles derived from both the matrix and embedded predicates.

Movement proceeds cyclically from one phrasal specifier to another. Schematically, a sentence like (59) is derived as in (60) (Hornstein 1999, 79–80). Movement is driven by theta role discharge, the EPP and case valuation.

(59) John hopes [~~John~~ to leave].

(60) [TP John [vP John hopes [TP John to [vV John [Nom] leave]
 EPP [D][Nom] θ 2 EPP[D] θ 1
 checking discharge checking discharge/MERGE



The movement theory of control allows a unified explanation of forward and backward control (Polinsky and Potsdam 2002, Potsdam 2008). Raising creates a chain, with two instances of the same constituent, one of which is deleted. This analysis is more in accord with minimalist approaches to syntax.

This proposal is motivated by the semantic similarities of obligatory control and the anaphoric construal of reflexives and traces, and by the goal of eliminating components of the theory of syntax such as PRO and control theory. The Movement Theory of Control embodies a basic insight that obligatory control is a kind of *de se* statement, like a reflexive binding, while optional control is like pronominal coindexing. The costs include the revision of assumptions noted above, and the claim that raising, control and reflexive binding are not just broadly similar, but are in some sense the same in syntactic derivation. This proposal has provoked much discussion, with responses focusing on language specific, empirical evidence for distinguishing raising and control (Landau 2003, Davies and Dubinsky 2004 and articles in Davies and Dubinsky 2006).

6 Problems presented for MTC by the Case restriction

In sections 2 and 4 above, I have outlined a restriction on Hindi/Urdu and some other languages, which prohibits controlled subjects from having lexical case. This restriction holds for obligatory control constructions, not raising or non-obligatory control sentences. If control is a sub-case of raising, and the lexical case restriction holds only for control, then the existence of this contrast has no obvious explanation in the Movement Theory of control. In the sections below, I explore some restrictions which could be stipulated to constrain control movement, arguing that they offer no explanation and fail to account for the data.

6.1 The raising analysis of Hindi/Urdu control sentences

The MTC would represent control sentences as in (61), in which the matrix subject is valued with nominative case (61a) or dative case (61b)

(61) a. woo [~~3.M.Sg~~ gaarii calaa-naa] caah-taa hai
 3.Sg.[Nom] car.F.Sg.[Nom] drive-Inf.M.Sg want-Impf.M.Sg is
 'He wants [to drive a car].'
 b. usee [~~3.M.Sg~~ gaarii calaa-naa] aa-taa hai
 3.Sg.Dat car.F.Sg.[Nom] drive-Inf.M.Sg come-Impf.M.Sg is
 'He knows [(how) to drive a car].'

The embedded subject has discharged a theta role feature in the vP of the embedded clause. It moves to Spec of the embedded TP to meet the EPP requirement. It gets no nominative case from the embedded infinitive, by the assumption that infinitive inflection has no structural Case feature. The subject then moves to matrix vP, where it discharges a second theta role feature, finally moving

to Spec/TP for the EPP and nominative case in (61a). In (61b), the dative case is checked within matrix vP; then the DP moves to Spec/TP for the EPP feature.

6.2 The problems of accounting for the Dative Restriction

The analysis in (61) would proceed in the same way for the ungrammatical (62a,b):

- (62) a. *woo [~~3.M.Sg.Dat~~ paisaa mil-naa] caah-taa hai
 3.Sg.[Nom] money[Nom] get-Inf.M.Sg want-Impf.M.Sg is
 ‘He wants [to get money].’
- b. *usee [~~3.M.Sg.Dat~~ paisaa mil-naa] aa-taa hai
 3.Sg.Dat money[Nom] get-Inf.M.Sg come-Impf.M.Sg is
 ‘He knows [(how) to get money].’

The embedded subject would get a theta role and lexical case in the embedded vP. It would move to the embedded Spec/TP for the EPP.¹⁴ It would then raise to matrix vP to discharge the second theta feature. Finally, it would move to Spec/TP for the EPP feature. As the MTC is formulated, movement would be blocked from the Specifier of embedded TP if the DP in that position received case in VP—a restatement of (43) which must stipulate that the lexically cased DP would be moving to a matrix position in which it receives another theta role. Otherwise, if the movement were a case of Raising to subject or object, the sentence would be grammatical, as in (24a,b), (35b, c), repeated as (63) and (64):

- (63) a. baccee=koo buxaar aa-yaa
 child=Dat fever.M.Sg.[Nom] come-Pf.M.Sg
 ‘The child got a fever.’
- b. mãã=nee baccee=koo [~~baccee-koo~~ buxaar aa-tee hu-ee]
 mother=Erg child=Dat child=Dat fever.M.Sg.[Nom] come-Impf.Obl be-Pf.Obl
 deekh-aa
 see-Pf.M.Sg
 ‘The mother saw the child getting a fever.’
- (64) a. raam=koo [~~raam-koo~~ kroodh aa-nee] lag-aa
 Ram=Dat Ram=Dat anger.M[Nom] come-Inf.Obl begin.Pf.M.Sg
 ‘Ram began to get angry.’
- b. raam=koo [~~raam-koo~~ kroodh aa-naa] shuruu hu-aa
 Ram=Dat Ram=Dat anger.M[Nom] come-Inf.M.Sg beginning be-Pf.M.Sg
 ‘Ram began to get angry.’

Under the MTC, the only distinction between control and raising is whether the matrix predicate assigns a second theta to the moved DP.

Another stipulation would be to say that Raising as control simply does not move DPs which get an experiencer theta role. This stipulation would describe the ungrammaticality of (62a,b), but it would not account for the contrast in (65a,b)

- (65) a. mãĩ [~~mãĩ~~ yah taaraa deekh-naa] caah-tii hũũ
 I[Nom] I[Nom] this star[Nom] see-Inf.M.Sg want-Impf.F.Sg am
 ‘I want [to see this star].’
- b. *mãĩ [~~mũjhee~~ yah taaraa dikhaaii dee-naa] caah-tii hũũ
 I[Nom] I.Dat this star[Nom]- sight give-Inf.M.Sg want-Impf.F.Sg am
 ‘I want [to see this star].’

¹⁴Lexically cased subjects have the same reflexive binding and control into adjunct properties as structurally cased subjects, both satisfying the EPP requirement on T (Davison 2004). If so, then DPs with lexical case can raise out of vP/VP to Spec/TP to meet the EPP requirement of T’, just as other external arguments do.

The embedded predicates both discharge an experiencer theta role; *deekh-naa* ‘see’ has a nominative/ergative subject, while its near synonym *dikhaaii dee-naa* ‘see, be visible to’ requires a dative subject. (See Davison 2004 for further discussion of the semantic and syntactic properties of these predicates.) This restriction would have to apply only to control instances of movement, as the experiencer in (63b) can undergo raising to object position, and the experiencer in (64c) raises to subject position, without loss of grammaticality.

Another possible solution would be to assume a case matching principle to explain the ungrammaticality of (62a,b). This would mean that there is case assigned in the embedded clause, which must match the case of the matrix subject position. In (62a), there would be a potential case clash between the lexical case checked in the lower vP and the nominative case feature of matrix T. Assuming structural cases are unvalued on DP, then the [Nom] feature of T could not value an already valued lexical case feature. This mismatch of case might account for the ungrammaticality of (62a). But there should be no mismatch in (62b), in which the dative case of the matrix vP matches the dative case checked in the embedded vP. Yet without a case mismatch, the sentence (62b) is still ungrammatical.

Yet another possible is to explain (62a) as an instance of case overwriting. Some versions of the MTC require that the embedded subject position is a case valued position, because in instances of backwards control, the embedded subject is the part of the chain which is pronounced. Polinsky and Potsdam (2002) and Potsdam (2008) show that the case on the lower copy is the one determined by the local predicate. Let us assume that in grammatical sentences the infinitive subject has nominative case, which somehow merges with matrix nominative or ergative case. In the ungrammatical sentences, the embedded clause dative case illicitly overwrites the nominative case valued in the matrix, violating a restriction that a subject position may not have both lexical and structural case. The MTC would say for Hindi/Urdu that (62a) is ungrammatical because the embedded subject is moved with dative case to a matrix subject position which must be valued nominative, or ergative in (66). Ergative case is associated with the transitivity of the matrix verb and its tense and aspect, and is not overwritten by dative case if the embedded verb is the dative-subject verb *mil-naa* ‘get’.

- (66) us=nee/ *usee [yah kitaab parh-naa/ *mil-naa] caah-aa
 3.Sg=Erg 3.Sg.Dat this book.F.Sg.[Nom] read-Inf.M.Sg/ *get-Inf.M.Sg want-Pf.M.Sg
 ‘He/she wanted [to read/*to get this book].’

This explanation fails for (62b), in which both subject positions have lexical case. The movement analysis of control would move a DP which receives its case in subordinate vP to the matrix clause, where it also gets dative case, as in (63b). This move should be licit in the MTC, but the sentence is just as ungrammatical as (62a), in which the dative case does not appear in the matrix clause.

In order to explain (62a) and (63b) as violations of a match between structural and lexical case, we would have to assume that Hindi/Urdu always rules out positions with both structural and lexical case. But in Raising to Object constructions, the embedded clause may have a lexically cased subject (67b). Raising to Object constructions value structural dative case on the raised subject (67c):

- (67) a. [Lexical dative case]
 baccee=koo buxaar aa-yaa
 child=Dat fever.M.Sg[Nom] come-Pf.M.Sg
 ‘The child got a fever.’
- b. [Lexical and structural dative]
 mãã=nee baccee=koo [~~baccee=koo~~ buxaar aa-tee hu-ee] deekh-aa
 mother=Erg child=Dat child=dat fever [Nom] come-Impf.Obl be-Pf.Obl see-Pf.M.Sg
 ‘The mother saw the child getting a fever.’
- c. [Structural dative]
 mãã=nee baccee=koo [~~baccee~~ roo-tee hu-ee] deekh-aa
 mother=Erg child=Dat child[Nom] cry-Impf.Obl be-Pf.Obl see-Pf.M.Sg
 ‘The mother saw the child crying.’

So again there is a categorical difference between raising and control constructions. Raising allows case overwriting (65b), but control sentences would not under the restriction on case overwriting.

6.3 The persistence of the control/raising distinction under various stipulations

In the preceding section, I have proposed stipulations of various kinds to account for violations of what I have called the Dative Restriction. The first stipulation recasts the Dative Restriction as a ban on moving embedded subjects with lexical case. This ban is too strong, as it would include Raising to Object and Subject as well. The only principled difference between control and other raising in the MTC is the number of theta roles lexically assigned by the matrix predicate in vP. The case ban applies just to movement to a vP position which values a theta role feature. The condition on moving is expressed as a diacritic use of the matrix argument structure, whether one does or does not accept theta roles as purely syntactic formal features.

The second stipulation is more semantic in nature. It says that DPs with an experiencer role (or goal role) may not be raised. This tack runs into the problem that non-lexically cased subjects may have an experiencer theta role, such as the close synonyms for ‘see’ in (63). And this prohibition also only applies to control sentences, leaving Raising sentences exempt, such as (63) and (64).

The third stipulation is to require case matching in the embedded and matrix positions of a DP. This accounts for some ungrammatical sentences, such as (62a), in which the embedded clause case does not match the matrix, but it fails to account for (62b), where there is a match of lexical case in the embedded and matrix clauses. It also does not account for Raising to Subject sentences like (64), in which the embedded subject has lexical case, but nominative is normally valued on the matrix subject.

The final stipulation would be to prohibit case overwriting, if the lexical case on the embedded subject is to overwrite the matrix case. This stipulation does not account for case-matching sentences like (62b), which should be grammatical but are not. It also does not explain Raising to Object sentences such as (67b), which are grammatical instances of a lexical dative and a structural dative (or accusative) appearing on the same raising DP.

The Dative Restriction (43) is also a stipulation, without apparent motivation. It lacks elegance and explanatory power. Yet it seems to be a correct stipulation, as it focuses on (a) the lexical case of the embedded subject and (b) the control construction, however this is to be represented formally. The alternative stipulations placed on a Movement account of Control which I have summarized above are no more explanatory, and have the extra requirement that some diacritic has to distinguish the control constructions in which the various restrictions apply from ordinary raising, where they do not. Nothing in the general account of movement predicts that such a restriction should apply specifically to control, but there is abundant evidence that it does.

The Hornstein movement analysis might be rescued if we make the stipulation (68):

(68) Lexical case realization condition (I)

Lexical cases must be realized phonetically within the local clause.

We would also have to assume that, as with Raising/Passive, no case may be assigned by local Tense/Aspect in a control construction. This case suppression property would be one selected by the matrix predicate in Raising/Control contexts. There would therefore be a contradiction. Dative or other lexical case must be assigned with a theta role within embedded vP, and by assumption this DP raises to Spec TP. No overt case may be realized on the embedded TP subject because of properties of embedded Tense/Aspect, which are in turn selected by the matrix verb. Only ‘null case’ is possible, if such a case exists. The contradiction could immediately make the sentence ungrammatical, as the featural properties of the embedded subject are illegible at the PF interface. Or the presence of an obligatory dative-case subject somehow blocks movement to the matrix, blocking the checking of a theta feature of the matrix verb. In that case, Full Interpretation would be violated.

The stipulation about the realization of lexical case is (43) is too strong. It does not hold in cases of non-obligatory control, such as (69):

- (69) a. [pro(arb) paisaa mil-nee]=kaa mauqaa hai
 money[Nom] get-Inf.Obl=Gen.M.Sg opportunity is
 ‘It is an opportunity [(for one) to get money].’
- b. [pro kroodh aa-tee]=hii woo ghar=kee andar ghuus ga-yaa
 anger[Nom] come-Inf.Obl 3.Sg house=Gen.Obl in enter go-Pf.M.Sg
 ‘As soon as he/she got angry, he/she went inside the house.’

The examples in (69) are grammatical instances of null subjects of dative subject predicates, where the lexical case which is not realized. So the stipulation on lexical case has to include the condition that it applies only to Control, not Raising:

- (70) Lexical case realization condition (II)

Lexical cases must be realized phonetically within the local clause in contexts of obligatory control.

This condition is not materially different from the descriptive generalization (43). Both have to circumscribe the condition to just those sentences where obligatory control is involved. Raising and non-obligatory control contexts are exempt. The ungrammaticality of control sentences in Hindi/Urdu is not explained by any intrinsic property of the Raising analysis.

One implication of the restriction is that case constrains control. Landau (2006) argues against a special null case on PRO, noting that there is language specific evidence for the ordinary range of cases on null subjects. He bases his arguments on case concord and conditions on dependencies of case assignment (2006, 157). The Lexical Case Restriction is a condition based ultimately on Case, even if the presence of lexical case can be derived from the shape of the verbal projection projecting lexical properties of predicates.

7 Control, raising and the Lexical Case condition

In the preceding sections, I have proposed a condition specifically on control sentences, applying subject, object and adjunct control subcases (43). In languages with lexically cased subjects, primarily experiencers, these subjects cannot be embedded in control complements. This condition (43) does not hold in raising complements in Hindi/Urdu, a language subject to this case constraint. The evidence from Hindi/Urdu strongly supports the idea that raising and control are distinct, and control is not reducible to movement, at least in the class of languages which includes Hindi/Urdu and others mentioned above.

This conclusion is not dependent on data from just one language. Some other languages besides Hindi/Urdu have the condition on control sentences. Much more remains to be discovered. Some important questions are (a) which languages with lexically case-marked subjects have the case condition (43), and (b), is there there the same very clear distinction between raising and control in some or all of these languages with the case restriction? Very little investigation has been done of possible differences between Raising and Control in these languages. Sinhala has been mentioned above as a language with control but no raising. It has not yet been possible to find out definitively if Sinhala rejects control sentences with involitive subjects of the kind which would correspond to lexically cased embedded subjects. The answers to these questions will be important in trying to find commonalities among languages which might define what gives rise to the condition.

Other languages, such as Icelandic, Telugu and Assamiya, lack the lexical case condition in all types of control sentences. It is suggestive that Telugu and Assamiya have both forward and backward or copy control (Subbarao 2004, Haddad 2007). Is it possible to predict that if a language has backward or copy control, expressing the embedded subject overtly, it will fail to have the lexical case condition? The reverse does not hold, as Icelandic is exempt from the lexical case restriction, and has no backwards control. Other backward control languages like Tsez might be explored for conditions on lexical case and raising.

The evidence presented in this paper has cast doubt on the identification of control sentences with raising sentences in Hindi/Urdu. Some language-particular evidence exists that control and

raising are subject to different conditions. Some languages like Sinhala and Madurese have robust control complements but no raising; it would be useful to add to the number of such languages. Runner (2006) has noted that in languages like English, extraction from object controllers is free, but raised objects have restrictions on extractions. He also notes that case agreement in various languages affects raising to object sentences differently from raising to subject and control cases .

The language-specific facts and generalization presented in this paper point towards a tension within approaches to syntax. Syntactic theory which tries to capture Universal Grammar is biased towards minimal assumptions of basic components of the grammar, and maximum generality of description. The movement theory of control is attractive from this point of view, though it leaves open some important questions about the nature of thematic roles and the conditions on them. Variation among languages should be reducible to different parameter values, whether they are very broad (such as word order), or very local, such as lexical selection and feature properties of lexical items in individual languages. The kind of close examination of raising and control in Runner (2006) and this paper shows that the maximally general account of control misses some important patterns which turn up in more than one language; they are not pure language idiosyncrasies, nor are they universal. More research is needed on the actual properties raising and control, whether it is motivated by scepticism about the movement theory of control, or by a wish to give a full account of the way a specific language instantiates control and raising constructions. A greater range of data would then be the basis for hypothesis about finding features which predict whether or not a language has both forward and backward control (a relatively rare feature), and whether it has the case restriction. These questions also lead to further questions about the nature of control and raising in Universal Grammar.

8 Summary and Conclusions

Many languages have lexically cased subject. In some types of embedded non-finite clause in Hindi/Urdu and certain other languages, there is a restriction on the case of the subject. This restriction creates an ungrammatical sentence in some non-finite clause types, but not others. I have proposed that case restriction affects control but not raising complements. In one kind of analysis, null obligatorily controlled subjects are PRO, subject to a still unexplained incompatibility between PRO and lexical case.

In the Movement Theory of Control, control and raising both derive from movement for formal feature checking. Languages with backward as well as forward control lack the case condition. They offer strong support for the movement account. However, in the case of Hindi-Urdu, the movement account runs up against an insurmountable problem in stating the case restriction as a general condition on movement. Somehow the various imaginable stipulations have to distinguish between raising and control. The MTC also does not predict that some languages would have control but not raising, but this seems to be the case.

There are puzzling questions for further investigation. It seems implausible that languages differ in how controlled subject are represented. Yet we have seen that there are languages like English without lexically case subjects and no case restriction, languages like Hindi with lexically cased subjects which may not be controlled, and languages with lexically cased subjects which may be controlled, including ones like Telugu with both forward and backward control. These differences suggest that there is more variation individual languages which remains to be further explored.

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Abbreviations

Acc=Accusative, Adj=Adjectivizer, Cont=Contingent, Cp=Conjunctive participle, Dat=Dative, Erg=Ergative, F=Feminine, Fin=Finite, Gen=Genitive, Hon=Honorific, Imp=Imperfective, Inf=Infinitive, M=Masculine, N=Neuter, Nom=Nominative, Nonfin=Nonfinite, Obl=Oblique, Opt=Optative, Pf=Perfective, Pl=Plural, Pres=Present, Prog=Progressive, P=Conjunctive participle, Pst=Past, Quot=Quotative, Sg=Singular, Vol=Volitional, 1=First person, 3=Third person.

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Focus, Word Order and Intonation in Hindi

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ABSTRACT

A production study is presented that investigates the effects of word order and information structural context on the prosodic realization of declarative sentences in Hindi. Previous work on Hindi intonation has shown that: (i) non-final content words bear rising pitch accents (Moore 1965, Dyrud 2001, Nair 1999); (ii) focused constituents show greater pitch excursion and longer duration and that post-focal material undergoes pitch range reduction (Moore 1965, Harnsberger 1994, Harnsberger and Judge 1996); and (iii) focused constituents may be followed by a phrase break (Moore 1965). By means of a controlled experiment, we investigated the effect of focus in relation to word order variation using 1200 utterances produced by 20 speakers. Fundamental frequency (F0) and duration of constituents were measured in Subject-Object-Verb (SOV) and Object-Subject-Verb (OSV) sentences in different information structural conditions (wide focus, subject focus and object focus). The analyses indicate that (i) regardless of word order and focus, the constituents are in a strict downstep relationship; (ii) focus is mainly characterized by post-focal pitch range reduction rather than pitch raising of the element in focus; (iii) given expressions that occur pre-focally appear to undergo no reduction; (iv) pitch excursion and duration of the constituents is higher in OSV compared to SOV sentences. A phonological analysis suggests that focus affects pitch scaling and that word order influences prosodic phrasing of the constituents.

1 Introduction

Prosody is an integral component of language, and so it is only natural that online sentence comprehension and production critically depend on the structuring cues provided by prosody. The role of prosody in comprehension and production seems to be especially relevant for languages such as German and Hindi that involve relatively free word order; word order flexibility increases the number of options available for expressing information structure, significantly complicating the means by which the incoming signal can be decoded. Any extra-syntactic cue, such as prosody, would a priori be expected to provide an important cue for facilitating comprehension.

European languages such as English and German (e.g., Gussenhoven 2008, Ladd 1996, Selkirk 2007, Truckenbrodt 1995, Féry and Kügler 2008) have received a great deal of attention concerning the prosodic marking of information structure. However, not much is known about Hindi in this respect. In an attempt to fill this gap, we investigate the effect of word order and intonation on prosody. We carried out a production study of Delhi Hindi (20 participants) which showed that the intonation of Hindi and its interaction with focus and word order differs from well-studied intonational languages such as English and German. First, the primary prosodic cue accompanying focus

on a constituent is post-focal pitch range reduction, rather than the raising of F0 as observed in intonational languages such as English; this is consistent with previous research on Hindi intonation (Moore 1965, Harnsberger 1994). In pitch range reduction (or compression), the voice register available for realizing the melody of tones is reduced as compared to the one the speakers have at their disposal when starting the sentence. High tones are lower, or not realized at all, depending on the amount of register compression. Second, in sentence-initial focus, canonical (SOV) word order shows a greater post-focal pitch range compression than non-canonical (OSV) order. Third, when sentence-medial elements are focused, (i) the sentence-initial object in non-canonical (OSV) order has a higher F0 peak as well as a larger F0 range than the sentence-initial subject in canonical (SOV) order, (ii) the duration of the medial (focused) element is longer in the non-canonical order compared to canonical order, and (iii) no evidence is found of pre-focal pitch range compression for given (previously mentioned) elements.

We propose an analysis of phrasing in Hindi according to which each content word in Hindi is phrased separately as a prosodic-phrase (p-phrase). Each p-phrase receives a low tone, which we analyze as a pitch accent, and a high phrase boundary associated with the right edge of the prosodic word. Regarding pitch range effects, tones are scaled relative to abstract reference lines, and we assume the all-new sentence pattern to represent the neutral baseline. Focus, then, compresses the post-focal register in Hindi.

2 Background

Hindi belongs to the Indo-European branch of languages and is an Indo-Iranian language (Kachru 1987) genetically related to European intonation languages such as English, German and Russian. It is natively spoken by approximately 366 million speakers (source: Ethnologue, www.ethnologue.com), mainly in the central and northern part of India, but also in Bangladesh, Nepal, the United Kingdom and many other countries. In addition, Hindi is also used as a second language or a lingua franca by many Indians in non-Hindi speaking regions. The syntax of Hindi and Urdu (which is spoken in Pakistan as well as India) are virtually identical, although the scripts and choice of content words differ. We use the term ‘Hindi’ in this paper but the conclusions presented are expected to extend to Urdu as well.

2.1 Hindi intonation

The work of Nair (2001) and Dyrud (2001) suggests that Hindi has lexical stress, in the sense that every word has a designated syllable on which prominence is realized (see Hayes 1995, Moore 1965, Ohala 1986, who notice contradictions on this view). Nair (1999) and Dyrud (2001) find acoustic correlates of prominent syllables, like higher pitch and longer duration. Position of lexical stress is dependent on syllable weight, the heavier syllables attracting stress first. Hussain (1997) shows how the position of stress can be predicted by syllable weight (but see Ohala 1986, who finds differences in stress position depending on whether a word is uttered in isolation or in a sentence).

All researchers on Hindi intonation appear to agree that each content word except the final one is associated with a rising contour.¹ According to Moore (1965, 68), every p-phrase (called ‘foot’ by Moore) contains a pitch accent, where this prosodic domain is defined as “one to several syllables in length, which normally is uttered with a continuously rising pitch from beginning to end”. Harnsberger (1994) makes a similar observation, and proposes that the low part of the rising contour is a low pitch accent, annotated as L* in an autosegmental-metrical notation system (Pierrehumbert 1980). The high part of the rising contour is either a trailing tone H⁻², or a boundary tone H_P. The subscript ‘P’ represents a phrase boundary smaller than the intonation phrase (see Hayes and Lahiri 1991, for this annotation convention). In the analysis presented below, we treat the high part as a boundary tone.

¹Moore’s data suggests that wh-questions are realised with a different intonation pattern, though Moore himself does not emphasize this fact and a systematic analysis has yet to be done.

²A trailing tone is the part of a bitonal pitch accent that follows the starred tone.

Moore's account of Hindi intonation comprises an analysis of pitch, intensity and duration for three prosodic phenomena: the expression of emphasis (or focus), the expression of speaker attitudes, and phrasing (Moore 1965, 62). Although Moore distinguishes different melodic contours on a single syllable, i.e. level, rise, fall, rise-fall, fall-rise (Moore 1965, 65), the underlying pitch accent is considered a rising one. Deviations from this underlying pattern on the surface are the result of speaker's attitude, or, alternatively, the result of a pure phonetic effect, namely tonal transition from a very high rising pitch to the following low tone (1965, 68, 75).

According to Moore, focus has a phrasing effect. In the terminology used here and which is also used by Lahiri & Hayes for the closely related language Bengali (Hayes and Lahiri 1991), focus has the effect of inserting a p-phrase boundary at the left edge of the focused phrase. The same effect of focus has also been observed in Harnsberger (1994). According to Hayes & Lahiri, a focused phrase also causes dephrasing of the postfocal material. Like Hindi, Bengali is a head-final language (SOV), and the formation of p-phrases is primarily based on syntax (see also Lahiri and Fitzpatrick-Cole 1999). Every maximal constituent is a p-phrase, and the verb often forms its own p-phrase, obligatorily so when it is focused. Evidence for p-phrases comes not only from the tonal structure, but also from segmental processes like /r/ assimilation and voicing assimilation, which only take place inside of p-phrases. The absence of these processes correlates with p-phrase boundaries. Some variations in phrasing occur as a consequence of speed, style and givenness, but these variations are also subject to syntactic constraints. It is not the case that all kinds of restructuring are allowed. Hayes & Lahiri also show that the phrase construction rule is cyclic and recursive. In contrast to Moore and Harnsberger, who assume two levels of prosodic phrasing below the intonation phrase, Hayes & Lahiri only allow p-phrases, which are cyclic and recursive. This is also the view adopted in this paper, though our experimental sentences do not make use of recursive p-phrases.

Beside the phrasing effect just discussed, focus has been claimed to have two additional prosodic effects (see Harnsberger 1994, 1999, Moore 1965, Dyrud 2001, among others). First, the rising pitch pattern may show a higher excursion, a greater intensity and longer duration.³ Second, post-focally the pitch range may be compressed or even completely flat and deaccented (Harnsberger and Judge 1996), although rising pitch accents are still realized in compressed pitch range.

There is a striking similarity between the intonation of Hindi and detailed descriptions of other South-Asian languages like Bengali and Tamil: Hayes and Lahiri (1991) and Khan (2007) assume several similar prosodic properties for Bengali, such as lexical stress, pitch accents associated with stressed syllables, and intonational phrasing on at least two levels. The Dravidian language Tamil, although genetically unrelated, also shows similarities with Hindi (Keane 2007a,b); this could be a consequence of language contact. According to the sentence-based typology of intonation systems recently developed by Féry and Fanselow (2008), Indo-Aryan and Dravidian languages share the property of being phrase languages, that is languages in which tones assigned at the level of the p-phrase play a crucial role for the intonational pattern. These languages differ from intonation languages like English for instance, which freely assign different kinds of pitch accents on words.

2.2 Information structure and Hindi syntax

Hindi is a head-final (Subject-Object-Verb) language, with relatively free word order. Constituents may be scrambled to express different information structural configurations, or for stylistic reasons. The first syntactic constituent in a sentence is usually the aboutness topic (Gambhir 1981, Butt and King 1996), which may under certain conditions be marked by the clitic *-to*, similar in some respects to Japanese *-wa* (Kuno 1981, Kidwai 2000). The term 'aboutness topic' is understood here as a referent which the remainder of the sentence is about, possibly contrasting with other referents, and followed by a focused constituent (see Reinhart 1981, Jacobs 2001, among others).

In Hindi, a focused constituent typically occupies the immediately preverbal position, and wh-

³Note, however, that according to Moore (1965) a focus needs not necessarily be realized by means of all correlates but any combination of one or two of these may suffice to phonetically express focus. Thus, F0 as a correlate may be absent.

markers also tend to occur preverbally (Kidwai 2000, 116). Nominal clitics can serve to mark focus (similar to English focus particles like ‘only’, ‘even’ or ‘also’, Sharma (2003)). However, focused constituents need not be morphologically marked. In this paper, ‘focus’ is used rather traditionally as the part of the sentence which introduces alternatives (Rooth 1985, 1992). The term ‘focus’ is applied to constituents which are informationally more important than other backgrounded parts of the same sentence. In the general case, an all-new sentence does not trigger a set of alternatives, though the possibility of focusing a whole sentence cannot be excluded in principle. Below, we call an all-new sentence a ‘wide-focused’ sentence. According to Butt and King (1996), in situ focusing of a phrase in Hindi is possible with multiple foci and results in contrastive focus readings. Kidwai (2000, 114-137) presents detailed arguments that focus is responsible for scrambling operations such as preposing (as XP adjunction operations).

Butt and King also provide evidence that background information occurs postverbally, and complete information – which is information of secondary importance to the information structure of the discourse – occurs in the preverbal region preceding the focus position.

2.3 Aim of the present study

Thus, although much is known or hypothesized about word order and focus in Hindi, very few controlled experimental studies exist that explore the interaction with prosody. In order to remedy this situation, we took this previous work as a theoretical starting point and designed a production experiment that investigates the intonational realization of focus and its interaction with different word orders.

3 Production experiment

3.1 Method

3.1.1 Design and Materials

The experiment involved a 3x2 factorial design with two factors: focus (subject, object and wide focus) and word order (SOV and OSV⁴)

Each trial consisted of a question-answer pair: a question and a response to the question. The question set up either a subject, object or wide focus for the response utterance; see examples (1), (2), (3). In (1-b) and (1-c) the question involves subject focus, in (2-b) and (2-c) object focus, and in (3) wide focus. In the examples, a bracketed segment with a subscripted F stands for the focused element relative to the preceding question.

- (1) Subject question
- a. *kis ne davaaai ko khariidaa?*
who ERG medicine ACC buy.PAST?
‘Who bought the medicine?’
 - b. [*graahak ne*]_F *davaaai ko khariidaa*
customer ERG medicine ACC buy.PAST
‘(The) customer bought the medicine.’
 - c. *davaaai ko [graahak ne]F *khariidaa*
medicine ACC customer ERG buy.PAST
‘(The) customer bought the medicine.’*
- (2) Object question
- a. *graahak ne kyaa khariidaa?*
customer ERG what buy.PAST?
‘What did the customer buy?’

⁴Only two word orders (SOV and OSV) are considered here in order to keep the number of experiment conditions tractable, and because not all word orders are possible in Hindi and the constraints on word order variation are far from clear.

- b. graahak ne [davaaai ko]_F khariidaa
 - c. [davaaai ko]_F graahak ne khariidaa
- (3) Wide focus question
- a. kyaa huuaa?
what happen.PAST?
'What happened?'
 - b. [graahak ne davaaai ko khariidaa]_F
 - c. [davaaai ko graahak ne khariidaa]_F

The questions were always in canonical (SOV) word order, and the answers always contained a transitive verb and two arguments, with subject arguments in ergative case and objects in accusative case. Subjects were nouns referring to humans and objects referred to inanimate referents. Past tense and perfective aspect was used in all sentences. Half of the subject and object nouns were bisyllabic with initial stress and the other half were trisyllabic with stress on the second syllable. The complete set of target items is shown in the Appendix.

A note on terminology: Since at most one argument (subject or object) is focused in the question utterance, the non-focused argument will be designated as given in the response utterance (previously mentioned in the question; Allerton 1978, Lambrecht 1994). For example, in the subject question (1), *davaaai*, 'medicine', is mentioned, and so in the response utterances (1-b) and (1-c) the referent denoted by *davaaai* is given. By contrast, in the wide focus condition (3), since none of the arguments are mentioned, in the corresponding response utterances (3-b) and (3-c) none of the noun phrases refer to given elements. This distinction between the focused and given element becomes relevant when the results of the experiment are presented.

A total of 18 unique question-answer pairs were constructed and each pair was realized in the 6 conditions, resulting in $18 \times 6 = 108$ sentences per speaker. All the 108 sentence-pairs were presented to each speaker in a pseudo-randomized manner; items from four other unrelated experiments were interspersed as fillers. Four pseudo-randomized lists were prepared to minimize order effects.

The questions were recorded in a speech recording laboratory in the University of Potsdam in preparation for presentation of stimuli to participants; the presentation procedure is described below.

3.1.2 Participants

30 native speakers of Hindi participated in the experiment. All were female students at the University of Delhi, India and were residents of Delhi and surrounding areas. Each speaker was paid 150 Indian Rupees for participation and took approximately 45 minutes to complete the experiment.

3.1.3 Procedure

The experiment was carried out using presentation software. First, participants were equipped with a set of headphones and a microphone head-set, and familiarized with the task through written and verbal instructions, followed by two practice trials. Each trial consisted of a presentation of the question and its answer on the computer screen, written in Devanagari. Participants heard the pre-recorded question over headphones, spoken by a male voice. At the same time the target sentence was presented on the screen. Participants were instructed to speak out the answer displayed on the screen as a response to the question. If the question was answered without any hesitations or false starts, the next trial was presented. If there were hesitations, participants were asked to repeat the answer. A total of 48 items (4%) had to be repeated because of false starts or hesitations. Presentation flow was controlled by the experimenter, and participants were allowed to take a break whenever they wanted. The sentences produced by participants were recorded at the University of Delhi on a DAT tape recorder.

3.1.4 Data pre-processing and statistical analysis

Due to limited resources we analyzed a subset of the data. Of the 18 items, five items from each syllabic and stress pattern, i.e., a total of 10 items, were selected for annotation and analysis (the

<i>Dependent variable</i>	<i>Where measured</i>
F0-maximum (Hz)	at the right edge of preverbal constituents (This is where H boundary tones are expected.)
F0-range (Hz)	preverbal constituents
Duration (ms)	preverbal constituents

TABLE 1 Dependent variables.

first five items of each syllabic pattern) Of the 30 speakers, utterances from the last 20 speakers was used in the data analysis. This resulted in a total of 1200 utterances (20 speakers \times 10 items \times 6 conditions). The above criteria for subsetting the data were decided upon arbitrarily.

The recordings were redigitized from DAT at a sampling frequency of 44.1 kHz and 16 bit resolution. Data were labeled by hand at the level of the constituent, as shown in (4). The vertical lines mark constituent boundaries.

- (4) | graahak ne | davaaii ko | khariidaa |
 customer ERG medicine ACC buy.PAST
 ‘(The) customer bought the medicine.’

The pitch analysis was conducted using a Hanning window of 0.4 seconds length with a default 10 ms analysis frame. The pitch contour was smoothed using the Praat (Boersma and Weenink 2005) smoothing algorithm (frequency band 10 Hz) to diminish microprosodic perturbations. Stylized pitch tracks were calculated. For this purpose, each constituent in (4) was divided into five equal intervals, and the mean pitch was aggregated over the 20 speakers and 10 sentences for each interval. The resultant values were interpolated separately for each condition.

For each constituent in (4), the maximum F0, the minimum F0 and the duration were detected using a Praat script. In the second constituent, only those F0 maxima were measured that followed the F0 minimum in that constituent; this was done in order to exclude maxima due to transitions from preceding H tones. The maximum after the low tonal target represents the high tone in the LH gesture. Based on the measurements of F0-maximum and F0-minimum the F0-range was calculated (F0-max minus F0-min).

The statistical analysis relied on three dependent variables, F0-maximum, F0-range, and duration; the loci of these measurements are shown in Table 1. All dependent measures were log-transformed to meet the assumption of the regression model.

A multilevel model (Gelman and Hill 2007, Bates and Sarkar 2007, Pinheiro and Bates 2000) was fit, using crossed random factors speaker and item, and focus status of constituent (wide focus, narrow focus, given), and word order of sentence (SOV vs. OSV) as fixed factors.

3.2 Results and Discussion

3.2.1 Effect of Focus

The contours in Figures 1–3 show time-normalized mean pitch tracks for each focus condition averaged over all 20 speakers. The contours show rising tonal patterns on the non-final constituents and falling patterns on the final verb. Table 2 in the Appendix summarizes the results of the statistical analyses.

As shown in Figure 1, for SOV structures, in the subject, object and wide focus conditions a rising pitch gesture is realized on both pre-verbal constituents. Object focus and wide focus do not show a significant difference, but subject focus is realized with a significantly higher F0 excursion compared to the wide focus counterpart (although the magnitude of the difference is small). In the subject focus condition, the rising gesture on the object is realized in a clearly lower and compressed range compared to the other conditions.

A similar pattern is seen in OSV structures. Here, the pitch tracks of subject focus and wide focus are nearly identical. This absence of a difference between the two types of focus may due to

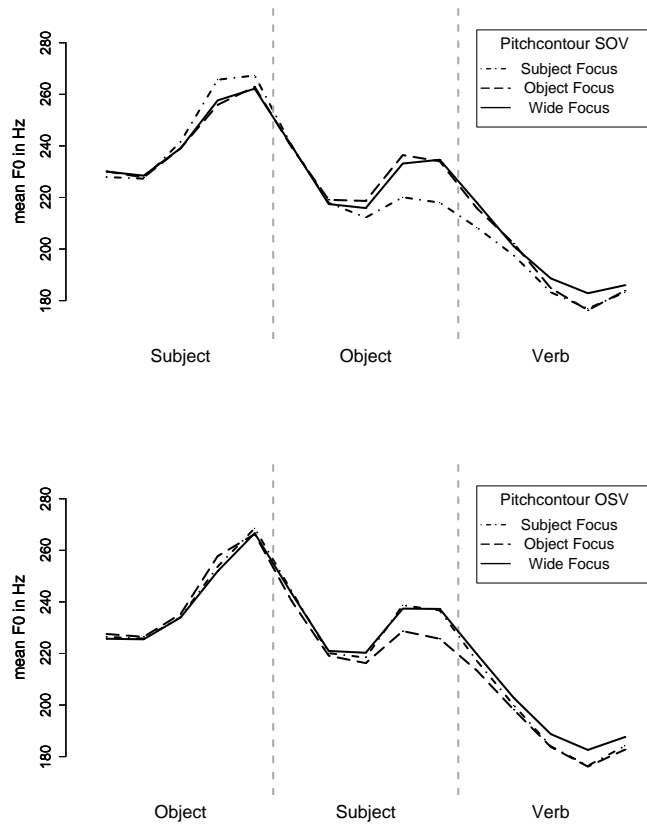


FIGURE 1 Time-normalized pitch tracks, based on five measuring points per constituent, showing the mean across all speakers. The upper plot shows SOV order and the lower plot OSV order. The comparisons of interest in each plot are subject focus (dotted line) and object focus (dashed line) with respect to wide focus (solid line).

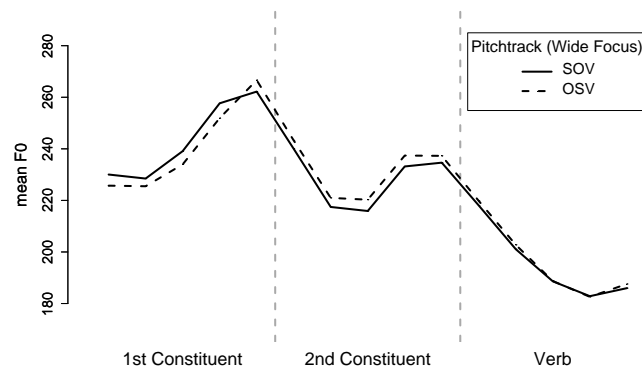


FIGURE 2 Time-normalized pitch track based on five measuring points per constituent averaged across all speakers for SOV (solid line) and OSV (dotted line) in the wide focus condition.

the fact that in OSV word order, the subject is in the default preverbal focus position (Section 2.2) in both the conditions. In OSV structures, the realization of (sentence-initial) object focus shows a divergent pattern, although not on the focused constituent itself. Only post-focal compression is visible: the rising pitch gesture in the post-focal constituent is significantly lower than the one for wide focus.

Focus thus induces post-focal compression of the pitch range, which confirms the results of Moore (1965), and Harnsberger and Judge (1996). However, the expected effect of greater pitch excursion on the focused constituent itself is only borne out for initial focus in SOV sentences but not for medial focus or OSV sentences.

We now turn to the results of the statistical analyses on the three dependent variables. Subject focus in SOV order had a higher F0-maximum ($t=4.26$), a greater pitch range ($t=4.97$), and longer duration ($t=2.62$) on the focused subject, compared to the wide focus baseline. Compared to the baseline, the given object showed a significantly lower F0-maximum ($t=-9.06$), a smaller F0-range ($t=-9.94$), and shorter duration ($t=-6.24$).

Although no effect of focus was found on the object in OSV sentences, post-focal compression on the medial constituent was seen when the initial object was in focus (lower F0-maximum ($t=-8.23$), lower pitch range ($t=-6.7$) and shorter duration ($t=-3.62$) compared to the wide focus baseline) much as in SOV order. When the medial subject was focused, it had a slightly but significantly higher F0 range ($t=2.34$) compared to the baseline. F0-maximum and duration did not yield significant effects here.

Pre-focally given constituents do not show any clear difference compared to wide focus baseline: an initial given subject is nearly identical in F0 maximum (initial subject and baseline: 274 Hz), F0 range (initial subject 58 Hz, baseline 59 Hz), and duration (initial subject 556 ms, baseline 558 ms). The same result holds for an initial given object (F0-max: initial object 276 Hz, baseline 279 Hz; F0-range: initial object 67 Hz, baseline 68 Hz; and duration: initial object 551 ms, baseline 558 ms).

3.2.2 Effects of word order

Wide focus. Figure 2 shows SOV and OSV word orders in the wide focus condition, and Table 3 in the Appendix summarizes the results of the statistical analyses.

Almost no difference is seen in the time-normalized pitch tracks. The marked word order (OSV) is on average slightly lower in the rising part of the first constituent, higher on its peak, and it is slightly higher on both the rising part and on the peak of the second constituent. Regarding the dependent variables, the F0-range on the initial constituent, but not the F0-maximum, is significantly larger

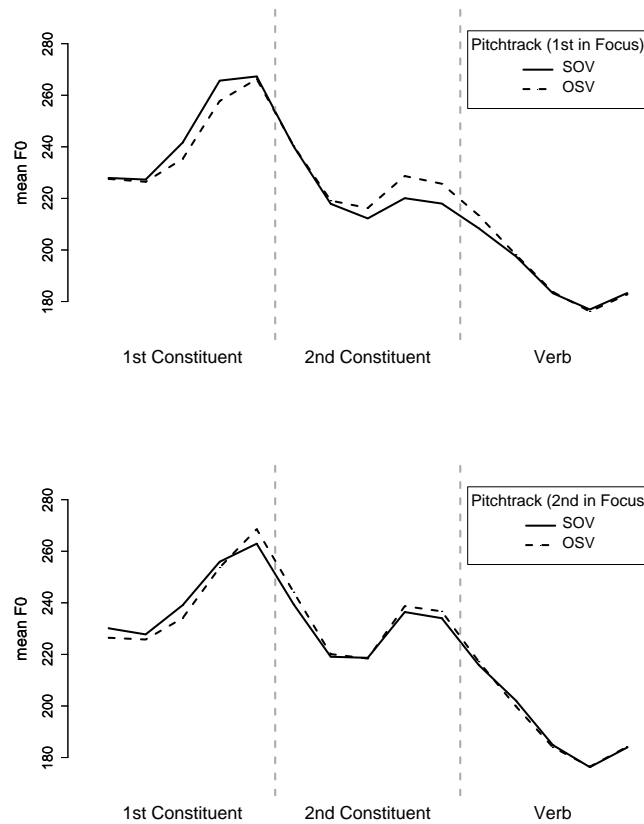


FIGURE 3 Time-normalized pitch tracks based on five measuring points per constituent averaged across all speakers for SOV (solid line) and OSV (dotted line) word order; in the upper plot the first constituent, and in the lower plot the second constituent is in focus.

(9 Hz) in OSV than in SOV, $t = 4.59$. This suggests that the low pitch accent is realized lower in OSV order. Additionally, the duration of the preverbal constituent is on average 17 ms longer in OSV compared to SOV. This difference is significant ($t = 2.51$).

First or second constituent in focus. We turn next to the word order comparison when either the first (Figure 3a) or second constituent is in focus (Figure 3b). In sentence-initial focus (Figure 3a), no difference was found in the realisation of the focused constituent, but in the post-focal constituent the amount of post-focal compression is larger for the unmarked word order. In other words, the post-focal pitch range is higher for OSV word order. When the first constituent is the focus, the medial subject (OSV) displays a higher F0-maximum ($t = 4.55$), a greater F0-range ($t = 2.65$), and longer duration ($t = 3.76$) than the medial object (SOV). Although the contour plot (Figure 3a) suggests an earlier and steeper rise in pitch on the first constituent for SOV structures, as compared to OSV sentences, no significant differences in the dependent variables were found on the initial focused constituents.

In case of second-constituent focus, a small difference appears on the pre-focal given constituent. The marked word order (OSV) shows a higher F0 peak on the initial given object. The F0-maximum ($t = 3.44$), and correspondingly, the F0-range ($t = 4.77$) on the initial constituent is significantly higher in OSV, as compared to SOV structures. The duration of the medial (focused) constituent itself is 20 ms longer in OSV than SOV sequences ($t = 3.56$). In the duration measure, the same pattern is

seen for these constituents when they are given (22 ms, $t=3.76$), i.e., when the focus is on the first constituent.

3.3 Summary of the results

The results can be summarized as follows. Pitch contours of SOV and OSV sentences display the same basic pattern: both arguments have a rising tonal structure, and the verb has a falling structure. This result is in line with previously observed pitch patterns in Hindi (Moore 1965, Harnsberger 1994). The highest part of all three constituents are in a very clear downstep relationship to each other.⁵

With the exception of initial subject focus in SOV structures, focus was not found to affect the pitch excursion and duration of the focused elements. However, it does affect the post-focal constituent, when the initial element is in focus: in both word orders, the medial, post-focal constituent has a lower F0-maximum, a smaller F0-range and duration is shorter than in the baseline wide focus condition. When focus is on the second, preverbal constituent, no reliable difference was found compared to the wide focus baseline in F0-maximum, F0-range and duration on either of the preverbal constituents. Thus, we found no evidence of pre-focal compression due to givenness, and no raising of F0 as a consequence of focus as reported for many intonation languages (e.g., Bartels and Kingston 1994, Baumann et al. 2006, Cooper et al. 1985, Féry and Kügler 2008). The absence of any prosodic effect when the preverbal constituent is focused might be due to the fact that the preverbal position is the syntactic default position for focus (Kidwai 2000). Prosodic marking of focus in this position might therefore be redundant.

Word order has an effect on prosody: significant differences were found between SOV and OSV word orders, appearing most clearly on the given constituents. First, in sentence-initial focus, the amount of post-focal compression was larger in SOV than in OSV sentences, as reflected by a lower F0-maximum, a smaller F0 range and shorter duration of the medial constituent in SOV sentences. Moreover, in sentences with focus on the second constituent, the F0-maximum, as well as the F0-range on the initial given constituent are slightly but significantly higher in OSV, as compared to SOV structures. Third, the duration of the medial focus constituent is longer in OSV than SOV sequences.

4 A phonological interpretation

A phonological analysis (including phrasing and pitch scaling) is presented next, based on the production data. The prosodic phrasing of the experimental sentences is a direct consequence of syntactic structure and is thus very simple, as the syntactic structure of the sentences investigated is quite simple and all constituents are phrased individually. The tonal realization is, on the one hand, dependent on the syntactic structure (downstep pattern), as well as finality or non-finality of the smaller prosodic phrases in a larger intonation phrase, and, on the other hand, the result of information structure. The variation observed in pitch scaling comes from information structure and is discussed in more detail below.

4.1 Phrasing

The general pattern of intonation described by Moore (1965), Harnsberger (1994, 1999) and others was confirmed in our data. Every content word (here every argument) except for the final one (the verb) has a rising contour, which can be analyzed as a p-phrase. This implies that the phrasal contour is clearly realized, especially the final boundary tone of a p-phrase. Every constituent forms its own p-phrase, and all three constituents form an intonation phrase or i-phrase. The final verb and the preceding object are more tightly phrased together than the initial argument. This can be seen in the figures, which show that the high tone of the second argument and the high tone of the verb are fused together. From this high tone, the contour realized on the verb is just smoothly falling until

⁵Although Moore does not mention the effect of downstep it appears to be visible in his data, e.g., his examples (11) or (14) (Moore 1965, 80, 101).

the end of the sentence. The greater prosodic tightness between the last argument and the verb can be expressed as recursive phrasing (see for instance Ito and Mester 2007, for recursive phrasing), as illustrated in (5): The p-phrases of the object and of the verb are grouped together in a single p-phrase that comprises them both.⁶ By contrast, and as shown in (6), the order OSV does not have recursive phrasing. A subject and a following verb are separated by a stronger syntactic boundary than an object and a following verb. As a result, they are not grouped together in a common p-phrase. This difference between SOV and OSV order is not reflected in our average data, but we assume that syntax is an important factor in prosodic phrasing, and that it triggers a difference between the two patterns.

- (5) a. [[S]_P [[O]_P [V]_P]_P]_I
 b. [[graahak ne]_P [[davaai ko]_P [khariidaa]_P]_P]_I
 customer ERG medicine ACC buy.PAST
 ‘The customer bought the medicine.’
- (6) a. [[O]_P [S]_P [V]_P]_I
 b. [[davaai ko]_P [graahak ne]_P [khariidaa]_P]_I
 medicine ACC customer ERG buy.PAST
 ‘The customer bought the medicine.’

The difference between the tonal realization of the p-phrase of the subject and the object on the one hand and verb on the other, comes from the non-finality of the former, and finality of the latter. The tonal structure of the verb is determined by the final low boundary tone (see below), while the tonal structure of the arguments is influenced by the non-final high boundary tone.

Importantly for the phonological analysis, phrasing is unchanged by narrow focus, since the phrasal boundaries are always realized, albeit sometimes only weakly. This points to an absence of an effect of focus for phrasing: focus does not insert a prosodic boundary (see similar results for Bengali in Khan 2007, 39–40), though this result needs confirmation from a larger and more varied set of data. This analysis would contradict that of Moore (1965), who assumes a phrase break after a focused constituent.

4.2 Pitch and pitch scaling

Following Nair (1999) and Dyrud (2001) among others, we assume that Hindi has lexical stress, which means that the low part of the rising pattern observed on all non-final constituents can be analyzed as a starred low tone L* for a pitch accent. Harnsberger (1999) proposed that, phonologically, the high part of the rising gesture may be analysed in two different ways: as a high trailing tone (+H-) or as a high phrase tone (H_P). Because of the clear phrasing found in our data, we analyze the rising pitch gesture as a low pitch accent L* and a high phrase boundary tone H_P, see (7). This is also the pattern proposed by Hayes & Lahiri for Bengali. The final verb has a falling contour, which we assume is coming from a high pitch accent H* and a low boundary tone at the level of the intonation phrase (L_I).⁷

- (7) L* H_P L* H_P H* L_I
 [[graahak ne]_P [[davaai ko]_P [khariidaa]_P]_P]_I
 customer ERG medicine ACC buy.PAST

Based on the time-normalized pitch contours in Figure 1, we assume that H_P is associated with the right edge of the constituent, i.e. the target noun plus case marker.⁸ Further evidence for this claim comes from an unpublished study by Genzel (2007) on Hindi. Genzel manipulated the number

⁶Alternatively, three levels of phrasing may be assumed, as proposed by Khan (2007) for Bengali.

⁷The last p-phrase can optionally end with a rising contour which does not necessarily strike Hindi speakers as a list intonation. Some of our speakers regularly realized a rising final intonation, others only occasionally.

⁸Moore (1965) reported a similar observation, the rising pitch gesture may continue throughout the noun and any following grammatical morpheme.

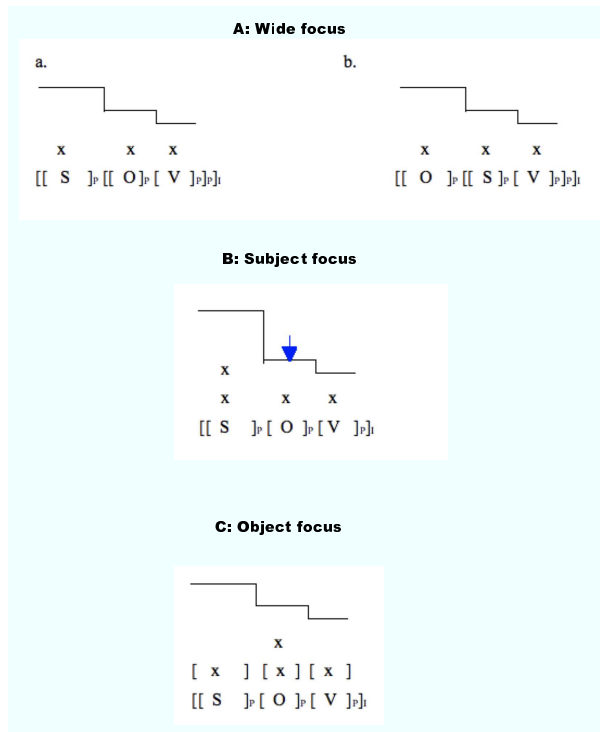


FIGURE 4 Figure A shows the phonological interpretation of $[\text{SOV}]_F$ (a) and $[\text{OSV}]_F$ (b) in the wide focus context; the prosodic phrasing, metrical grid and top lines relationship are displayed. Figure B shows the phonological interpretation of an $S_F\text{OV}$ sentence in subject focus context (initial focus). The prosodic phrasing, metrical grid and top lines relationship are displayed. The arrow indicates a lowering of the post-focal pitch range. Figure C shows the phonological interpretation of an SO_FV sentence in object focus context (preverbal focus). The prosodic phrasing, metrical grid and top lines relationship are displayed.

of syllables of a target word from one to five in order to investigate the behavior of the high tone. Her data suggest that the high tone is associated with the right edge of a prosodic word (see Khan 2007, for the same conclusion for Bengali).

The wide focus pattern can serve as a baseline for the remaining contours: All three high tones are subject to downstep. The downstep pattern affects the high tones of prosodic domains. Each high tone is lower than the preceding high tones in the same level of prosodic structure. Figure 4-A shows the metrical structure of sentences of both word orders plus the top lines of the prosodic domains to illustrate pitch scaling. Every constituent is the head of its own prosodic phrase, and for this reason, each constituent has the same metrical level. The downstepped lines above the metrical structure illustrate the top lines of the prosodic phrases. They show the highest point that the speaker's voice can reach at this moment, and define the maximal height of the high tones. We take the downstep pattern of the p-phrases as an obligatory feature of Hindi intonation. A sequence of prosodic phrases of the same level is organized in downstepped p-phrases.

Narrow focus on one constituent is accompanied by givenness of the other constituents. We represent prominence due to focus and givenness with the help of abstract metrical grid positions. The constituent with narrow focus acquires an additional grid mark, and the following ones become, in relation, less prominent. This difference may change the scaling of tones, as is illustrated with an $S_F\text{OV}$ configuration, see Figure 4-B. It is important to realize that the difference in prominence can in principle be realized in two ways implying pitch scaling: either by a rise on the focused constituent, or by a lowering on the given constituents. In Hindi, a change in the focus relationship is expressed by compression of the given constituents, but only of the post-focal ones. The first focused constituent

does not change its level.

When the second constituent is narrowly focused, no difference in scaling appears (Figure 4-C). There is neither raising of the focused constituent nor lowering of the given constituent. We assume that the reason for the total absence of prosodic effects in such a configuration is that the top lines associated with prosodic domains cannot be changed in such a way that downstep inside of an i-phrase is cancelled. This means that the change in the metrical structure as a consequence of the change in information structure has no effect on the relative height of the top lines, and thus, also on the height of the individual tones which are scaled according to these top lines. Raising of the medial constituent would result in suppressing the difference between the first and the second constituent. The same result would appear if the first constituent were compressed. Since both operations would cancel the downstep relation, none of them is performed, and pitch scaling is not affected by focus on the preverbal constituent.

We turn next to word order considerations. First, post-focal compression is larger in SOV than in OSV order. This effect correlates with the difference in phrasing shown in (5) and (6), which correlates with a difference of syntactic boundary strength between a preverbal argument and a verb: it is weak in SOV and strong in OSV sentences. In other words, an object and a following verb are more tightly connected than a subject and a following verb. The difference in post-focal compression reflects this difference. The stronger boundary between a subject and a following verb is also reflected in the significantly longer duration that a focused subject has, as compared to a focused object in the same position (548 ms vs. 528 ms, $t=3.56$).

Second, in case of preverbal focus, the initial argument displays a greater pitch range and higher F0-maximum in the non-canonical OSV than in the canonical SOV order. This may be the consequence of the scrambled word order in case the object is preposed. As discussed in Section 2, a preposed constituent is generally interpreted as a topic (Gambhir 1981, Butt and King 1996). It may be the case that the speakers, or some of them, have realized the given object as a topic, which would explain the extra high boundary tone. Nevertheless we refrain from analyzing the prosodic phrasing of the initial given object differently from an initial subject, for instance as a separate intonation phrase. There are two reasons for this. First, the context did not give any indication for the speakers to interpret this constituent as a topic; and second, the effects obtained were rather weak. We point to the fact that boundaries of prosodic phrases are subject to gradience anyway, but do not provide a deeper explanation for this effect of word order.

5 Concluding remarks

Based on the Hindi production study, we have proposed that each constituent forms its own prosodic domain, of the size of a prosodic phrase. Non-final p-phrases have a rising pattern (L^*H_P) and the final ones have a falling pattern (H^*L_I). This structure is not changed by focus. Thus, focus does not introduce a different pattern of phrasing; the prosodic phrases are in a strict downstep relationship which cannot be disturbed.

Hindi differs with respect to the expression of focus and its interaction with the downstep pattern from languages like English or German. In these languages, a sequence of downstepped accents is always interrupted by focus, and focus is realized with an upstep or a raising of the high tone on the focused word (e.g., Bartels and Kingston 1994, Baumann et al. 2006, Cooper et al. 1985, Féry 1993, Féry and Kügler 2008). By contrast, in Hindi focus prominence appears to be expressed after the focused item, by means of post-focal compression. In our material, sentences with focus on the preverbal constituent do not reveal any prosodic difference compared to the wide focus sentences. Since the preverbal position is the syntactic default position for focus (Kidwai 2000), prosodic marking of focus in this position might be redundant and therefore remains unrealized.

Given the analysis above, the global downstep pattern is more important than local register changes induced by focus.

Second, although Hindi's use of post-focal compression is similar to other languages that reduce the prominence of given material to enhance the salience of focused material (Cruttenden 2006), a

rising pitch accent on content words is required even in post-focal position. This contrasts with other intonational languages, which commonly employ complete deaccentuation of post-focal material.

Third, in contrast to German (and to Bengali, Hayes and Lahiri 1991), pre-focal given elements in Hindi appear to not undergo compression. Given the downstep pattern, it follows that any register compression before a focus would disturb the downstep pattern. If the pitch range of a pre-focal constituent would be compressed, the dissimilative tonal effect of downstep would be blocked, minimizing the prosodic difference between a pre-focal and focal constituent. Downstep seems to be compulsory; we do not find any reduction of the pre-focal pitch register in case of medial focus. It may be that the downstep pattern facilitates sentence comprehension in that it clearly marks constituent boundaries.

It remains to be determined whether the prosodic structure and cues identified here are used by comprehenders to parse sentences more efficiently. Another important open question is whether the constraints identified here are valid for more complex utterances. Answering these questions lies outside the scope of the present study and must be left for future work.

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6 Appendix

6.1 Tables accompanying the Results section

First constituent		Comparison		F0 max (Hz)		F0 range (Hz)			Duration (ms)	
		Means	t-score	Means	t-score	Means	t-score	Means	t-score	
SOV	Wide vs Narrow	274	281	4.26*	58	68	4.97*	556	567	2.62*
	Wide vs Given	274	274	0.15	58	59	<1	556	558	<1
	Given vs Narrow	274	281	4.15*	59	68	4.23*	558	567	2.05*
OSV	Wide vs Narrow	276	279	1.29	67	69	<1	558	559	<1
	Wide vs Given	276	279	1.56	67	68	1.01	558	551	-1.09
	Given vs Narrow	279	279	-0.09	68	69	<1	551	559	1.85
Second constituent										
SOV	Wide vs Narrow	247	250	1.49	44	47	1.32	526	528	<1
	Wide vs Given	247	230	-9.06*	44	30	-9.94*	526	504	-6.24*
	Given vs Narrow	230	250	9.97*	30	47	10.85*	504	528	6.77*
OSV	Wide vs Narrow	249	250	<1	42	48	2.34*	543	548	1.64
	Wide vs Given	249	237	-8.23*	42	32	-6.7*	543	526	-3.62*
	Given vs Narrow	237	250	8.65*	32	48	8.26*	526	548	5.65*

TABLE 2 F0-maximum, F0-range, and duration on the first and second constituent for SOV and OSV order in different focus conditions as well as their statistical comparisons by means of t-tests; absolute t-values above 2 are significant and are marked with an asterisk.

First constituent		F0 max			F0 range			Duration		
Focus	SOV	OSV	t-score	SOV	OSV	t-score	SOV	OSV	t-score	
Wide	274	276	1.5	58	67	4.59*	556	558	<1	
Narrow	281	279	<1	68	69	<1	567	559	-1.37	
Given	274	279	3.44*	59	68	4.77*	558	551	-1.18	
Second constituent										
Wide	247	249	1.31	44	42	1.23	526	543	2.51*	
Narrow	250	250	<1	47	48	<1	528	548	3.56*	
Given	230	237	4.55*	30	32	2.65*	504	526	3.76*	

TABLE 3 Maximum F0, duration, and F0-range on the first and second constituent for different focus conditions comparing SOV and OSV word order as well as their statistical comparisons by means of t-tests; absolute t-values above 2 are significant.

6.2 Stimuli

Stressed syllables are capitalized.

6.2.1 Pattern-1 (2 syllabic Subject, 3 syllabic Object)

- (1) GRAAhak ne daVAAii ko khariidaa
(The) customer bought the medicine
- (2) BAAAlak ne suRAAhii ko chhupaayaa
(The) kid hid the jar
- (3) GAAAyak ne darVAAje ko dhakelaa
(The) singer pushed the door
- (4) NAUkar ne kaTOre ko hataayaa
(The) servant took away the bowl
- (5) AADmii ne gaVAAhii ko sudhaaraa
(The) man corrected the statement
- (6) MAAlak ne kiRAAye ko badhaayaa
(The) landlord increased the rent
- (7) BRAAHman ne cheTAAVnii ko sunaayaa
(The) brahman announced the warning
- (8) SAANsad ne jaanKAArii ko failaayaa
(The) parliamentarian spread the awareness
- (9) CHHAAtra ne kamPYUter ko ghumaayaa
(The) student turned the computer

6.2.2 Pattern-2 (3syllabic Subject, 2syllabic Object)

- (10) maNUshya ne CHAAadar ko jalaayaa
(The) man burnt the bedcover
- (11) saVAArii ne JOOte ko utaaraa
(The) passenger took off the shoe
- (12) shiKAArii ne PAUdhe ko ukhaadaa
(The) hunter uprooted the plant
- (13) khiLAAadii ne GHODE ko bhagaayaa
(The) sportsman made the horse run (faster)
- (14) kanDAKtar ne GAAdii ko rukaayaa
(The) conductor stopped the vehicle
- (15) shaRAAbii ne BOTal ko bajaayaa
(The) drunkard made sound with the bottle

- (16) maiKEnik ne TAXi ko chalaayaa
(The) mechanic drove the taxi
- (17) adHYAApak ne MOORti ko banaayaa
(The) teacher made the sculpture
- (18) adHYAKsha ne PYAAle ko uthaaya
(The) chairperson picked up the glass