Causatives and their Passives in Sanskrit

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Abstract

We discuss data on causative constructions and their passives in Sanskrit. Sanskrit is unusual in licensing two different causative constructions for most verbs, together with corresponding passives. We explore the formal analysis of these patterns in argument structure terms, formalized within the argument structure proposals of Kibort (2007) and the approach to causative argument structure proposed by Lowe and Birahimani (2019).

1 Introduction

Sanskrit is an old Indo-Aryan language which was originally spoken in the Northwest of the Indian subcontinent in the first and second millennia BC; it ceased to be a living language during the first millennium BC, but its importance grew, as it became a lingua franca, especially for academic, literary, and religious discourse, throughout India in the first and second millennia AD. Classical Sanskrit has a productive morphological causative, which shows two possible argument structure patterns with most transitive verbs. Both possible patterns are found in other languages, and constitute the two main ways in which languages form causatives to transitives, but relatively few languages have been described as freely permitting both possibilities alongside one another. In addition, Sanskrit has a highly productive morphological passive, which can be applied to any causative verb. The use of passive causatives has been claimed to be more frequent in Sanskrit than in other languages in which this combination occurs, due to the high productivity and use of the passive voice (Bubeník 1987). Sanskrit passives of causatives are further interesting in being able to passivize on either the original subject or object of the base predicate, corresponding to the two patterns of active causative to transitive verbs.

Licensing both causative patterns, and their corresponding passives, for a single causative morpheme, proves problematic for existing LFG analyses of predicate composition within Kibort's (2007) approach to (Lexical) Mapping Theory. In §2 we present the Sanskrit data on causatives and their passives. In §§3–5 we present our formal analysis, discussing three possible ways of analysing the data within a mapping theory approach to complex predicates. In §6 we draw conclusions.

2 Data

The basic possibilities for causativization, passivization, and their combination, in Sanskrit have been known for a long time, see e.g. the overviews in Speyer (1886: 32–38) and Renou (1961: 472–473). Kiparsky and Staal (1969) provide an early

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generative treatment of some of the patterns, with a focus on the prescriptions of the authoritative native grammarian Pāṇini. Cardona (1978), Hock (1981), Jamison (1983) and Kulikov (2013) provide detailed treatments of causativization and its origins in the earliest attested stage of Sanskrit, Vedic; Kulikov (2012) includes discussion of passive causatives attested in Vedic. Deshpande (1991) discusses some related patterns in passivization with ditransitive verbs. The existence of two parallel causative argument structures for transitive verbs is mentioned in passing by Aissen (1979: 16–17, 78), but without analysis. The only detailed treatment of passives of causatives in Classical Sanskrit is by Bubeník (1987), who however focuses on data from a very small corpus. Our observations on attested patterns below are based on a new large-scale corpus investigation.[1]

2.1 Causativization

In Sanskrit, causativization is a morphological operation involving a suffix *-áya-* and various largely predictable ablaut alternations in the verbal root. Thus, for instance, to the verbal root $\sqrt{hṛ}$ 'to take' we get the simple present *har-a-ti* 'takes' and the causative present *hār-aya-ti* 'causes to take'; to the root $\sqrt{viś}$ 'to enter' we get the simple present *viś-a-ti* 'enters' and the causative present *veś-aya-ti* 'causes to enter'.

With most verbs, this process is regular and productive; with some verbs, including some common verbs, the causative can have an unpredictable idiomatic or lexicalized meaning: *ākārayati*, causative of *ā-*$\sqrt{kṛ}$ (*ā-* 'hither'; $\sqrt{kṛ}$ 'do, make') means 'to invite'; *darśayati*, causative of $\sqrt{dṛś}$ 'to see', means 'show' (something to someone) rather than 'cause (someone) to see (something)'. With several transitive verbs, the causative is semantically indistinguishable from its corresponding basic verb: thus, the simple present and the causative of $\sqrt{vṛ}$ (*vṛṇoti* and *vārayati*, respectively) both mean 'to cover'.[2]

In this paper we focus only on the semantically and morphosyntactically regular causatives, and restrict ourselves largely to the more interesting case of causatives of transitive verbs, whose argument structures involve three arguments: the two original arguments of the uncausativized (base) predicate, and an added causer.

When an intransitive verb is causativized, the original subject of the base predicate becomes the object of the resulting predicate (marked with the accusative

[1]The corpus consists of ca. 5 million words, spans over two millennia and includes all major Sanskrit textual genres. For reasons of space we cannot provide further details here.

[2]In many cases this is an accidental reflex of earlier historical developments, but it also becomes an ongoing feature of the *-áya-* causative that spreads in Middle Indic, with the result that the direct reflex of the *-áya-* causative suffix in modern Indo-Aryan (where it survives) is as a simple transitivity marker; see Bloch (1965: 239–242) and Masica (1991: 315–321) for the historical development of causative suffixes in Indo-Aryan. Butt (1998: §4.1) incorrectly states that *-áya-* underlies Hindi-Urdu *-ā* (and related causative morphemes in other modern IA languages); in fact, *-ā* comes from early Indo-Aryan *-āpaya-*, while Hindi-Urdu *-vā* (and related morphemes) come from Middle Indo-Aryan doubled causatives in *-āpāpaya-*.

case); this is illustrated in (1).[3]

(1) a. *devadattaḥ śete*
D.NOM lie.PRS.3SG
'Devadatta lies down.'
b. *yajñadatto devadattaṃ śāyayati*
Y.NOM D.ACC lie.CAUS.PRS.3SG
'Yajñadatta makes Devadatta lie down.'

When a transitive verb is causativized, there are, for most verbs, two possibilities. These possibilities correspond to the two main strategies for causativization of transitive verbs attested cross-linguistically. For example, Baker (1988: 161–167) proposes two "causative rules" found in different languages; these differ crucially in the treatment of the original subject of a transitive base predicate. Under "causative rule 1", the subject of an original transitive verb surfaces as an oblique or indirect object in the causative, whereas under "causative rule 2" the subject of an original transitive verb surfaces as an object in the causative.

As stated, most verbs in Sanskrit can show both these possibilities in the causative. The sentences in (2) illustrate the second type: the subject of the base predicate appears as the object in the causative (marked in accusative case), with the object of the base predicate also appearing in the accusative. We call this the accusative-accusative (ACC-ACC) type.

(2) a. *devadatto kaṭaṃ karoti*
D.NOM mat.ACC make.PRS.3SG
'Devadatta makes a mat'
b. *yajñadatto devadattaṃ kaṭaṃ kārayati*
Y.NOM D.ACC mat.ACC make.CAUS.PRS.3SG
'Yajñadatta makes Devadatta make a mat.'

Alternatively, the original subject of the base predicate becomes an oblique argument (usually marked with instrumental case), with the original object of the base predicate remaining the object of the causative; this is illustrated in (3).

(3) *yajñadatto devadattena kaṭaṃ kārayati*
Y.NOM D.INSTR mat.ACC make.CAUS.PRS.3SG
'Yajñadatta makes Devadatta make a mat.'

We call this the 'oblique-accusative' (OBL-ACC) type.[4] As noted above, the ACC-ACC and OBL-ACC causatives correspond to the two major strategies of causativization attested cross-linguistically. However, most languages show only one

[3]The examples are our own, based on real examples found in the Sanskrit corpus and on those discussed by the ancient indigenous grammatical tradition.

[4]The instrumental case marking is primarily semantic, marking agency. With experiencer verbs like $\sqrt{jñā}$ 'to know' and $\sqrt{śru}$ 'to hear', the expected semantic case, dative/genitive, almost always occurs in place of the instrumental, but some examples occur where the instrumental is used in place of a semantically more appropriate case, showing a degree of syntactic standardization.

or the other pattern. The only languages that we are aware of as having been described as showing the same flexibility found in Sanskrit are Bantu languages like Chichewa. According to Alsina (1992), Chichewa freely admits both types of causative introduced above, and Alsina attributes this possibility to a number of other Bantu languages, Shona, Swahili and Kinyarwanda. However, Baker (1988: 161–167) discusses the Chichewa data and attributes the two causative structures to two distinct dialects; Baker (1988: 174–177) also discusses Kinyarwanda, but notes only the equivalent of the ACC-ACC causative.

Alsina (1996: 185–200) provides an analysis of two different causativization patterns in Romance, and argues that these correspond to the two types of causative found in Chichewa. Alsina treats dative-marked original subjects in Romance causatives as OBJ, contrasting with the alternative prepositional marking of the same argument, which he labels an OBL. However, Alsina does not properly distinguish OBJ from OBJ_θ, and allows two OBJ arguments in the same f-structure in violation of Consistency. As noted by Butt et al. (1997), the dative-marked original subjects in Romance causatives are better treated as OBJ_θ; thus Romance languages show only Baker's first type of causative.

In some languages, both patterns are found but with different sets of verbs. For example, in Marathi and some other modern Indo-Aryan languages, most verbs take the equivalent of the OBL-ACC causative, but a semantically identifiable subset of verbs, e.g. ingestive verbs, take the equivalent of ACC-ACC (Alsina and Joshi 1991). Çetinoğlu and Butt (2008) discuss data from Turkish which superficially appears to show both patterns at work with different sets of transitive verbs. Their analysis clearly demonstrates, however, that Turkish causatives of transitive verbs which apparently correspond to Baker's Rule 2 (and therefore to the Sanskrit ACC-ACC causative) in fact involve causativization of bivalent bases which take an OBJ_θ rather than OBJ alongside their subject. That is, the 'Rule 2' causatives in Turkish involve base verbs which are not transitive in the strictest sense of the word (i.e. in terms of taking a core OBJ argument). In terms of basic transitive verbs, then, Turkish consistently follows only Baker's Rule 1; the apparent Rule 2 causatives in fact follow the pattern for intransitive verbs. In contrast, in Sanskrit both patterns are found with the same verb (as illustrated above), and such verbs unambiguously involve OBJ rather than OBJ_θ, since the relevant argument becomes the subject in the (noncausative) passive:

(4) *kaṭaḥ* *kriyate*
mat.NOM make.PS.PRS.3SG

'A mat is made.'

Returning to the Sanskrit data, one approach to the difference between the ACC-ACC and OBL-ACC types is that the latter might be interpreted with a kind of 'passive' sense, e.g. (3) could be translated 'Yajñadatta caused the mat to be made by Devadatta'.[5] Yet the OBL-ACC causative is typologically well-paralleled, and

[5]So Kiparsky and Staal (1969: 102–103) argue that the OBL-ACC type is derived by applying

this type of causative is the only type of causative available in many languages, including modern Indo-Aryan languages, where a 'passive' interpretation would be untenable. In fact, the semantic difference between (2b) and (3) is not entirely clear. For Speyer (1886: 36–37), the distinction between the OBL-ACC and ACC-ACC causatives is to do with the intended expression: whether the causer acts on the original subject of base predicate (ACC-ACC) or on the original object (OBL-ACC). For Bubeník (1987), the difference between ACC-ACC and OBL-ACC causatives is contactive vs. non-contactive causation respectively. Following the native ancient grammarian Patañjali, Bubeník also refers to the degree of agency retained by the causee-agent (the original subject), stating that in the ACC-ACC type the original subject has less independence and agency, whereas in the OBL-ACC type the original subject has more independence and agency. On the other hand, Hock (1981) argues that at least in origin the OBL-ACC is marked, indicating lower agency and/or affectedness of the causee. Our investigations do not fully support any of these positions, and in this paper we remain agnostic about the difference between the OBL-ACC and ACC-ACC causatives, translating both neutrally as in (2b) and (3) above.

According to the indigenous grammarian Pāṇini, the default causative type is the OBL-ACC, and the ACC-ACC type is largely restricted to a subset of verbs of perception, consumption and making sound (*Aṣṭādhyāyī* 1.4.52–55). In reality, the ACC-ACC type is more widespread, and later grammarians extend its scope (see e.g. Joshi and Roodbergen 1975: 235–281). It remains true, however, that a subset of verbs, corresponding to Pāṇini's semantic classification, never show the OBL-ACC causative, such as the verb $\sqrt{paṭh}$ 'to recite':[6]

(5) a. *māṇavako vedaṃ paṭhati*
boy.NOM veda.ACC recite.PRS.3SG
'The boy recites the Veda.'

b. *Devadatto māṇavakaṃ vedaṃ pāṭhayati*
D.NOM boy.ACC veda.ACC recite.CAUS.PRS.3SG
'Devadatta makes the boy recite the Veda.'

c. **Devadatto māṇavakena vedaṃ pāṭhayati*
D.NOM boy.INSTR veda.ACC recite.CAUS.PRS.3SG

passivization to the base predicate before causativization.

[6]It might be questioned whether it is justifiable to claim that some Sanskrit sentences are ungrammatical, as (5c), given that Sanskrit no longer has first-language speakers. Fortunately, the sophisticated and precise Sanskrit tradition of grammatical analysis delimited quite clearly what was and was not possible in Sanskrit; moreover, the surviving Sanskrit corpus is vast, running into the tens of millions of words at least, to the extent that the complete absence of a pattern is reasonable evidence for ungrammaticality, particularly when supported by native grammatical statements.

2.2 The passive

The finite passive in Sanskrit is formed from the root by means of mostly regular morphological processes: to the verbal root that usually stands in zero grade, the suffix *-ya-* and specialised mediopassive person/number endings are added to form the present passive. In other finite tenses (which are relatively uncommon in Classical Sanskrit), the passive is formally identical with the middle voice.[7] More common even than the finite present passive is the so-called 'past passive participle' in *-ta-*/*-na-*; in Vedic this 'participle' was only marginally integrated into the verbal paradigm (Lowe 2015b), but in Classical Sanskrit it is a full and productive part of the verbal paradigm, being the most common way of forming a past tense verb form. The past passive participle does function partially as a passive formation, but shows ergative alignment (the participle agreeing with the internal argument of a transitive verb, or the single argument of an intransitive verb), and is commonly used as a simple past tense, with no necessary passive interpretation.[8]

In the passive equivalent of an active clause, the object or core accusative argument of the verb is promoted to subject, and the demoted subject appears in the instrumental case. It is worth noting that there is no difference in basic (i.e. non-causative) passivization patterns between verbs which can (or always do) form OBL-ACC causatives and those that can only form ACC-ACC causatives. For example, the passives of both √*kṛ* (cf. 2–3) and √*paṭh* (5) work the same way:[9]

(6) a. *māṇavako vedaṃ paṭhati*
boy.NOM veda.ACC recite.PRS.3SG
'The boy recites the Veda.'
b. *vedaḥ paṭhyate māṇavakena*
veda.NOM recite.PASS.PRS.3SG boy.INSTR
'The Veda is recited by the boy.'

(7) a. *devadatto kaṭaṃ karoti*
D.NOM mat.ACC makes.PRS.3SG
'Devadatta makes a mat.'
b. *kaṭaḥ kriyate devadattena*
wood.NOM make.PASS.PRS.3SG D.INSTR
'A mat is made by Devadatta.'

This suggests that the internal arguments of all basic transitive verbs, both those like √*kṛ* and those like √*paṭh*, are fundamentally the same in argument structure

[7] Except in the aorist, which has a morphologically isolated passive formation restricted to the 3sg.

[8] For an account of the historical development of this participle, see Bynon (2005), with earlier references.

[9] The passive agent is optional, and often unexpressed; we do not represent it, or any other arguments, as optional in the glosses because in Sanskrit all arguments are omissible in context, even core object arguments.

terms, i.e. core object arguments in the active tenses which can be promoted to subjects in the passive.

2.3 Passive of causative

Passivization can also apply to causativized predicates.[10] As with the active causative, there are two possibilities. Either the first (i.e. the active subject), or the second (i.e. the active object), argument of the base predicate becomes the subject again in the passive causative. The first possibility is shown in (8), the second in (9).[11]

(8) *devadatto kaṭam kāryate yajñadattena*
D.NOM mat.ACC make.CAUS.PASS.PRS.3SG Y.INSTR

'Devadatta is made to make a mat by Yajñadatta.'

(9) *kaṭo devadattena kāryate yajñadattena*
mat.NOM D.INSTR make.CAUS.PASS.PRS.3SG Y.INSTR

'A mat is caused to be made by Devadatta by Yajñadatta.'

Although it is not the only conceivable possibility, it seems overwhelmingly likely that the promotion of the original subject of the base verb to subject represents the passive of the ACC-ACC causative, while the promotion of the original object to subject represents the passive of the OBL-ACC causative.[12]

This is supported by the fact that verbs which form only ACC-ACC causatives can also only passivize on the original subject. So, for the passive causative of $\sqrt{paṭh}$, only the type in (10) is found.

(10) *māṇavako vedaṃ pāṭhyate devadattena*
boy.NOM veda.ACC recite.CAUS.PASS.PRS.3SG D.INSTR

'The boy is made to recite the Veda by Devadatta.'

As passivization on the original object of an ACC-ACC causative is never found, this provides strong evidence that with such causatives, it is the original subject of the non-causative which is the core object argument in the causative, while the original object must be treated as a secondary object or oblique argument in the causative (since it cannot be passivized on).

[10]The passive can apply to causatives, but causativization cannot apply to passives. In the passive causative the passive suffix replaces the causative suffix, in all forms considered in this paper, so that the only morphological marking of the causative is the ablaut grade of the root.

[11]It is extremely rare for both instrumental arguments to be expressed in a passive like (9); cf. fn. 9.

[12]Setswana attests both types of passive causative, but has only one type of active causative, corresponding to the ACC-ACC causative of Sanskrit (R. Pretorius and A. Berg, p.c.); the same pattern is described for Kinyarwanda by Baker (1988: 174–180). In these Bantu languages the explanation is due to their being symmetrical object languages, meaning that the analysis will be somewhat different.

3 LFG analysis - preliminaries

The argument structure of causatives has been well studied within LFG, beginning with Alsina and Joshi (1991) and Alsina (1992, 1996), and developed most extensively by Butt (e.g. 1995, 1997, 1998, 2014).[13] In this paper, we follow Dalrymple et al. (2019) in integrating Butt's approach to complex predication with the model of argument structure developed by Kibort (2001, 2004, 2006, 2007). Kibort's argument structure model has been subject to precise formalization and integration with glue semantics by Findlay (2016), and this has been extended to a glue treatment of complex predication by Lowe (2015a, 2019). In the following we present 'traditional' argument structures modelled as complex semantic forms, but everything presented below could be unproblematically reformulated within a glue-based model.

As discussed by Lowe and Birahimani (2019), all the most important approaches to causative complex predicates and similar complex predication in LFG assume two types of predicate composition. Alsina and Joshi (1991) and Alsina (1992) first proposed the notion of *argument fusion*, whereby the causative predicate contains an argument position which is coindexed with an argument position of the embedded predicate. Alsina (1996) allows also a different kind of causative predicate, which does not involve coindexation of arguments; this is called *argument raising* by Butt (2014). For somewhat different reasons from Alsina, Butt (2014) also accepts both argument fusion and argument raising for the same complex predicates in Hindi-Urdu. We take the proposals of Butt (2014) to represent the most advanced and up-to-date treatment of the standard approach to predicate composition in LFG.

Lowe and Birahimani (2019) argue that the assumption of both argument fusion and argument raising for the same complex predicate is unsatisfactory for the analysis of morphological causatives in Siraiki, and for the same reasons we believe it to be equally unsatisfactory for causatives in Sanskrit. To begin with, Butt's (2014) approach requires that causative morphemes (or light verbs) are systematically ambiguous, showing both argument fusion and argument raising capabilities, and moreover, the choice of one or other possibility depends fundamentally on the embedded predicate. The assumption that both argument fusion and argument raising are possible cross-linguistically is entirely reasonable, and as argued by Butt (1998) the two notions respectively parallel the notions of raising and control in syntax. But we would not expect systematic ambiguity whereby single morphemes showed both possibilities, just as we do not find that raising verbs can systematically also be control verbs. In Butt's model, what is fundamentally a difference between the embedded predicate – whether it is transitive or intransitive – is modelled by means of an ambiguity in the embedding predicate. We feel that

[13] A brief analysis of the two causative patterns in Chichewa is provided by Bresnan et al. (2016: 341–343). However, they do not adopt a complex predicate approach to causativization, but assume monoclausal argument structures with variation in the a-structure classification of the agent. We will not consider this approach further here.

it would be preferable if the difference between causatives of transitive and intransitive verbs rather fell out naturally from the difference between the embedded predicates themselves.

The model of Butt (2014) is designed to deal with complex predicate patterns like causation specifically in languages like Hindi-Urdu, which show only the equivalent of the OBL-ACC causative to transitive verbs (i.e. they follow Baker's 1988 Causative rule 1). If we did try to transfer this to Sanskrit, where both OBL-ACC and ACC-ACC causatives are found, we would run into difficulties, as it would not be possible to license the ACC-ACC causatives without introducing a three-way ambiguity for the single causative morpheme: an argument fusion structure for the OBL-ACC causatives (with the causee specified as [+R]), an argument raising structure for causatives of intransitives, and a second argument fusion structure for the ACC-ACC causatives (with the causee specified as [−R]).[14]

Lowe and Birahimani (2019) show that it is possible, and argue that it is preferable, to model Siraiki causatives with reference to only one type of predicate composition, involving argument fusion, not raising.[15] This works out as long as the second argument of the causative predicate is unspecified for [±O/R] features, and given an independently required principle of ordering as to how argument linking proceeds. We show below that the Sanskrit data can be accounted for within the same kind of approach, although the details are more complicated.

Lowe and Birahimani (2019) propose an emendation to Kibort's (2007) universal valency template, augmenting it with the possibility of unspecified positions. For Sanskrit causatives, only a single unspecified position is required.[16] We therefore begin by assuming the valency template shown below:

(11)

⟨	arg_1	arg_2	arg_3	arg_4	arg_5	…	arg_n	⟩
	[−O/−R]	[−R]	[+O]	[ ]	[−O]		[−O]	

Below, we further argue that Sanskrit causatives and their passives require additional degrees of flexibility with regard to this valency template, raising questions over how far we can really consider this template universally fixed.

4 Analysis

The basic requirements for our analysis are the following. It is necessary to account for both the OBL-ACC and ACC-ACC causative formations, as well as the fact that with a certain subset of verbs, only the ACC-ACC type is possible. In addition, the argument structures for both types of causative must interact with the passive in the expected way.

[14] A conceivable alternative, argument raising applied to a transitive predicate, would not give a licit outcome for any transitive verb whose first argument is [−O].

[15] This does not mean that argument raising is not a possibility for causative structures in other languages; cf. the discussion above.

[16] This is because double causatives are not found; they first develop in early Middle Indic (Edgerton 1946).

In principle one might approach the difference between OBL-ACC and ACC-ACC causatives in two ways: either the causative morpheme itself is ambiguous, having two distinct argument frames or sets of properties which derive the required differences; or, there is a single causative argument frame associated with the (single) causative morpheme, and the two types of causative derive from some other point of variation. Following the principles discussed above and by Lowe and Birahimani (2019), we take the second course. For all (productive and semantically regular) causative formations in Sanskrit, then, we assume the argument frame below for the causative morpheme:

(12) CAUS ⟨ $\underset{[-\text{O}]}{\text{arg}_1}$, $\underset{[\ ]}{\text{arg}_4}$ %PRED ⟩

We begin with the OBL-ACC causative. If we apply the causative predicate in (12) to an ordinary transitive verb like *kṛ* 'make', which appeared in (2), we obtain the following:

(13)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	$\underset{[-\text{O}]}{\text{arg}_1}$	$\underset{[\ ]}{\text{arg}_4}$	*kṛ* 'make' ⟨	$\underset{([-\text{O}])}{\text{arg}_1}$	$\underset{[-\text{R}]}{\text{arg}_2}$	⟩⟩
	SUBJ	OBL_θ			OBJ	

Under Kibort's (2007) Mapping Principle, linking proceeds as follows: arg_1 links to the highest available grammatical function, then arg_2 links to the highest remaining grammatical function, and so on. For Siraiki causatives, Lowe and Birahimani (2019) argue that linking in Siraiki and other modern Indo-Aryan languages must likewise proceed according to arg index: arg_1 links first, then arg_2, etc., but crucially this is without consideration for embedding, so that the arg_2 of an embedded predicate will link before the arg_4 of the outer predicate.[17] In the case of (13), this obtains the right outcome: the arg_1 links to SUBJ, the embedded arg_2 links to OBJ, and then the arg_4 of the causative predicate links to OBL_θ.[18] However, since the embedded arg_2 is [−R], no other order of linking is possible: arg_1 maps to the highest available grammatical function, SUBJ, and the next highest available grammatical function is OBJ, which is also the only remaining [−R] function, and so must link to the embedded arg_2.

The passive of the OBL-ACC causative falls out unproblematically. Following Kibort (2007), we treat passivization in argument structure terms as the addition of the feature [+R] to the first argument of a predicate. Following the same principles of linking, the passive corresponding to (13) will therefore be:

[17] By 'embedded' here we refer to embedding in the argument structure; at f-structure the causatives are monoclausal. Note that in formulating her Mapping Principle, Kibort (2007) considers only simple argument structures without embedding.

[18] Note that when arguments are fused, the properties of the embedded argument which undergoes fusion are replaced by those of the fusing argument in the superordinate predicate.

(14)

	CAUSER	CAUSEE		AGENT	THEME
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	arg_2 ⟩⟩
	[−O]	[ ]		([−O])	[−R]
	[+R]				
	OBL_θ	OBL_θ			SUBJ

As it is specified with both [−O] and [+R], arg_1 must link to OBL_θ. Arg_2 then links to the highest available GF, SUBJ, obtaining the desired passivization on the second argument (the original object) of the base predicate. On the traditional assumption that OBJ and OBL_θ are equally marked in terms of [±O/R] features, arg_4 can then link to OBL_θ.[19] We assume that OBJ is not possible in this case, because then the OBJ, the core internal argument of the predicate, would scope over the SUBJ, the external argument, being related to the external event of causation while the SUBJ was related only to the embedded event.[20]

Turning now to the ACC-ACC causative, as illustrated in (2b), the first problem to address is the grammatical function of the second accusative argument, the second argument of the embedded predicate (*kaṭam* 'mat' in 2b). It is the first accusative argument, the causee-agent (*devadattam* 'Devadatta' in 2b), which must be the core object in the ACC-ACC causative, not least because it becomes the subject in the passive of this causative (8). The second accusative argument cannot therefore be an OBJ. It could be either OBL_θ or OBJ_θ, but neither of these is compatible with the [−R] specification of the arg_2 argument slot.[21]

To resolve this difficulty, we propose that instead of an arg_2 specified as [−R], ordinary transitive verbs in Sanskrit have an underspecified second argument slot which in Kibort's terms is either arg_2 or arg_3, i.e. $arg_{2/3}$. This argument slot then either has the specification [−R] or the specification [+O]. There is cross-linguistic support for such a featural specification: [−R]/[+O] is exactly what Alsina and Mchombo (1993) proposed for internal arguments (except beneficiaries and recipients) to account for applicatives in Bantu.[22]

In the unmarked case, where a verb like *kṛ* 'make' is used in a noncausative, active, sentence (as in 2a), the difference is moot: either will map to OBJ. In the active causative, the difference is also moot in exactly the same way. So, we could rewrite (13) above with the new underspecified value for the second argument of 'make', and there will be no change in the linking:

[19] But note that for Her (2013), OBJ should be less marked than OBL_θ because [+O] is less marked than [+R].

[20] This could be considered a general constraint on complex argument structures; it is certainly hard to see how such a structure could make sense, or why such a structure would ever be desired.

[21] See Lowe (2017: 33–34) for accusative case OBL_θ arguments in Sanskrit.

[22] This proposed specification for internal arguments was accepted by Bresnan and Moshi (1990).

(15)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$arg_{2/3}$	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	SUBJ	OBL_θ			OBJ	

In the passive of the OBL-ACC, on the other hand, the [−R] feature must apply to the underspecified argument, since otherwise the predicate would lack a subject and violate the Subject Condition (Bresnan and Kanerva 1989, Berman 1999, 2003).[23]

(16)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$arg_{2/3}$	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	[+R]					
	OBL_θ	OBL_θ			SUBJ	

How does this help us with the ACC-ACC causative? As discussed above, the difference between these two causative argument structures should derive from some point of variation other than assuming two different versions of the causative predicate itself. Above, we derived the OBL-ACC causative by following Lowe and Birahimani (2019) in interpreting Kibort's Mapping Principle such that argument linking proceeds according to arg index, regardless of embedding. But there is one other logically possible way of interpreting Kibort's Mapping Principle with respect to complex predicates. That is, linking may proceed linearly, 'left-to-right'; or to put it another way, it may proceed according to arg index but with regard to embedding (so that an arg_4 which is in a superordinate predicate links before an arg_2, etc.).[24] If we assume that both are possible in Sanskrit, we immediately get the ACC-ACC causative:

(17)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$arg_{2/3}$	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	SUBJ	OBJ			OBJ_θ	

The arg_1 of the causative predicate links to SUBJ, the arg_4 of the causative predicate links to OBJ, and then the $arg_{2/3}$ of the embedded predicate must link to

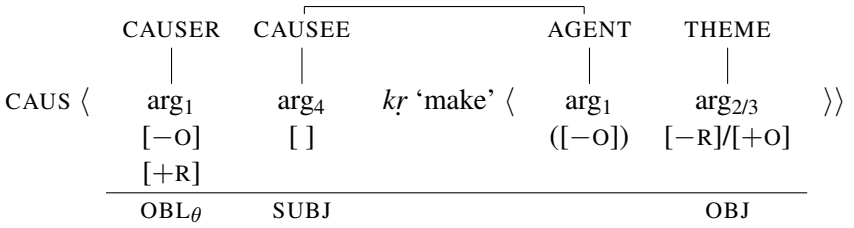
[23] The same applies to the noncausative passive.

[24] Kibort (2007) considers only simple structures with no embedding, i.e. structures in which linking according to arg index and linking according to left-to-right position are indistinguishable in their effects. It is a neat outcome of our analysis that the two possible interpretations of Kibort's Mapping Principle license the difference between the two causative structures under discussion.

OBJ$_\theta$ by virtue of the [+O] specification, since both [−R] arguments are already linked.

The passive of the ACC-ACC causative also falls out directly. With left-to-right linking, the arg$_4$ of the causative predicate will link to SUBJ, and the embedded arg$_{2/3}$ to OBJ:

(18)



Both types of causative, and their passives, thus derive from a single causative argument frame, a frame which will also account for causatives of intransitives. Recall that under Butt's (2014) approach, three distinct argument frames would be required for the single causative morpheme to account for these patterns.

It remains to account for the set of transitive verbs which can only form ACC-ACC causatives, such as *paṭh* 'recite' illustrated in (5). These verbs do not otherwise differ from the majority of transitive verbs in Sanskrit, and although there are semantic patterns, there are no absolute criteria by which this subset may be distinguished semantically.[25]

Perhaps the simplest solution would be to state an informal constraint to the effect that a certain subset of verbs require linking to proceed left-to-right and disallow linking according to arg index. Another way of looking at this would be to say that the verbs subject to this constraint require their arg$_1$s to link before their arg$_2$s, even when embedded under a causative predicate; and this perspective might be explicable e.g. in terms of the relative affectedness of the respective arguments.

Such a constraint cannot easily be formalized, however. A formal solution is possible, within the framework of our analysis and the assumptions made so far, but it requires us to assume further degrees of flexibility in Kibort's (2007) valency template. Beyond arg$_3$, Kibort assumes a potentially unrestricted number of arg slots, all with the specification [−O]; these are slots which link to various kinds of oblique arguments. But we could assume that beyond the initial core of three or four arg slots, there is more flexibility. Thus it might be possible, for example, to have an arg slot, say arg$_6$, with a specification [−R]/[+O]. This is the same specification as the arg$_{2/3}$ assumed above for ordinary transitive verbs in Sanskrit.

[25] Alsina (1996: 196–197) notes a partial parallel in Romance languages, where verbs with experiencer subjects can only form the causative with original subject expressed as a dative secondary object, and cannot form the alternative causative with original subject as oblique. Alsina argues that the restriction is a restriction on thematic roles: in Romance, at least, an oblique causee may not be an experiencer. The same explanation cannot apply to Sanskrit, since some verbs subject to this constraint take agent subjects. In Sanskrit the difference appears more to do with the affectedness of the object; we do not pursue the details of this further here, but note that our account assumes a difference between the objects of these verbs and of verbs not subject to the constraint.

But crucially the arg index of this slot is higher than the index of the arg_4 of the causative predicate.

We could therefore assume that the two sets of transitive verb in Sanskrit differ in no way (syntactically, at least), and that causativization applies in exactly the same way for both sets. But whereas with the *kṛ* 'make' type above, the flexibility in order of arg linking gave two possibilities, one in which the embedded $arg_{2/3}$ linked before the causative's arg_4, and one in which the converse order applied, with the *paṭh* 'recite' type both orders of arg linking give the same result: the causative arg_4 cannot but link before the arg_6 of the embedded predicate, because it both precedes it in 'left-to-right' order, and has a lower index.

(19)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*paṭh* 'recite' ⟨	arg_1	arg_6	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	SUBJ	OBJ			OBJ_θ	

(20)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*paṭh* 'recite' ⟨	arg_1	arg_6	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	[+R]					
	OBL_θ	SUBJ			OBJ	

In this section we have explored how we can model Sanskrit causatives and passive causatives within the framework of Kibort (2007), with the augmentations of Lowe and Birahimani (2019). Taking the two possible interpretations of Kibort's Mapping Principle when applied to argument structures with embedding, we have been able to neatly explain the alternation between the OBL-ACC and ACC-ACC causatives. Our analysis requires us to assume that core internal arguments are specified as [−R]/[+O], in line with proposals made for Bantu languages.

The assumption of an underspecified [−R]/[+O] requires more flexibility in Kibort's 'universal' argument structure template, on top of the assumption of fully unspecified slots. If we then accept also the idea that we might have slots such as arg_6 with a specification [−R]/[+O], as suggested immediately above, we move towards a point where our approach requires such flexibility in the template that we can no longer really call it universal. The central innovations of Kibort's model – the use of indexed arg positions, separating syntactic valency from semantic roles, and the unified Mapping Principle which depends on the arg indices – remain. But we would then essentially have reached the point where a strict and universal association between arg positions and [±O/R] features is no longer possible. In itself this is undesirable, as it makes the model less constrained and more stipulatory. On the other hand, there are also some attractive elements to our analysis, including

the fact that it is able to model the Sanskrit data, in particular the coexistence of OBL-ACC and ACC-ACC causatives, much more satisfactorily than previous proposals. We do not claim that the proposals we have made here are perfect, or that they should be the final word, but we present them as an exploration of what can be done, and what must be done, in order to effectively model the argument structure of Sanskrit causatives within the 'Kibortian' framework adopted here.

5 Exploring an alternative

The analysis presented in the preceding section works: it accounts for the data, has some attractive aspects, and does not suffer from the weaknesses of Butt's (2014) model discussed above. At the same time, it requires certain assumptions or stipulations, and requires us to relax the strict argument structure template of Kibort (2007) to the point where we must question its universality. In this section we explore an alternative approach (though still presented within the framework of Kibort 2007: for consistency).

As noted above, the data analysed in this paper is parallel to that for Chichewa as analysed by Alsina (1992), and similar also to the analysis of Romance in Alsina (1996). Alsina's analysis is rather different from our own, and in this section we explore whether it might provide a better account of the Sanskrit data than the approach developed above.

The main distinguishing feature of Alsina's approach is the assumption that argument fusion may be with potentially any argument of the embedded predicate. Alsina (1992, 1996) permits the causee argument of the causative predicate to fuse either with the first or second argument of an embedded transitive predicate. If it fuses with the first argument, the equivalent of the ACC-ACC causative results; if it fuses with the second argument, the equivalent of the OBL-ACC causative results. Note that, like our analysis in the previous section, Alsina's analysis assumes a single invariant causative argument frame; the variation comes in the fusion of arguments (whereas the variation in our account above comes in the order of arg linking).

Let us see how this works if we update Alsina's proposals and attempt to integrate them into the Kibortian argument structure approach adopted above. The analysis of the ACC-ACC causative (21), and its passive (22), is almost identical to what we presented above:

(21)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$arg_{2/3}$	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	SUBJ	OBJ			OBJ_θ	

(22)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$\text{arg}_{2/3}$	⟩⟩
	[−O]	[ ]		([−O])	[−R]/[+O]	
	[+R]					
	OBL_θ	SUBJ			OBJ	

In order to get the linking right in (21), we need to assume left-to-right linking to ensure that the arg_4 links to OBJ rather than the embedded $\text{arg}_{2/3}$. We also still require the embedded second argument to be $\text{arg}_{2/3}$, i.e. with the features [−R]/[+O], since this argument can surface as SUBJ (in the noncausative passive), OBJ or OBJ_θ.

For the OBL-ACC causative, we require argument fusion to take place between the second argument of the causative predicate and the second argument of the embedded predicate:

(23)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$\text{arg}_{2/3}$	⟩⟩
	[−O]	[ ]		[−O]	([−R]/[+O])	
	SUBJ	OBJ		OBL_θ		

(24)

	CAUSER	CAUSEE		AGENT	THEME	
CAUS ⟨	arg_1	arg_4	*kṛ* 'make' ⟨	arg_1	$\text{arg}_{2/3}$	⟩⟩
	[−O]	[ ]		[−O]	([−R]/[+O])	
	[+R]					
	OBL_θ	SUBJ		OBL_θ		

We again need to assume that linking takes place left-to-right, to ensure that in both active and passive the arg_4 of the causative predicate links before the arg_1 of the embedded predicate. Everything else follows without difficulty.

One issue with this approach (as it was with our approach above) is how to prevent the OBL-ACC causative with verbs like $\sqrt{paṭh}$ 'to recite'. In the approach presented in the previous section, we proposed a formal solution on the basis that these verbs have a higher index for their second arg slot, thereby neutralizing the difference between the two ways of ordering linking. In the approach currently under discussion, however, the variation comes not from the order of linking arguments, but from the possibility of argument fusion with either the first or second argument of the embedded predicate. It is not immediately obvious to us how to formally prevent argument fusion with the second argument of only certain verbs, but presumably an informal constraint could be formulated to the relevant effect.

Butt (1998) argues strongly against Alsina's freedom in licensing argument fusion, objecting that permitting merger with any argument is insufficiently con-

strained. Butt (1998) proposes that argument fusion is the argument structure correspondent of control, and argues for the constraint that fusion can only ever be with the first argument of the embedded predicate ("Restriction on Argument Fusion"). Within the Kibortian model adopted here, there are further arguments against fusion with the second argument. Fusion with the first argument is always monotonic in the sense that no arg slots are lost: the arg_1 of the embedded predicate does not link, but there is still an arg_1, introduced by the causative predicate. This is crucial to Lowe's (2015a) glue-based formalization of complex predicates: the arg_1 label of the lexical predicate becomes the arg_1 of the causative predicate, and the properties of the embedded arg_1 are transferred to the arg_4 of the causative predicate, but no arg positions are lost. If we permit fusion with the second argument of the embedded predicate, we end up with two arg_1s, and an $arg_{2/3}$ which has to essentially disappear. Within the monotonic glue formalization of Lowe (2015a), it would be impossible to deal with this.

Furthermore, at least in Sanskrit, we do not find a third pattern with causatives of ditransitive verbs which could be construed as argument fusion with the indirect object.[26] If it were possible for argument fusion to target the second argument of an embedded predicate, why should it not also be able to target a third argument, when present?

Overall, both Alsina's approach, as presented here in updated form, and the approach proposed above share some common features, and both require assumptions over and above those found in previous literature. We concur with Butt (1998) in restricting argument fusion to targeting the highest argument of the embedded predicate, and thus prefer the approach presented in §4. At the same time, we acknowledge that that approach takes us quite far from the original intention of Kibort's universal argument structure template.

6 Conclusion

In this paper, we have presented data of causatives and passive causatives in Sanskrit, and have explored possible LFG analyses broadly within the argument structure model of Kibort (2007) and the approach to complex predicates of Butt (2014).

Causatives and their passives in Sanskrit are of interest because the two cross-linguistically common patterns of causativization are found together in the same language, and even with the same verb forms. Under our proposed analysis, the variation between the ACC-ACC and OBL-ACC causatives derives from two possibilities in the order of linking argument slots to grammatical functions. Linking according to arg index without respect for embedding, as proposed for modern Indo-Aryan causatives by Lowe and Birahimani (2019), gets the OBL-ACC causative, and its corresponding passive. Linking left-to-right gets the ACC-ACC causative.

[26] Due to lack of space we have not discussed causatives of ditransitives above. Essentially, they work just like causatives of transitives, but with an additional beneficiary argument, which appears in the dative or genitive case, and this does not change in causative structures.

Our proposed analysis is not perfect, but is superior to existing LFG analyses in some respects. It requires increased flexibility in the Kibortian approach to argument structure, but depends on some of its key innovations, in particular the notion of indexed arg slots. We believe that it will be profitable to further explore the possibilities and limits of this approach to argument structure, and to complex predicates, in order to better understand its advantages and disadvantages relative to earlier models of linking in LFG.

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