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Passive and Causative in Sanskrit

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Abstract To what extent can fine-grained statistical analysis provide evidence regarding syntactic patterns in corpus languages like Sanskrit, particularly in cases where the interaction of multiple syntactic phenomena obscures the evidence? We investigate the value of a correlation matrix for bivariate data analysis in relation to varying syntactic patterns in a relatively poorly attested yet productive construction in Classical Sanskrit: the passive of the causative ('passive causative'). The interaction of causative and passive is complex in Sanskrit, but we show that even in the case of low frequency data, syntactic conclusions can be drawn from such interactions when detailed statistical analysis is employed. In particular, our analysis speaks to the status of the ergative in Sanskrit.

Keywords Passive. Causative. Sanskrit. Ergative. Correlation matrix.

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1 Introduction

Many of the basic facts about Sanskrit syntax have been known for more than a century; standard reference works are Delbrück (1888) and Speyer (1886; 1896). Yet it is only in recent years, with the advent of large numbers of digitised Sanskrit texts, that comprehensive, large-scale syntactic studies are finally becoming a possibility.[1] Sanskrit may be considered a corpus language, but its corpus is extensive, and if one is interested in major syntactic patterns, for example the relative order of major constituents in a sentence, one can now access millions of Sanskrit sentences at the touch of a button, each providing a relevant data token.

But there are many more oblique questions of Sanskrit syntax which are less easy to investigate. In this paper, we present the results of an investigation into the syntax of passive causatives (that is: passives of causatives) based on a large-scale corpus study.[2] While both the passive and the causative are highly productive categories in Sanskrit, the combination of passive and causative in the passive causative is rather less frequent (though still more common than in many languages). Moreover, due to a number of issues discussed below (§ 5), the usable data for passive causatives in Sanskrit is even more restricted than a cursory glance at the evidence might suggest. Nevertheless, we show that a bivariate correlation analysis reveals meaningful relationships in the syntax of Sanskrit passive causatives which would otherwise remain obscure.

In this paper we treat the syntax of 'Sanskrit' understood in a relatively broad sense, excluding the earliest Vedic Sanskrit, which is linguistically very different from later forms of the language, but including not only strictly Classical Sanskrit texts but also Epic and late Vedic Sanskrit, both of which are sufficiently similar to the Classical language to warrant treating them together. The Epics, the

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1 Currently the most important online archives of digitised Sanskrit texts are GRETIL (`gretil.sub.uni-goettingen.de`), Titus (`titus.uni-frankfurt.de`), and the Digital Corpus of Sanskrit (`www.sanskrit-linguistics.org/dcs/`).

2 Our corpus comprises texts from a broad variety of genres and periods of Sanskrit, spanning a period of over 1,600 years, amounting to c. 5.5 million words. It includes c. 1.3 million words of Vedic prose, c. 1.7 million words of Epic and c. 2.5 million words of various genres of Classical (i.e. post-Pāṇinian) texts dating as late as the thirteenth century AD. Details are provided in the Appendix.

Mahābhārata and *Rāmāyaṇa*, are based on oral traditions whose origins predate Pāṇini but, in their final form, employ a language mostly following Pāṇinian rules. Strictly non-Classical features characteristic of the Epic language are sometimes later adopted in otherwise 'Classical' texts which are influenced in one way or another by the Epics (see Lowe 2017b, 288-9). The Classical Sanskrit idiom is based on a prescriptive application of the monumental grammar of Pāṇini, the *Aṣṭādhyāyī*, but the target language of this grammar was in fact the language of Vedic prose texts like the *Aitareya Brāhmaṇa* (Kulikov 2013b); thus late Vedic should not be kept entirely separate from the later classical language. Although our corpus included a number of Vedic prose texts, containing numerous instances of active causatives, the Vedic texts contributed no data on passive causatives, since passive causatives built to transitive roots are not attested before the end of the Vedic period, as noted by Kulikov (2012, 696-7).

In § 2 we present the phemonena under investigation, and address some of the complexities of Sanskrit syntax relevant to these phenomena. In § 3, we compare typological work on the causative and the relation between active and passive. In § 4, we compare previous research on causatives in Sanskrit. In § 5, we detail the restrictions on working with causative and passive causative data in Sanskrit, which results in a relatively small token count for analysis even in the case of a large corpus. In § 6, we present our quantitative data; in § 7, we present and discuss a fine-grained statistical analysis of this data. In § 8 we discuss the implications of our data for understanding the status of the ergative in Sanskrit, and draw conclusions.

2 Argument Structure Patterns in Active and Passive Causatives

We begin with some basic definitions. Causativisation is a process which takes as input a verbal predicate with a particular argument structure and returns a new version of the predicate with an augmented argument structure; specifically, causativisation adds a 'causer' argument, which becomes the semantically and grammatically most prominent argument of the predicate (surfacing as the active subject, for example). In contrast, the process of passivisation alters the argument structure of verbal predicates in almost the converse way: it demotes or suppresses the grammatically most prominent argument of a predicate (i.e. the active subject), resulting in the promotion of a less prominent argument (such as the active object), where present, to the position of greatest grammatical prominence.

For example, in the causative of an intransitive verb, a new argument, the causer, appears, filling the role of subject, while what was the subject of the non-causative becomes the object of the resulting causative:

(1) a. *sa* *khaḍga-abhihato* *'patat*
he.NOM sword-struck.NOM fall.IMPF.3SG
'Struck by the sword, he fell'. (*Rāmāyaṇa* 6.84.24)

b. *lāṅgūlena* *pradīptena* *rākṣasāṃs* *tān* *apātayat*
tail.INS blazing.INS rākṣasa.ACC.PL they.ACC.PL fall.CAUS.IMPF.3SG
'He struck down (lit. 'made fall') the rākṣasas with his blazing tail'.
(*Rāmāyaṇa* 5.51.9)

The causative applied to an intransitive base effectively creates a transitive verb, with nominative subject and accusative object; when the passive is applied to this, the subject is demoted/suppressed, and the object is (re-)promoted to subject:

(2) *tvat-kṛte* *śaṅkitair* *agnau*
you-caused afraid.INS.PL fire.LOC
munibhiḥ *pātyate* *haviḥ*
sage.INS.PL fall.CAUS.PASS.3SG oblation.NOM
'Since you have done this, the oblation is cast (lit. 'caused to fall') into the fire by the frightened sages'. (*Rāmāyaṇa* 3.29.12)

The basic possibilities for causativisation, passivisation, and their combination, in Sanskrit have been known for a long time; see the overviews in Speyer 1886, 32-8 and Renou 1961, 472-3. Detailed treatments of causativisation and especially its origins in the earliest attested stage of Sanskrit, Vedic, can be found, for example, in Cardona 1978; Hock 1981; Jamison 1983; Tichy 1980; 1993; Kulikov 2013a.

When formed to intransitive bases, there is only one pattern of causativisation, and one pattern of passivisation of the causative, as illustrated in (1) and (2) above. In the case of transitive bases, however, Sanskrit permits two competing realisations of the causative in terms of the resulting argument structure, and likewise in the passive causative two competing argument structure realisations. It is these points of argument structure variation which we are interested in this study, and so henceforth we do not consider intransitive bases further.

In terms of the morphosyntactic categories involved, we draw a primary three-way distinction between finite present-stem active causatives, causative *ta*-participles, and finite present-stem passive causatives.[3] These are the three most important and productive

3 We use 'active' here to contrast with the passive, discussed below. This also includes what is usually referred to as the 'middle' voice, which in Classical Sanskrit is more like

morphosyntactic categories of the Sanskrit verb system; we exclude from consideration causatives formed to aorist and perfect stems, since they lack morphologically distinct passive forms, and are in any case extremely rare in our corpus.

The *ta*-participle, more commonly labelled the 'past/perfect (passive) participle' will be discussed in detail below. It is the most important of the morphologically 'non-finite' verbal categories; it is mostly used as a main clause predicate, and when used as such is the most basic and common means of expressing past tense. The *ta*-participle displays an ergative-absolutive agreement pattern, in contrast to the finite verbal categories which are exclusively nominative-accusative in alignment.

2.1 The Active Causative

Crosslinguistically, when a transitive verb is causativised, the resulting argument structure may have one of two basic forms: while the object of the transitive predicate retains its morphosyntactic objecthood, in one form or another, the subject of the original transitive verb may surface in the causative either as a direct object or as an oblique or indirect object (Baker 1988, 161-7). As discussed further below, in some languages only one of the two patterns is possible, while in others both patterns are found; in the latter case, the distribution of the two patterns may be subject to lexical, semantic and/or pragmatic restrictions. In Sanskrit, both patterns are possible for all or most verbs. For example, in (3b) the subject of the base predicate in (3a) appears as the object in the causative (marked with accusative case), with the original object of the base predicate also marked in the accusative (retaining this from the noncausative, and representing a secondary object function). We call this the 'accusative-accusative' (ACC-ACC) type.

(3) a. *ahaṃ* *setuṃ* *kariṣyāmi*
I.NOM bridge.ACC make.FUT.3SG
'I will make a bridge'. (*Rāmāyaṇa* 6.15.11)

b. *nalaṃ* *setum* *akārayat*
N.ACC bridge.ACC make.CAUS.IMPF.3SG
'He had Nala make a bridge'. (*Rāmāyaṇa* 6.114.41)

Alternatively, the original subject of the non-causative may surface as an oblique argument in the causative, usually marked with

a morphologically deponent active than a functionally distinct voice. Both take the same pattern of stem formation; they differ only in the forms of the person/number endings.

instrumental case, while the original object of the base predicate remains the sole (accusative-marked) object of the causative (4).[4] We call this the 'oblique-accusative' (OBL-ACC) type.

(4) *geyaṃ* *sa* *dhīmān* *vipra-varair* *akārayat*
song.ACC this.NOM wise.NOM brahmin-best.INS.PL do.CAUS.IMPF.3SG
'This wise one made the best brahmins perform (lit. make) a song'.
(*Vāmana Purāṇa* 68.59)

Note that the causative verb form is the same in both constructions. In the rest of this paper, we use the terms *embedded subject* and *embedded object* to refer to the 'original' subject and object of the base predicate when they appear in the causative. Our *embedded subject* corresponds to what is usually called the 'causee', but we adopt the term originally used by Comrie (1976) in order to have a clear and parallel means of referring to both the 'original' subject and the 'original' object in the causative.

2.2 'Reduced' Active Constructions

In Sanskrit all arguments are in principle omissible, and more often than not at least one of the non-subject arguments of a causative are omitted. Omitted non-subject arguments may be contextually recoverable, or may be non-specific. Argument omission somewhat obscures the line between ACC-ACC and OBL-ACC causatives when, as is frequently the case, the embedded subject ('causee') is omitted:

(5) *prātar* *utthāya* *tat* *sarvaṃ* *kārayāmi* *karomi* *ca*
early.ADV rise.ABS this.ACC all.ACC do.CAUS.1SG do.1SG and
'Having risen early I have (someone) do and (myself) do all this'.
(*Mahābhārata* 13.124.15)

4 The instrumental case marking is primarily semantic, marking agency, rather than syntactically determined. With experiencer verbs like *jñā* 'know' and *śru* '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 the semantically more appropriate case, evidencing a degree of syntactic standardisation. Whether instrumental or dative/genitive, the grammatical role of the argument is the same: it is an oblique; there is no evidence for distinguishing a separate role of 'indirect object' in Sanskrit. Moreover the variation between dative/genitive and instrumental does not affect our statistical analysis below, so we draw no distinction between these different case markings of the embedded subject.

We refer to this type as O-ACC. Alsina (1992, 519) observes a crosslinguistic tendency to the effect that object-marked embedded subjects cannot be omitted, while embedded subjects with oblique marking can be omitted, a tendency which makes sense given that oblique arguments are in general more omissible than core arguments (terms). But in Sanskrit, as mentioned, all arguments are in principle omissible, and omission of core object arguments, whether of causative or non-causative verbs, is widespread. Thus while it is likely that O-ACC more frequently, or more naturally, represents a reduced form of OBL-ACC than of ACC-ACC, it cannot be ruled out, indeed it is likely, that at least some instances of O-ACC represent reduced forms of ACC-ACC.

A third possibility for O-ACC is that it represents a separate constructional type which expresses a (likely indirect) causal sense but without increasing the valency of the verb; this would correspond to translating *kārayāmi* in (5) above as e.g. 'I have all this done'. As seen in the data below, O-ACC is extremely frequent.[5] The precise status of O-ACC causatives in relation to the other causative types remains to be established; our statistical analysis below provides evidence in relation to this question.

It is alternatively possible to omit the embedded object argument, but retain the embedded subject. Both ACC-O and, more rarely, OBL-O structures are found:

(6) a. *mānuṣā* *mānuṣān* [...] *kārayanti* *divāniśam*
man.NOM.PL man.ACC.PL [...] do.CAUS.3PL by.day-by.night
'Men… cause men to work day and night'. (*Mahābhārata* 12.254.39)

b. *śrāvayec* *chraddadhānānāṃ* *tīrthapāda-pada-āśrayaḥ*
hear.CAUS.3SG faithful.GEN.PL Kṛṣṇa-foot-resorting.NOM
'One who resorts to the feet of Kṛṣṇa should make the faithful hear (the story of Dhruva, i.e. by reciting it)'. (*Bhāgavata Purāṇa* 4.12.50)

Granted that ACC-O and OBL-O represent reduced forms of a fuller construction, with the embedded object omitted, naturally ACC-O must be a reduced form of ACC-ACC and OBL-O a reduced form of OBL-ACC. In our data there are 180 instances of OBL-ACC and 17 instances of OBL-O, meaning that the embedded object is omitted in almost exactly 10% of instances of (what is or would be) OBL-ACC. In contrast, ACC-O makes

5 This causee-less construction became so prevalent that, in the early Middle Indo-Aryan languages, the equivalent of *kārayati* was increasingly interpreted as a simple transitive (Edgerton 1946); the ultimate fate of the *-aya-* causative is as a transitive marker in modern Indo-Aryan languages. The causative in many modern Indo-Aryan languages derives directly from the redetermined causative suffix in *-āp-aya-*, which develops as a separate formation in early Middle Indo-Aryan.

up more than 30% of instances of (what is or would be) ACC-ACC: 41 instances beside 89 instances of (unreduced) ACC-ACC. This suggests a difference in the syntactic status of the embedded object in OBL-ACC and ACC-ACC constructions. For example, it would support an analysis whereby the embedded object in the OBL-ACC causative is the core object of the causative predicate, but in the ACC-ACC causative it is the embedded subject which is the core object, while the embedded object is a secondary/indirect object or oblique argument.

Finally, it is also possible for both non-subject arguments to be omitted; we refer to this type as the 0-0 construction:

(7)	*(viśrāma-icchāṃ*	*karoty*	*atra)*	*kārayanti*
	sleep-wish.ACC	do.3SG	here	do.CAUS.3PL
	na	*te*	*bhaṭāḥ*	
	not	this.NOM.PL	servant.NOM.PL	

'(He wants to rest here but) these servants do not allow (him) to do so'. (*Garuḍa Purāṇa* 2.5.98)

In this example, both embedded subject and embedded object of the causative are directly inferable from the previous clause, but it is also possible for one or both null positions to represent indefinite null arguments. The 0-0 type could in principle be treated as a reduced form of any of the types already introduced.

2.3 The Passive Causative

As with the active (§ 2.1), there are two types of passive causative. In one, the subject of the passivised causative verb is the embedded subject of the active causative, that is the original subject of the non-causative.[6] The embedded object remains in the accusative:

(8)	*candra-āsannair*	*hi*	*nakṣatrair*
	moon-in.conjunction.INS.PL	indeed	star.INS.PL
	lokaḥ	*kāryāṇi*	*kāryate*
	world.NOM	duty.ACC.PL	do.CAUS.PASS.3SG

'People are (lit. the world is) caused to do their duties by the constellations in conjunction with the moon'. (*Bṛhatkathāślokasaṃgraha* 15.6)

6 In using the term 'subject' in relation to passivisation here we refer fundamentally to 'grammatical' subjecthood, understood first and foremost in terms of nominative case and verbal agreement. But as we discuss in § 2.4, the instrumental agent in the passive does show some syntactic subject properties.

We refer to this type as PC-S: 'passive causative (with promotion of the embedded) subject'. Here, in the basic non-causative sentence underlying (8), *loka* 'people/world' would be the subject, and *kārya* 'duty' the object. These would then be the embedded subject and object, respectively, in the causative, with the causative subject being *nakṣatra* 'constellation'. In this PC-S passive, it is the embedded subject of the causative, here *loka*, which becomes the subject of the passive causative.

In the second type, it is the embedded object which becomes the subject in the passive of the causative:

(9)	*vegavatyā*	*tataḥ*	*saha*
	V.INS	then	with
	naravāhanadattasya	*vivāhaḥ*	*kāryatām*
	N.GEN	marriage.NOM	do.CAUS.PASS.IMP.3SG

'Then let the marriage of Naravāhanadatta with Vegavatī be caused to be carried out'. (*Bṛhatkathāślokasaṃgraha* 15.13)

We refer to this type as PC-O: 'passive causative (with promotion of the embedded) object'. While the embedded object is promoted to subject, the embedded subject, if expressed, appears in the instrumental. But since this is the passive of a causative, it is also possible for the instrumental to express the demoted subject of the active causative, i.e. the causer. Examples of the PC-O passive causative in which both instrumentals are overtly expressed are extremely rare (Hock 1981, 26) and are not found in our corpus.

2.4 *Ta*-Participle Causatives

Turning now to the *ta*-participle causatives, here again we find two competing argument structure possibilities, just as with the finite active and finite passive.

(10)	*bhrāṭṛ-bhrāṭṛvya-bāndhavaiḥ*	*kāritaḥ*	*kṣetra-karma-ādi*
	brother-nephew-relative.INS.PL	do.CAUS.TA-PTC.NOM.M	field-work-etc.ACC.N

'(He) was made to do fieldwork etc. by his brothers, nephews and other kinsmen'. (*Nārada Purāṇa* 1.48.42)

As an ergative construction, (10) shows the participle predicate agreeing with the object argument (O), here the doer of the work, which would be accusative in the non-ergative active, while the transitive subject/agent argument (A), which would be nominative and controlling verbal agreement in the non-ergative active, appears in

the instrumental. This therefore corresponds to the ACC-ACC finite causative. At the same time, although the *ta*-participle is not a passive formation, and is expected to pattern syntactically as an active, the case-marking and agreement patterns seen in (10) are superficially the same as those of the PC-S finite passive. Rather than treat *ta*-participle examples such as (10) as mere variants of the active ACC-ACC construction, we label and consider them separately: we refer to the construction in (10) as NOM-ACC.

(11) *vivāhaḥ* *kārito* *mayā*
marriage.NOM do.CAUS.PASS.TA-PTC.NOM I.INS
'I had the marriage carried out (lit. 'the marriage was caused to be done by me')'. (*Bṛhatkathāślokasaṃgraha* 14.118)

The formation in (11) likewise shows the O argument, here the marriage, agreeing with the verb and standing in nominative case, while the A argument, here the first-person pronoun, appears in the instrumental. As an 'active' ergative formation, this corresponds directly to the OBL-ACC finite causative. At the same time, again, it shows the same superficial case-marking and agreement patterns as the PC-O finite passive. We refer to the construction in (11) as OBL-NOM.[7]

7 The instrumental in (11) is most naturally interpreted as the causer, and hence the A argument of the causative, but if the embedded subject were to be expressed it would likewise appear in the instrumental (just as in the OBL-ACC construction), and there could conceivably be a context in which (11) could be read in this way (i.e. 'someone had me carry out the wedding'). As noted above for the finite passive, with the *ta*-participle also both instrumental arguments are hardly ever expressed at the same time, and never in our corpus. Given that the instrumental A argument with the *ta*-participle is generally taken as a subject (i.e. this is an active construction merely with ergative morphosyntax), while the instrumental agent in the finite passive (or causer, in the passive causative) is not a subject but an oblique/adjunct, we might expect a noticeable difference in the frequency of occurrence of this instrumental argument between the two categories: it should be considerably more omissible in the case of the finite passive. Butt and Deo (2017, 651) refer to Gonda (1951, 22) in claiming that in Sanskrit the instrumental agent is hardly ever expressed in the finite passive, but rarely omitted with the *ta*-participle. In fact Gonda (1951, 22) makes a claim only about finite passives, and only in relation to a small corpus study on the Vedic Sanskrit of the *Śatapathabrāhmaṇa*. In our data for passive and *ta*-participle causatives, we find the following:

	explicit causer	unexpressed
finite	5	84
ta-ptc	68	437

Only 5.6% (5/84) of finite passive causatives have an explicit causer, whereas 13.4% (68/437) of *ta*-participles do. This difference is statistically significant (Fisher's exact test: p = 0.03598). This therefore supports the assumption that the instrumental agent is more freely omissible in the case of the finite passive than of the *ta*-participle. Even in the *ta*-participle, though, omission of A is by far the most regular situation. These observations also bear some direct relevance to the expression of the embedded subject.

3 Typological Comparisons and the Relation Between Active and Passive

Our concern in this paper is an empirical investigation of the relations between the different active, passive and ergative causative structures in Sanskrit, and what this tells us about the underlying syntax of the constructions involved. We are aware of no comparable empirical or corpus-based studies of the relation between active and passive causatives in other languages. This may be partly because passives of causatives are not particularly common constructions in languages that admit them, but also because few languages freely admit both types of causative (i.e. constructions parallel to both (3b) and (4), which, as noted above, correspond to the two main argument structure patterns for causatives crosslinguistically). According to Alsina (1992), Bantu languages like Chichewa and Kinyarwanda freely admit both types of causative, but according to Baker (1988, 161-7), the two causative structures in Chichewa correspond to two distinct dialects, and in Kinyarwanda only the equivalent of the ACC-ACC causative is possible. Turkish appears to show both patterns, but Çetinoğlu and Butt (2008) show that in fact Turkish has only one type of causative to transitive verbs in the strictest sense (the equivalent of the Sanskrit OBL-ACC causative). Tamil permits both types of passive causative (K. Sarveswaran, p.c.), and at least in some varieties permits both types of active (Davies, Rosen 1988, 78), thus coming close to the Sanskrit situation, but to our knowledge the Tamil facts have never been investigated in detail. In other 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, Joshi 1991). We are aware of no detailed empirical or corpus-based studies of active vs. passive alternations in the causative in these or any other language.

An early attempt to explain the alternation between the different types of active causative is by Comrie (1976). Comrie relies on the

Comparing only PC-O and OBL-NOM, where both causer and causee can be expressed in the instrumental, there is a difference in the frequency of expression of the causee: with finite passive causatives, 34.6% (18/52) of examples have explicit causees (while none have explicit causers); with the *ta*-participle, 24.5% (67/273) have explicit causees. The difference is not significant (Fisher's exact test: $p = 0.1674$), yet it still appears relevant that most of the proportional difference between the two categories can be attributed to the expression of the causer: around 30% of the *ta*-participles do have instrumentals (so considerably closer to the 34.6% of finite passive causatives with instrumentals), 15 of them being causers. So the lower number of expressed causees with the *ta*-participle may be related to the expression of the causer: expressing the causer blocks the expression of the causee, so we find causees more frequently expressed in the finite passive causative.

Noun Phrase Accessibility Hierarchy (Keenan, Comrie 1977), which ranks the arguments of a predicate as follows:

(12) Subject > Direct Object > Indirect Object > Oblique argument

Comrie argues that when a causative is formed and a new subject argument, the causer, is introduced, the original subject of the non-causative, i.e. the embedded subject, is demoted to the highest available position on the argument hierarchy. If the direct object position is not already filled (as with intransitive verbs), or if in a particular language the direct object position permits doubling, then the demoted subject becomes a direct object; if the direct object position is filled and does not permit doubling, but the indirect object position is available, the demoted subject becomes an indirect object, and so on. Such an explanation neatly accounts for languages which show fixed patterns, e.g. where the embedded subject surfaces as a direct object in the causative of intransitives, but as an indirect object in the causative of transitives. But it cannot directly account for the syntactically unconstrained alternation between the two types with transitive verbs in Sanskrit, as introduced above.

An alternative to the syntax-oriented approach of Comrie (1976) is the semantically oriented account of Cole (1983). Cole argues that the varying role of the embedded subject in causative constructions can be fully explained by semantic factors, even in languages where originally semantic alternations have been fixed according to syntactic factors. Cole argues that when the embedded subject retains agency in the causative, it is expressed with agentive marking; in the case of Sanskrit, this corresponds to the instrumental marking of the OBL-ACC causative. When the embedded subject is non-agentive, it is expressed with appropriate marking, such as patient/object marking; this corresponds to the Sanskrit ACC-ACC causative. As discussed below and as reflected in previous approaches to the Sanskrit data, semantic factors clearly play an important role in the alternation between OBL-ACC and ACC-ACC in Sanskrit, but this does not preclude the importance of syntactic factors as well.

The earliest theoretical analysis of the Sanskrit causative is that by Pāṇini in his *Aṣṭādhyāyī*. According to Pāṇini, the distribution of ACC-ACC and OBL-ACC in Sanskrit is similar to modern Indic languages like Marathi: causatives of intransitive verbs are necessarily ACC-ACC; the default structure for causatives of transitive verbs is OBL-ACC, but a semantically definable subset of transitives (verbs of motion, perception, consumption and sounding) take ACC-ACC.[8] Two verbs, *kṛ* 'do,

8 Note we are presenting Pāṇini's analysis here, and not our own. Pāṇini includes verbs of motion, which can construe with an accusative representing the goal of motion,

make' and *hṛ* 'take', are specified as taking either.[9] As we will see below, the facts in Sanskrit texts are more complicated, but we provide corpus-based evidence which at least partly supports the semantic categorisation proposed by Pāṇini.

The indigenous grammatical tradition represented by Pāṇini's *Aṣṭādhyāyī* does not explicitly treat the passive causative, presumably because it did not feel the need: the two possibilities for the passive of the causative fall out unproblematically from the ordinary interaction of the rules for the causative and the rules for the passive.[10] What this ordinary interaction implies is that the PC-S passive causative (8) is specifically the passive of the ACC-ACC active causative (3b), while the PC-O passive causative (9) is the passive of the OBL-ACC causative (4).

On an abstract level this seems intuitively reasonable. If the passive necessarily involves the promotion of the core object argument to subject, then the PC-O passive must correspond to the OBL-ACC active causative, since in the latter the embedded object is the core object, and in the former the embedded object is the subject. Similarly, if we assume that the embedded subject is the sole core object in the ACC-ACC active causative, then this should correspond only to a passive of the PC-S type.[11] A similar prediction can be derived from Comrie's (1976) account of the active causative.

This correspondence, i.e. PC-S as passive of the ACC-ACC causative, and PC-O as the passive of the OBL-ACC causative, seems intuitively reasonable, and is taken for granted by e.g. Hock (1981). Yet it need not necessarily be the case. Certain languages which show only the equivalent of the ACC-ACC active causative show both types of passive causative, PC-S and PC-O, showing that it is at least possible for a PC-O passive causative to function as passive to an ACC-ACC causative. This is the case in Setswana (Rigardt Pretorius and Ansu Berg, p.c.) and is also the pattern described for Kinyarwanda by Baker (1988, 174-80).[12] In our data, we find a variety of patterns, some of which do not

as transitives, for reasons internal to his system.

9 The ACC-ACC type and the free choice with *kṛ* and *hṛ* are specified in Pāṇini's *Aṣṭādhyāyī* 1.4.52-3. The OBL-ACC type results from more general rules.

10 Essentially, in Pāṇini's system there is usually a free choice between active and passive for the main verb when deriving a clause. The passive takes as its nominative argument (i.e. in modern terms its grammatical subject) a particular argument role labelled the *karman*, and the *karman* of any causative verb is clearly defined by the rules for the causative itself.

11 Recall the greater frequency of ACC-O over OBL-O, discussed above, which supports treating the second accusative of ACC-ACC as not being a core object argument.

12 These Bantu languages are symmetrical object languages, so these passivisation possibilities are parallel to the alternations these languages show with non-causative ditransitive verbs (cf. Bresnan, Moshi 1990).

appear to support this correspondence. For example, with the verb *jñā* 'know', the active causative is predominantly ACC-ACC (five of six examples, or 20 of 22, if we include ACC-O and OBL-O), whereas the passive shows a preference for PC-O (14 of 23 examples).

A rather different approach is taken by Kiparsky and Staal (1969). They argue, in an early generative treatment, that the OBL-ACC causative results from first applying passivisation to the base, and then applying the causative, while ACC-ACC results from applying the causative to the non-passivised base. A 'passive first' analysis of causative constructions in which the embedded subject is marked with the same oblique case as passive agents is also considered favourably by Comrie (1976), but argued against by Cole (1983). In the present context, the relevance of such a proposal is that it could not easily be integrated with an approach which associates one of the passive causative structures with the OBL-ACC active causative. If in the OBL-ACC causative the passive has already applied, we should not be able to apply it again (double passives are not possible in Sanskrit). Thus the two passive causative constructions, PC-S and PC-O, could only be both passives of the ACC-ACC causative, as is apparently the case in the Bantu languages mentioned in the previous paragraph.

Despite the support of Comrie (1976), there are typological considerations against the proposal of Kiparsky and Staal (1969): cross-linguistically, the passive is well-attested applying to causatives, but causativisation is not found applying to passives. Nevertheless, both data from certain Bantu languages and existing theoretical analyses of the Sanskrit causative cast doubt on the otherwise widespread assumption that PC-S is necessarily the passive of the ACC-ACC causative, and PC-O the passive of the OBL-ACC causative. The question requires empirical evidence, which has been hitherto lacking. The data we present in this paper allows us to fill this gap.

4 Prior Research on Sanskrit

As mentioned in the previous section, for Pāṇini and the indigenous grammatical tradition that followed him, it was only a semantically specific subset of verbs which could form ACC-ACC causatives, and all but two verbs were restricted to either ACC-ACC or OBL-ACC. It has long been observed, however, that the reality of attested Sanskrit usage is rather different: many verbs show both ACC-ACC and OBL-ACC causatives, and although different verbs may differ in how frequently they show one or the other pattern, it does not appear possible to claim that either pattern is definitely excluded for any verb. Modern treatments have therefore sought to explain the choice between the two patterns on semantic bases, based on notions such as the 'intended expression' (Speyer 1886, 37-8), the 'affectedness' or 'agency' of the embedded subject (Hock 1981; Bubeník 1987), or '(non-)contactive' causation (Bubeník 1987). Such proposals are in line with the semantically oriented approach advocated by Cole (1983), discussed above.

It is of course difficult to draw clear semantic distinctions between almost identical constructions in a language which no longer has native speakers. Indeed, the semantic distinctions drawn between the ACC-ACC and OBL-ACC causatives by previous authors do not appear immediately reconcilable. For example, Hock (1981, 21) states that "the causee [= our 'embedded subject'] marked by the instrumental seems to be less saliently the agent [than the causee marked by the accusative]", and likewise "the instrumental [causee] is marked for decreased 'agency' as compared to the accusative" (Hock 1981, 24). In apparent contrast, for Bubeník (1987, 690), "the causee in the accusative implies low retention of control [by the causee]", whereas instrumental marking "leaves greater control in the hands of the causee". Bubeník's (1987) account is in line with that of Cole (1983), while Hock's (1981) account stands in sharp contrast.

In our view, both Hock (1981) and Bubeník (1987) (and Cole 1983) are trying to describe the same difference between ACC-ACC and OBL-ACC, but do not do so clearly and compatibly because their focus is on the embedded subject alone. Although superficially the only difference between ACC-ACC and OBL-ACC is indeed the status (specifically, the case and grammatical role) of the embedded subject, the semantic difference does not rest fundamentally on the embedded subject, but on the verb itself and the verb's relation with its arguments, most importantly its object argument. As pointed out by Börjars and Vincent (2008), since at least Fillmore (1968, 25) it has been recognised that certain arguments of predicates represent

> the semantically most neutral case, the case of anything representable by a noun whose role in the action or state identified by the verb is identified by the semantic interpretation of the verb itself.

What is in Fillmorean terms the 'Objective' case, is in more modern terminology the semantic role of Theme; following Börjars and Vincent (2008, 164), "what is standardly called Theme is simply a projection into an internal argument slot of some or all of the lexical semantic content of the predicate". But to look at it the other way around, the lexical semantic content of a predicate depends on its Theme, indeed on its core internal argument(s), since Themes standardly (in the active) surface as core objects. If we take the OBL-ACC causative, then, the embedded object is the Theme of the causative predicate, and the causative predicate is understood in these terms: the interpretation of *kārayati* in (13b) is fundamentally about an event of 'making' interpreted in relation to a mat: Yajñadatta causes a mat to be made, through the agency of Devadatta. But with the ACC-ACC causative (13c), Devadatta is the core object argument of the causative predicate, and the predicate is thus interpreted in relation to Devadatta as the Theme (of the causation): Y. causes D. to act, and that action is the making of a mat.[13]

(13) a. *devadattaḥ* *kaṭaṃ* *karoti*
D.NOM mat.ACC make.3SG
'Devadatta makes a mat'.

b. *yajñadatto* *devadattena* *kaṭaṃ* *kārayati*
Y.NOM D.INS mat.ACC make.CAUS.3SG
'Yajñadatta has a mat made by Devadatta'.

c. *yajñadatto* *devadattaṃ* *kaṭaṃ* *kārayati*
Y.NOM D.ACC mat.ACC make.CAUS.3SG
'Yajñadatta makes Devadatta make a mat'.

Hock's (1981) claim that the instrumental marks 'reduced agency' of the embedded subject is thus really trying to describe a lesser focus on the action of the agent in the OBL-ACC construction, since the predicate is interpreted in primary relation to the embedded object Theme, rather than a difference in the semantic entailments associated with the embedded subject. And Bubeník's (1987) reading of 'low retention of control' by accusative-marked embedded subjects reflects the fact that in an ACC-ACC causative the predicate is interpreted primarily in relation to the embedded subject

13 We here use constructed examples, based on those offered in the grammatical tradition, to provide precise parallels, but the same points apply, *mutatis mutandis*, to (3b) and (4).

interpreted as a Theme of the event of causation (rather than as an Agent of the caused event).

In any case, the semantic difference between ACC-ACC and OBL-ACC is a separate question from that of the relations between the active and passive patterns. Whatever specific entailments influence the choice, or derive from the use, of one or another active pattern, we would expect those entailments to be reflected in whichever passive is associated with whichever active. But it is difficult, if not impossible, to use such fine semantic differences as firm empirical evidence for associations between active and passive patterns, at least in Sanskrit, because we are dealing with a corpus language and cannot rely on speaker intuitions (it would be difficult even in a language with native speakers). Below, we show that distributional data from our corpus study can provide more robust evidence in regard to the association between active and passive causative structures.

5 Restrictions on the Data

Although causatives are highly productive in Sanskrit, and although passive causatives are frequent in our corpus and formed to a large number of different verbs, the specific comparisons under investigation here could only be meaningfully compared in relation to ten Sanskrit verbs. In this section we explain why only such a small set of verbs were useable.

Based on the list of verb forms in Whitney 1885, together with other standard grammars, we identified 241 verbal roots which have attested active causatives and could conceivably also form passive causatives (which are not consistently listed by Whitney 1885).[14] Of these 241 roots, only 140 are always or sometimes transitive (in the sense of taking an accusative object argument).[15] Intransitive roots

14 For most verbs, active causatives are morphologically clearly distinct from non-causatives. However, the suffix *-aya* used in the causative is also used for some non-causative present stems; these are mostly denominatives in origin (originally with a suffix *-ya-*). For example, the verb *varṇayati* 'describes' is not a causative, but a denominative based on the noun *varṇa-* 'colour, shade'; synchronically the Indian tradition nevertheless treated it as an *-aya-* present to a root *varṇ*. There is some diachronic interaction between causatives and denominatives of this sort, and this may be a factor in the complicated picture of causative stems discussed below. For example, to the noun *kāma-* 'desire' a denominative *kāmayate* 'desires' was formed, which was reinterpreted as a causative based on a (previously non-existent) root *kam* 'desire', resulting in the formation of other finite verbal forms to this secondarily extracted root; see Jamison 1983, 75.

15 On the problematic nature of defining transitivity in the context of Sanskrit, see e.g. Kulikov 2012b; Lowe 2017a, 4-34. For the present purposes it is sufficient to take 'accusative object argument' to mean an accusative argument which regularly becomes the subject in the passive (thus excluding goal accusatives).

(including verbs of motion which can take goal accusatives, and verbs which take only clausal complements) cannot display the patterns under investigation, so those roots were the first to be excluded.

Forty-five of the remaining 140 roots are morphologically ambiguous in the passive: their passive causative is, or would be if attested, formally identical to their basic passive. For example, the root *āp* 'obtain' forms an active present stem *āpnoti* 'obtains', a basic causative *āpayati* 'causes to obtain', and a basic passive *āpyate* 'is obtained'. If a passive were to be formed to the causative stem, it would have the form *āpyate*, indistinguishable from the basic passive. Such a passive causative would be clearly identifiable only if it were PC-S, i.e. if it had the sense 'was caused to obtain', since its subject argument would then be different from the basic passive 'is obtained'. But a PC-O passive 'was caused to be obtained' would in most cases be impossible to distinguish from the basic passive. That is, it is often contextually unproblematic to read a basic passive as if it were a PC-O passive causative, and if we cannot always be absolutely sure of the difference based on context, our figures for the PC-O passive causative would be inflated by cases of the simple (non-causative) passive. Thus we are left with only 95 morphologically reliable, transitive roots which are recognised to form causatives.

Our study sought not only to compare finite active with passive, but also to compare *ta*-participle with both finite active and passive. It was therefore necessary to restrict our study further to only those roots which are attested in all three categories. Fifty of the remaining 95 roots are unattested in either the finite passive or the *ta*-participle (mostly the former) in our corpus.[16] For example, the root *likh* 'write', a common verb widely attested in the active causative and in the causative *ta*-participle *lekhita-* 'caused to write / caused to be written', is not attested in the expected finite causative passive **lekhyate*.

Of the remaining 45 roots, 35 are semantically problematic, falling broadly into two groups. Twenty roots form causatives which, while being genuine morphological causatives, are not semantically causative, functioning rather as simple transitive stems alongside the existing transitive stems of the root. For example, the root *kṛt* 'cut' forms a present *kṛntati* 'cuts', and a morphological causative *kartayati*, which however means the same as the simple present. There also is a passive of the latter, again entirely regular in its morphology, *kartyate* 'is cut'. At times it would be possible to force a PC-O passive causative reading onto *kartyate*, but it is never necessary:[17]

16 The majority of these appear to be unattested in the relevant category outside our corpus as well.

17 Several of the relevant roots form their regular simple present with a nasal element, either a nasal infix in the root (e.g. *kṛt*, *kṛntati* or *kartayati* 'cuts'; *stambh*,

(14) *sa* *taiḥ* *saha* *śastreṇa*
he.NOM they.INS with knife.INS
yudhyate *yāvat* *tathā* *kartyate*
fight.PASS.3SG until thus cut.CAUS.PASS.3SG
'With the knife he fights with them, until he is thus hacked to pieces (lit. 'is (caused to be?) cut')'. (*Śikṣāsamuccaya* 4)

Since the active causative is simply transitive, like the causative of an intransitive verb, and since the (morphological) passive causative need never be treated as anything other than a passive to a transitive stem, the data for this and parallel roots can tell us no more than the data for unambiguously intransitive roots, and must be excluded.

In some cases, the problem lies in the basic verb, which can be either transitive or intransitive. For example, the root *vah* has a simple present *vahati* which can be intransitive, 'travels, is conveyed', or transitive, 'conveys, transports'. The causative *vāhayati* can function as the causative of the basic verb in its transitive or intransitive sense, and the passive causative *vāhyate* is likewise ambiguous. Again, certain constructions with the active or passive causative are clearly identifiable as causatives to the transitive base, such as ACC-ACC actives and PC-S passives. But OBL-ACC, O-ACC and passive PC-O cannot reliably be distinguished from causatives based on the intransitive sense of the root, as can be seen immediately below. The root as a whole must therefore be excluded.

(15) *saṃvāhyantāṃ* *ca* *śakaṭair* *naukābhir* *mā* *vilambatha*
travel.CAUS.PASS.3PL and cart.INS.PL ship.INS.PL neg take.2PL
'and let them be conveyed (lit. 'be caused to travel / be made to be carried') by carts (and) ships; do not delay'. (*Brahma Purāṇa* 47.9)

The other broad group of semantically problematic verbs are those whose causatives have unpredictable idiomatic or lexicalised meanings, which do not correspond to the expected sense of a causative to the base verbal sense. For example, the causative of *ā-jñā* 'perceive, understand' has undergone a semantic development which means that it no longer functions as a regular causative: *ājñāpayati* does not

stabhnoti or *stambhayati* 'stops, supports'; *lup*, *lumpati* or *lopayati* 'breaks'), or (synchronically) a suffix (*dṝ*, *dṛṇāti* or *dārayati* 'tears'; *stṝ*, *stṛṇāti* or *stārayati* 'spreads'; *vṛ*, *vṛṇoti* or *vārayati* 'covers'). Many of these alternative *-aya* forms have a historical explanation; see Jamison 1983, 178-89, for the early history of *-aya* and its transitive use, and also Renou 1961, 473-4, on the variable sense of some *-aya* formations.

merely mean 'causes to perceive/understand', but 'commands'.[18] Similarly the causative of *vac* 'speak' regularly refers to a sound being produced, e.g. someone playing an instrument or reading out a letter. That is, the causative of *vac* can mean, literally, that someone is causing something (a lute/a letter) to speak, as in the following example.

(16) *vācite* *lekhe* *siddhārthena*
speak.CAUS.TA-PTC.LOC letter.LOC S.INS
'when this letter was read by Siddhārtha' (*Kathāsaritsāgara* 8.1.161)

Yet the corresponding usage does not exist in the basic verb: letters, musical instruments, etc. are not said to 'speak' using the non-causative of *vac*; the causative is therefore not the regular causative of the basic verb.[19]

Some causatives also show additional argument structure patterns which cannot be subsumed under causative syntax proper. The verb *bhojayati*, causative of *bhuj* 'to eat, enjoy', has two broadly synonymous constructions, one a genuine causative 'make eat', the other more naturally translated 'feed (with)'. The genuine causative shows the ACC-ACC pattern ('make someone (ACC) eat something (ACC)'), while the alternative constructions shows an instrumental of the substance fed ('feed someone (ACC) with something (INS)'), resulting in an 'ACC-OBL' pattern which is otherwise not found with causatives. Although it is possible to distinguish the 'ACC-OBL' construction (17a) from the genuine causatives (17b) when the foodstuff is expressed, there is no way to distinguish the two constructions when it is omitted (17c).

(17) a. *tato* *'nnena* *avaśeṣeṇa* *bhojayed* *atithīn* *api*
then food.INS remaining.INS eat.CAUS.OPT.3SG guest.ACC.PL too
'Then he should feed the guests too with the remaining food'. (*Mahābhārata* 13.100.17)

18 In this case, it is only the forms of *ā-jñā* which were excluded. Causatives of the simplex root *jñā* 'know' or *jñā* in combination with other preverbs are semantically regular; for example, to *jñā* 'know' the causative, *jñāpayati*, means 'informs, lets know'.

19 Regular uses of the causative of *vac* are found, but they cannot always be securely distinguished from the specialised sense, and so the root as a whole was excluded. On the causative of the similar root *vad* 'speak', which may have influenced the causative of *vac*, see Kulikov 2012a, 697.

b. *ikṣūṃś* *ca* *madhu-lājāṃś* *ca*
sugarcane.ACC.PL and honey-grain.ACC.PL and
bhojayanti *sma* *vāhanān*
eat.CAUS.3PL past draft-animal.ACC.PL
'They made the draft animals eat both sugarcane and honied grains'. (*Rāmāyaṇa* 2.85.52)

c. *dvijān* *dvādaśa* *bhojayet*
brahmin.ACC.PL twelve.ACC eat.CAUS.OPT.3SG
'He should feed the twelve brahmins'. (Lit. 'he should make the twelve brahmins eat') (*Nārada Purāṇa* 1.121.19)

Since genuine cases of ACC-O could not therefore be distinguished from a reduced form of the non-causative ACC-OBL construction, the data for this root was omitted.

Semantic specialisation is of course a gradient notion, and it is not easy to draw a clear line. As in the case of *bhuj*, we have been guided by syntactic factors as well as semantic, and this leads us to include two causatives which are sometimes considered semantically specialised. The causative of *dṛś* 'see' appears both with an ACC-ACC argument structure ('make someone (ACC) see something (ACC)'), which is unproblematic for a true causative, and an OBL-ACC structure, which is more naturally translated as 'show' than 'make seen': 'show something (ACC) to someone (GEN/DAT)'). But even if there is arguably a degree of semantic specialisation here (from 'make see(n)' to 'show'), for our purposes the argument structure patterns shown by *darśayati* are entirely consistent with a true causative, and there is no syntactic argument for excluding the root. We also include the causative *ghātayati*, morphologically suppletive to the root *han* 'slay', which is sometimes considered semantically specialised in the sense 'have killed, have executed', usually O-ACC. Again, *ghātayati* does show entirely regular causative argument structures, including instances of ACC-ACC (which can only be treated as genuine causatives), and so there is no syntactic reason to exclude it.

For the reasons discussed in this section, only ten roots proved viable for our investigation.[20] The ten verbs included in our study range across the categories that Pāṇini specifies as ACC-ACC, OBL-ACC, or both, permitting us also to compare our data with Pāṇinian prescriptions. Altogether, our corpus contains 1660 relevant tokens for these ten verbs (991 finite actives/middles, 77 finite passives and 592 *ta*-participles). We present and offer an initial discussion of this data in § 6, and then turn to a statistical analysis in § 7.

20 As noted above, certain clearly distinguishable subsets of data for these roots, such as the causative of *ā-jñā*, were excluded.

6 Data and Analysis

Before we introduce our data, we briefly summarise the relevant issues and the potential correlations we might expect to find. We state a list of explicit predictions, so that each issue can be easily referred back to later on.

6.1 Predictions and Possibilities

Above we introduced six types of active causative: ACC-ACC, OBL-ACC, 0-ACC, ACC-0, OBL-0 and 0-0. Firstly, we would predict that ACC-0 positively correlate with ACC-ACC, since the former can only be a reduced form of the latter. That is, verbs which more frequently form ACC-ACC active causatives should be statistically more likely to form ACC-0 causatives, since they are underlyingly the same formation.

- Prediction 1: positive correlation between ACC-ACC and ACC-0.

For the same reason, the equivalent correlation should hold between OBL-ACC and OBL-0.

- Prediction 2: positive correlation between OBL-ACC and OBL-0.

More tentatively, we may expect a closer correlation between 0-ACC and OBL-ACC than between 0-ACC and ACC-ACC, based on the idea that oblique arguments are more omissible than core object arguments. That is, while 0-ACC may in principle represent a reduced form of either OBL-ACC or ACC-ACC, if the embedded subject of the ACC-ACC causative is a core object argument, this should be less frequently omissible than the oblique argument of the OBL-ACC causative.

- Prediction 3: 0-ACC is more closely correlated with OBL-ACC than with ACC-ACC.

The question of a correlation between ACC-ACC and OBL-ACC is complex. If our data were to follow Pāṇini's prescriptions, that is if all but two verbs were to form exclusively either an ACC-ACC or an OBL-ACC causative, we would expect either no correlation or an inverse correlation. If there is a positive correlation between ACC-ACC and OBL-ACC, this would mean that the more a verb forms ACC-ACC causatives, the more it is also likely to form OBL-ACC causatives. This would therefore speak against lexical constraints, or even strong lexical preferences, for one active causative type over another, suggesting a more contextual semantic basis for the choice between ACC-ACC and OBL-ACC, rather than a grammatical or lexical semantic basis. As discussed above, contextual semantic distinctions are

assumed to underlie the alternation in most modern work (Speyer 1886; Hock 1981; Bubeník 1987).

- Prediction 4: OBL-ACC and ACC-ACC are positively correlated.

We can then consider the two finite passive categories, PC-S and PC-O. If the widespread assumption that PC-S is the passive of the ACC-ACC causative and PC-O the passive of the OBL-ACC causative is correct, then we might expect to find two things: firstly, positive correlations both between PC-S and ACC-ACC, and between PC-O and OBL-ACC; and secondly, a similar degree of correlation between PC-S and PC-O as between ACC-ACC and OBL-ACC. That is, we expect verbs which form ACC-ACC active causatives to correspondingly form PC-S passives more frequently, and the equivalent, *mutatis mutandis*, for OBL-ACC and PC-O. On the other hand, under the approach of Kiparsky and Staal (1969), according to which the OBL-ACC causative involves an underlying passivised base, we might expect positive correlations between ACC-ACC and both PC-S and PC-O, and no significant correlation between the passive categories and OBL-ACC. For the sake of argument, we frame our predictions in terms of the more widespread assumptions.

- Prediction 5: positive correlation between PC-S and ACC-ACC.
- Prediction 6: positive correlation between PC-O and OBL-ACC.
- Prediction 7: a similar degree of correlation between PC-S and PC-O as between ACC-ACC and OBL-ACC.

Considering now the *ta*-participle types NOM-ACC and OBL-NOM, we would expect these categories to correlate with the finite active ACC-ACC and OBL-ACC categories, respectively. In fact, if we assume that the *ta*-participle is a paradigmatically active (or at least distinctly non-passive) formation, we should find not only strong correlations between ACC-ACC and NOM-ACC, and between OBL-ACC and OBL-NOM, but also similar correlations between each member of these pairs and the other (e.g. passive) categories.

- Prediction 8: positive correlation between ACC-ACC and NOM-ACC.
- Prediction 9: positive correlation between OBL-ACC and OBL-NOM.
- Prediction 10: similar correlations between ACC-ACC and NOM-ACC, and between OBL-ACC and OBL-NOM, with other categories.

6.2 Active Causative

We now turn to the data itself. In § 2 we introduced the different categories of active causative. Here we repeat the examples for ease of reference:

(18) a. OBL-ACC:
geyaṃ *sa* *dhīmān* *vipra-varair* *akārayat*
song.ACC this.NOM.M wise.NOM.M brahmin-best.INS.PL do.CAUS.3SG
'The wise one made the best brahmins perform (lit. make) a song'.
(*Vāmana Purāṇa* 68.59)

b. ACC-ACC:
nalaṃ *setum* *akārayat*
N.ACC bridge.ACC make.CAUS.3SG
'He had Nala make a bridge'. (*Rāmāyaṇa* 6.114.41)

c. 0-ACC:
prātar *utthāya* *tat* *sarvaṃ* *kārayāmi* *karomi* *ca*
early rise.ABS this.ACC.N all.ACC.N do.CAUS.1SG do.1SG and
'Having risen early I have (someone) do and (myself) do all this'.
(*Mahābhārata* 13.124.15)

d. ACC-0:
mānuṣā *mānuṣān…* *kārayanti* *divā-niśam*
man.NOM.PL man.ACC.PL do.CAUS.3PL by.day-by.night
'Men… cause men to work day and night'. (*Mahābhārata* 12.254.39)

e. OBL-0:
śrāvayec *chraddadhānānāṃ* *tīrthapāda-pada-āśrayaḥ*
hear.CAUS.3SG faithful.GEN.PL Kṛṣṇa-foot-resorting.NOM
'One who resorts to the feet of Kṛṣṇa should make the faithful hear (the story of Dhruva, i.e. by reciting it)'. (*Bhāgavata Purāṇa* 4.12.50)

f.
karoty *atra)* *kārayanti* *kārayanti*
do.3SG here do.CAUS.3PL do.CAUS.3PL
na *te* *bhaṭāḥ*
not they.NOM.PL servant.NOM.PL
'(He wants to take rest here but) the servants do not allow (him) to do so'.
(*Garuḍa Purāṇa* 2.5.98)

We begin with ACC-ACC and OBL-ACC. Table 1 presents the figures for these patterns for the ten roots included in our study **[tab. 1]**. For comparison, the roots are grouped according to Pāṇini's categories: those that should prescriptively show OBL-ACC only, the two verbs that can take either OBL-ACC or ACC-ACC, and verbs which should prescriptively take ACC-ACC only.

Table 1 Active causatives

Root	**ACC-ACC**		**OBL-ACC**		**ACC-ACC**	**Pāṇini**
	(full)	ACC-0	(full)	OBL-0	proportion	
han 'kill'	2	0	9	0	.18	OBL-ACC only
pac 'cook'	0	0	1	0	0	
grah 'seize'	12	4	26	2	.36	
dā 'give'	4	3	0	0	1	
kṛ 'do'	14	1	6	0	.7	either
hṛ 'carry'	5	0	4	0	.56	
jñā 'know'	5	15	1	1	.91	ACC-ACC only
śru 'hear'	27	7	3	3	.85	
paṭh 'recite'	3	2	0	0	1	
dṛś 'see'	17	9	130	11	.16	
Total	**89**	**41**	**180**	**17**	**.40**	

Table 1 shows that both ACC-ACC and OBL-ACC are attested across a range of roots, beyond the restrictions observed by Pāṇini. (19) gives two examples of this, ACC-ACC with the theoretically OBL-ACC only verbs *han* 'strike, kill' and *dā* 'give' respectively.

(19) a. *evaṃ* *daśa* *sutās* *tasya*
thus ten daughter.ACC.PL he.GEN
kaṃsas *tān* *aghātayat*
K.NOM they.ACC kill.CAUS.IMPF.3SG
'Thus, Kaṃsa caused them to kill that one's ten daughters'.
(*Brahmāṇḍa Purāṇa* 2.71.182)

b. *taṃ* *nija-svāminaṃ* *siṃhaṃ*
him.ACC own-master.ACC lion.ACC
tasya *abhayam* adāpayat
him.GEN without-fear.ACC give.CAUS.IMPF.3SG
'He made his own master, the lion, give safe passage to him'.
(*Kathāsaritsāgara* 10.4.69)

Although Pāṇini's prescriptions are not universally observed, as was already well known, table 1 shows that there are some tendencies in

that direction: three of the four roots which for Pāṇini are ACC-ACC only show a greater than 0.8 proportion of ACC-ACC structures, the three highest proportions of ACC-ACC in our data, while three of the four roots with the lowest proportion of ACC-ACC, all below the average of 0.4, are found with roots which for Pāṇini should be OBL-ACC only.[21] In addition, the two roots for which Pāṇini licences both structures show proportions roughly in the middle. Two roots, *dṛś* and *dā*, go against expectations. This partial conformance to Pāṇini's norms could be a result of conscious attempts to follow Pāṇinian grammar by some authors, or may reflect a deeper feature of Sanskrit grammar which Pāṇini himself recognised and over-prescriptively incorporated into the *Aṣṭādhyāyī*, or indeed, a combination of both. If it were only the former, i.e. conscious conformity with Pāṇini, then one might have expected that the more strictly Classical texts in our corpus would conform more closely with the Pāṇinian norms, and that the linguistically freer Epics, for example, might show more deviation.[22] However, we found no pattern in the distribution of the data in terms of more or less 'Pāṇinian' Sanskrit; forms violating Pāṇinian norms are evenly distributed across the different genres in our corpus. This may suggest that these tendencies are a more ingrained aspect of Sanskrit grammar, which Pāṇini merely imperfectly reflected in his grammar.

The greater part of the active data involves structures which are ambiguous between ACC-ACC and OBL-ACC due to the omission of the first argument; in particular, 0-ACC alone makes up more than half the active causative data, as shown in table 2 **[tab. 2]**.

Table 2 Active causative distributions with omission of first argument

Root	0-0	0-acc	Pāṇini
han 'kill'	8	75	OBL-ACC only
pac 'cook'	2	18	
grah 'seize'	0	16	
dā 'give'	1	23	
kṛ 'do'	4	114	either
hṛ 'carry'	5	58	
jñā 'know'	6	6	ACC-ACC only
śru 'hear'	30	25	
paṭh 'recite'	1	2	
dṛś 'see'	32	238	
Total	**89**	**575**	

21 Excluding *dṛś* (since the high token frequency of OBL-ACC with this root overwhelms the other figures), this contrast between Pāṇini's OBL-ACC only and ACC-ACC only roots is statistically significant (Fisher's exact test $p = 5.75 \times 10^{-9}$).

22 Such a distribution is found with other phenomena in Sanskrit, cf. Lowe 2017b.

There are no clear patterns in the distribution of O-ACC here; it is frequent with all roots.

6.3 Passive Causatives

Table 3 presents the distribution of all finite passive causative forms of the ten roots attested in our corpus in terms of PC-S vs. PC-O. The ordering of roots in the table is the same as that in tables 1 and 2. Examples of passive causatives for all ten roots are provided in the appendix.

Table 3 Passivisation patterns in finite passive causatives

Roots	pc-s	pc-o	PC-S Proportion
han 'kill'	0	1	0
pac 'cook'	0	1	0
grah 'seize'	1	2	.33
dā 'give'	4	3	.57
kṛ 'do'	8	13	.38
hṛ 'carry'	2	3	.4
jñā 'know'	9	14	.39
śru 'hear'	1	1	.5
paṭh 'recite'	1	0	1
dṛś 'see'	0	13	0
Total	**26**	**51**	**.34**

As table 3 shows, the number of attested finite passive causatives for most roots is very small, except for *kṛ* 'do', *jñā* 'know', and *dṛś* 'see'. Nevertheless some observations can be made. According to previous studies, PC-O is highly restricted: Speyer (1886, 37-8) states that this pattern (i.e. the embedded object becoming the subject in the passive) is very rare compared with PC-S; Bubeník (1987) finds PC-O to be frequent only with the verb *han*. In contrast, table 3 shows that PC-O is attested with all but one of our ten roots, and is more common overall than PC-S.

Table 3 also shows considerable variation between the different roots in terms of their relative preference for PC-S or PC-O. Excluding *dṛś*, which is again an outlier, all roots which are attested more than once show a relatively even distribution of PC-S vs. PC-O: between 0.33 and 0.57 proportion of PC-S. The three roots which are attested only once all pattern in the 'expected' directions, based on Pāṇini's prescriptions: *han* and *pac* as OBL-ACC only roots show only PC-O, and *paṭh* as ACC-ACC only shows only PC-S. But since we are dealing with lone attestations for each root, this may be nothing more than chance.

6.4 *Ta*-Participle Causatives

The figures for this category, shown in table 4, are higher than those for the previous categories, due to the high productivity of the *ta*-participle in Sanskrit **[tab. 4]**.

Table 4 Patterns in ta-participle causatives

Roots	nom-acc	obl-nom	NOM-ACC Proportion
han 'kill'	0	73	0
pac 'cook'	0	6	0
grah 'seize'	12	4	.75
dā 'give'	6	7	.46
kṛ 'do'	38	73	.34
hṛ 'carry'	1	28	.03
jñā 'know'	66	4	.94
śru 'hear'	34	17	.66
paṭh 'recite'	3	0	1
dṛś 'see'	11	209	.05
Total	**171**	**421**	**.29**

With *ta*-participles, OBL-NOM is more common overall than NOM-ACC; the proportion is similar to the proportion of PC-O with the finite passive causatives. The two roots unattested in NOM-ACC are both in Pāṇini's 'OBL-ACC only' category (= OBL-NOM in the ergative participle, cf. §2.4), while the two roots with the highest proportion of NOM-ACC are those in Pāṇini's 'ACC-ACC only' category (= NOM-ACC in the ergative). However, the root *dṛś*, for which 95% of occurrences are OBL-NOM, goes strongly against Pāṇinian expectations, although this is in line with its behaviour in the finite active and passive. The root *grah*, showing 75% NOM-ACC, also goes against Pāṇinian expectations, although less severely. Also, the root *hṛ* is surprisingly rare in NOM-ACC, given its otherwise fairly even distribution.

In this section we have offered merely a few superficial observations, particularly relating to the Pāṇinian analysis. In the following section, we investigate the correlations in our data in more detail.

7 Examining the Correlations

Our data is complex and varied, involving distinct patterns (OBL-ACC vs. ACC-ACC, PC-S vs. PC-O, etc.) in different but related data sets for a set of ten verbal roots which do not all pattern together and which show considerable variation in frequency of attestation. In this section we use correlation matrices to identify patterns in this complex dataset.

The 'correlation' in this term refers to the measure of the dependence between two variables. In a correlation matrix, this is expressed in the form of a correlation coefficient, which is measured on a scale from −1 to +1. The closer the value is to +1 or −1, the more closely the two variables are related. While the value of the coefficient tells us about the strength of the relationship, the sign (+/−) of the coefficient indicates the direction of the relationship, positive or negative respectively. A positive correlation coefficient means that the two variables correlate in the same direction: an increase in one is accompanied by an increase in the other and a reduction in one is accompanied by a reduction in the other. A negative correlation coefficient represents a negative correlation: when one variable increases, the other decreases, and vice versa. A correlation coefficient of 0 means that there is no correlation between the two variables: they are not related to each other at all. The correlation coefficients are not the same as p-values, but p-values for each coefficient can be (and were) generated. In the correlation matrices we mark coefficients with significant p-values (≤ 0.05), and discuss some other p-values below.

Our data consists of frequencies of token instances of verbs in particular syntactic constructions. Frequency data tends to follow a Zipfian distribution, which means that there are few very high-frequency items and many low-frequency items (Piantadosi 2014). This is a non-linear distribution, while traditional correlations (e.g. Pearson's correlation coefficient) are linear. We therefore applied a logarithmic transformation (the natural logarithm, base *e*, approximately 2.718282)[23] to the data in order to normalise the frequency data, in other words, to reduce the distance between the smallest and the highest data points, which otherwise would skew the statistical analysis. Furthermore, to address the zero values in our data set, we applied the 'Add-k' smoothing method, with k = 0.1 added to all values (Bellégo, Benatia, Pape 2021; Criscuolo, Overman, Van Reenen 2019; Jurafsky, Martin 2020).

23 The reason for using the natural logarithm is that higher bases tend to pull extreme values in more drastically than lower bases (Osborne 2002). For comparison, we also performed a transformation using base 10 and the correlations were not significantly different.

Table 5 Full correlation matrix for (transformed) data from tables 1-4

	0-0	0-ACC	ACC-0	OBL-0	ACC-ACC	OBL-ACC	PC-S	PC-O	NOM-ACC	OBL-NOM
0-0	1	0.48	0.06	0.30	0.22	0.28	-0.22	0.30	0.08	0.57
0-ACC	0.48	1	-0.21	0.20	0.28	**0.72**	-0.30	0.60	-0.07	**0.96**
ACC-0	0.06	-0.21	1	**0.72**	**0.64**	0.04	0.39	0.29	**0.87**	-0.15
OBL-0	0.30	0.20	**0.72**	1	0.58	0.62	-0.16	0.36	0.55	0.27
ACC-ACC	0.22	0.28	**0.64**	0.58	1	0.39	0.41	0.35	**0.78**	0.28
OBL-ACC	0.28	**0.72**	0.04	0.62	0.39	1	-0.40	0.50	0.08	**0.73**
PC-S	-0.22	-0.30	0.39	-0.16	0.41	-0.40	1	0.30	**0.69**	-0.25
PC-O	0.30	0.60	0.29	0.36	0.35	0.50	0.30	1	0.47	**0.69**
NOM-ACC	0.08	-0.07	**0.87**	0.55	**0.78**	0.08	**0.69**	0.47	1	-0.01
OBL-NOM	0.57	**0.96**	-0.15	0.27	0.28	**0.73**	-0.25	**0.69**	-0.01	1

Bold: Correlations with significant p-value (≤ 0.05)

Table 5 shows the correlation matrix (generated using R) for the transformed values of the data from tables 1-4 **[tab. 5]**. That is, the variables underlying the correlation matrix are the log-transformed numbers of finite PC-S, finite PC-O, *ta*-participle NOM-ACC etc. in our corpus for each root. The figures in the table show the correlations between those variables. For example, the 0.48 figure near the top left represents a positive correlation between the number of (finite active) O-O tokens and the number of (finite active) O-ACC tokens in our corpus; that is, the larger the number of O-O tokens for any root, in general the larger the number of O-ACC, and vice versa.[24]

For convenience, the correlation matrix in table 5 can be considered in three sections, indicated by the dashed lines, partly corresponding to the relations between the different supercategories of our data.[25] The top left quadrant of table 5 shows the correlations between the six finite active categories, that is between ACC-ACC and OBL-ACC, ACC-ACC and ACC-O, etc. The bottom right quadrant includes three (smaller) sets of correlations: the correlation between the two passive categories, PC-S and PC-O; the correlation between the two *ta*-participle categories, NOM-ACC and OBL-NOM; and the correlations between these passive and participial categories. The bottom left and top right quadrants (which include the same information) show the correlations between the active categories and both the passive and participial categories.

24 Most of the correlations in table 5 are positive, and the negative correlations that there are are all low. This is an artefact of the type of data we are considering, and has no significant consequences.

25 The grouping of finite passive with *ta*-participle is simply because these together constitute four categories, vs. the six categories of finite active, permitting the table to be divided into four roughly equal parts. If preferred, one may ignore the dashed lines and take the table as a whole.

7.1 The Active Correlations

We begin with the active correlations. We find three statistically significant correlations in this (top left) quadrant of the matrix. Above, we presented a number of predictions (§ 6.1): that we should expect a positive correlation between ACC-ACC and ACC-O (prediction 1), reflecting the fact that the latter is a reduced form of the former, and similarly a positive correlation between OBL-ACC and OBL-O (prediction 2); also, that we should expect a closer correlation between O-ACC and OBL-ACC than between O-ACC and ACC-ACC (prediction 3), based on the idea that oblique arguments are less obligatory than core object arguments; and that we might expect, given the claims of previous literature, a positive correlation of some sort between ACC-ACC and OBL-ACC (prediction 4), assuming that the choice between the two is based more on context than on grammatical or lexical semantic constraints.

ACC-ACC positively correlates with ACC-O (0.64, $p = 0.0443$), supporting prediction 1. In terms of prediction 2, OBL-ACC does positively correlate with OBL-O, but the p-value is marginally above the threshold for significance (0.62, $p = 0.0584$). The lack of significance here is likely due to the very small number of OBL-O tokens. O-ACC positively correlates with OBL-ACC (0.72, $p = 0.0177$); while there is a minor positive correlation between O-ACC and ACC-ACC, it is not significant. This supports prediction 3.

In relation to prediction 4, although there is a positive correlation between ACC-ACC and OBL-ACC, it is not significant. Interestingly, there is a significant positive correlation between ACC-O and OBL-O (0.72, $p = 0.0192$). Given that these categories respectively represent reduced forms of ACC-ACC and OBL-ACC, this could be taken to represent the correlation between the two non-reduced categories. But the question remains why this correlation is not found to the same degree with the non-reduced categories themselves, nor indeed between OBL-O and ACC-ACC, or between ACC-O and OBL-ACC. The strong correlation is specifically between the reduced categories; this may indicate that in our data certain roots disprefer reduced structures of either kind, while other roots license reduced structures of either kind, but it does not necessarily tell us anything about the correlation between ACC-ACC and OBL-ACC.

The data therefore does not allow us to make definitive claims regarding the relative importance of contextual considerations vs. lexical or grammatical constraints in the choice between ACC-ACC and OBL-ACC. As our raw data shows, most of our verbs attest both active causatives, meaning that hard grammatical constraints of the kind proposed by Pāṇini (i.e. that most verbs can only form one or another causative) are not (at least generally) at play. But still the lexical semantics of different verbs may predispose them to favour one or another type of causative, above and beyond purely contextual considerations.

To the extent that it may be possible to make such fine distinctions in a corpus-based language, this issue awaits future work.

7.2 The Passive and Active-Passive Correlations

Above, we predicted that we should find positive correlations between PC-S and ACC-ACC (prediction 5), and between PC-O and OBL-ACC (prediction 6), based on the assumption that PC-S is the passive of the ACC-ACC causative and PC-O the passive of the OBL-ACC causative. An alternative possibility was raised that OBL-ACC works differently, in which case we would expect correlations between ACC-ACC and both PC-S and PC-O.

There are no statistically significant correlations between the finite active and passive categories. In terms of the non-significant correlations, it is noticeable that PC-S is positively correlated with both ACC-ACC and ACC-O (0.41 and 0.39), but negatively correlated with all the other finite categories: OBL-ACC, O-ACC, OBL-O and O-O; note that our data primarily involves positive correlations, and these are four of only nine negative correlations out of the forty-five correlations we are investigating.[26] PC-O is also significantly correlated with OBL-ACC. Taking this all together with the significant correlation between O-ACC and OBL-ACC (which suggests that the former is often a reduced form of the latter), we can conclude that there is a closer relation between PC-S and ACC-ACC (and its variants) than between PC-S and OBL-ACC (or its variants), and likewise a closer relation between PC-O and OBL-ACC (and its variants) than between PC-O and ACC-ACC (or its variants). This provides statistical support for the traditional assumption that PC-S is the passive of the ACC-ACC causative, and PC-O the passive of OBL-ACC. However, the correlations are not absolute, and there appears to be considerable freedom in the formation of passives relative to actives.

The highest non-significant correlation between the finite active and passive categories is between PC-O and active O-ACC (0.60, $p = 0.0696$). Since O-ACC is ambiguous between ACC-ACC and OBL-ACC, this correlation does not contribute anything to our assessment of predictions 5 and 6. It was however noted above that the O-ACC construction may to some extent represent a separate construction, and not merely a reduced form of ACC-ACC and/or OBL-ACC. Considered as such, O-ACC would necessarily form a PC-O passive, so this near significant positive correlation may support that understanding of it. Note also that the correlation

26 Cf. fn. 23. PC-S is also negative correlated with OBL-NOM, meaning that the majority of negative correlations in our data (including the four most extreme negative correlations) concern PC-S.

between PC-O and O-ACC speaks against Kiparsky and Staal's (1969) analysis of OBL-ACC as a causative applied to a passive base.

Prediction 7 was that we might find a similar degree of correlation between PC-S and PC-O as between ACC-ACC and OBL-ACC, based again on the idea that PC-S is the passive of the ACC-ACC causative, and PC-O the passive of OBL-ACC. We do in fact find this: the degree of correlation between PC-S and PC-O is 0.30, while the correlation between ACC-ACC and OBL-ACC is 0.39. Since this is only a similarity in degrees of correlation, rather than a correlation itself, it must be interpreted cautiously, but it does add further support to the idea that PC-S and PC-O alternate as passives in correspondence, at least to some extent, with the alternation of ACC-ACC and OBL-ACC as actives.

7.3 The Participle Correlations

Above, we predicted that NOM-ACC should correlate positively with ACC-ACC (prediction 8), that OBL-NOM should correlate positively with OBL-ACC (prediction 9), and also that the correlations between NOM-ACC and ACC-ACC, and between OBL-ACC and OBL-NOM, and the other (e.g. passive) categories should be similar (prediction 10). These predictions are based on the assumption that the ergative *ta*-participle is a syntactically active category, albeit with ergative-absolutive morphosyntactic alignment.

These predictions largely hold. Participial NOM-ACC positively correlates with the active category ACC-ACC (0.78, $p = 0.0075$) and with its reduced form ACC-O (0.87, $p = 0.0011$); both these correlations are significant. In broad terms the degrees of correlation with different categories shown by NOM-ACC are all similar to those shown by ACC-ACC.

Similarly, participial OBL-NOM positively correlates with OBL-ACC (0.73, $p = 0.0167$) and O-ACC (0.96, $p<0.0001$); it shows broadly the same degrees of correlation with other categories as OBL-ACC.

Another more interesting difference between the finite active and the *ta*-participle categories may be observed, however. While there were no significant correlations between the main finite active and finite passive categories – that is, there was no significant correlation between ACC-ACC and PC-S, nor between OBL-ACC and PC-O, as originally predicted – the corresponding correlations between the participial categories and the passive are statistically significant. So NOM-ACC is positively correlated with passive PC-S (0.69, $p = 0.0264$), while OBL-NOM is positively correlated with PC-O (0.69, $p = 0.0275$).

This shows that the *ta*-participle categories pattern more closely with the passive than the finite active categories do. And this in turn provides evidence that the *ta*-participle category shows syntactic affinities with the passive beyond what would be expected from a standardly active formation.

To this point we have followed the mainstream modern understanding of the *ta*-participle formation as fundamentally non-passive: a morphosyntactically ergative formation, but syntactically aligned with the active, just like its descendant (the perfective aspect) in many modern Indo-Aryan languages. But to understand the position of the *ta*-participle in the causative data considered here, we must adopt a more nuanced understanding of the formation, which we address in the next section.

8 Discussion and Summary

8.1 Passive Causatives and the Ergative

The status of the *ta*-participle in Sanskrit is complicated, and there remains no agreement in the literature as to its origin and early development in the history of Sanskrit.[27]

The *ta*-participle is traditionally labelled a 'passive' participle in Western grammars (e.g. Whitney 1896, 340), but in fact this is a misnomer; the participle shows ergative-absolutive morphosyntactic alignment: with intransitive verbs the participle agrees in case, gender and number with the single (subject) argument (S), which appears in the nominative, while with transitive verbs the participle agrees with the object argument (O), which appears in the nominative, while the transitive subject/agent argument (A) gets instrumental case marking.

(20) *te* *'dya* *suptā* *mahītale*
they.NOM.PL.M today sleep.TA-PTC.NOM.PL.M ground.LOC
'Today they have fallen asleep on the ground'. (*Mahābhārata* 1.138.15d)

(21) *madra-rājaḥ* *kṛtaḥ* *śalyo*
M-king.NOM.M make.TA-PTC.NOM.M Ś.NOM
dhārtarāṣṭreṇa *mādhava* *senā-patiḥ*
Dh_son.INS M.VOC army-commander.NOM
'The son of Dhṛtarāṣṭra has made Śalya, king of the Madras, the commander of the army'. (*Mahābhārata* 9.6.22b–c)

27 Relevant literature includes: Pray 1976; Klaiman 1978; Andersen 1986; Bubeník 1989; 2001; Hook 1991; Peterson 1998; Jamison 2000; Butt 2001; Bynon 2005; Condoravdi, Deo 2014; Butt, Deo 2017; Patel-Grosz 2021.

The ergative when applied to a transitive verb is superficially identical to the passive of a transitive verb:[28] what would ordinarily be the object appears in the nominative case, the default subject case, and what would ordinarily be the subject appears in the instrumental, the same case as the demoted subject in the passive. Compare (21) with the finite passive in (22).

(22) *kriyate* *'yaṃ* *vidhir* *mayā*
do.PASS.3SG this.NOM.M ordinance.NOM.M me.INS
'This ordinance is observed by me'. (*Mahābhārata* 2.6.2d)

This superficial similarity does not make the *ta*-participle a passive, since the similarity is restricted to transitive verbs. The intransitive is crucially different. The alignment in (20) is superficially identical to the corresponding finite active (e.g. $sa_{[\text{NOM}]}$ *svapiti* 'he sleeps') and is different from the impersonal finite passive (e.g. $tena_{[\text{INS}]}$ *supyate* lit. 'it is slept by him').

Despite the persistence of the idea that the ergative construction in Indo-Aryan (including in Sanskrit) derives historically from a passive (most recently Patel-Grosz 2021), the fact is that as far back as we are able to reconstruct, the *ta*-participle and its ancestor, the Proto-Indo-European verbal adjective in *-*to*, never showed passive alignment in the sense of 'demoting' both the A of transitive verbs and the S of intransitives. Rather, it always showed ergative alignment in the sense of agreeing with the S of intransitives and the O of transitives.

The question of morphosyntactic alignment is, however, distinct from the question of paradigmatic alignment ('alignment' in the less technical sense). As discussed by Butt and Deo (2017), the *ta*-participle in the earliest attested Sanskrit is an adjectival stative-resultative formation. This would not have been specifically aligned with either the active or passive voice in the verbal system, since it was not originally a verbal construction.[29] At some stage in the history of Sanskrit (at the latest by the Epic Sanskrit period, according to Butt and Deo, but perhaps much earlier), it was reanalysed as a verbal formation. It came to serve as a basic past tense predicate from the late Vedic Sanskrit period onwards.

Although the *ta*-participle formation is fundamentally not a passive formation, but rather an active formation with ergative

28 Excepting a very few verbs which may – but need not – show nominative/accusative alignment in the *ta*-participle, but not the finite passive. These are all complex verbs formed of transitivising preverbs with intransitive bases.

29 And so we disagree with Butt and Deo's (2017) use of the term 'passive' to describe it at this period.

morphosyntactic alignment, we have seen evidence above from the causative and passive causative correlations showing that the *ta*-participle categories pattern more closely with the finite passive than the finite active categories do. This suggests that it is overly simplistic to treat the *ta*-participle as a purely active (or non-passive) category, and to assume that there is no synchronic paradigmatic association between the *ta*-participle and the passive in Sanskrit.

In fact, there are other signs of influence between the two. Although it is the less common pattern by far, the *ta*-participle can show 'passive' alignment with intransitive verbs. For example, in (23) the *ta*-participle of the intransitive verb *sthā* 'stand, stay' is exceptionally treated as an impersonal passive, exactly parallel to the (exceptionlessly impersonal) finite passive of the same verb, shown in (24).

(23) *virāṭanagare* *pārthaiḥ* *kathaṃ*
V.LOC Pāṇḍava.INS.PL how
mūḍhātmabhiḥ *sthitam*
foolish.INS.PL stay/be.TA-PTC.NOM.SG.NTR
lit. 'how could it be stayed in V. by the foolish Pāṇḍavas': 'how could… stay in V'. (*Bṛhatkathāślokasaṃgraha* 22.305)

(24) *yāvad* *anena* *muninā* *sthīyate*
while this.INS sage.INS stay.PASS.3SG
'while this sage stays (alive)' (lit. 'while it is stayed by this sage') (*Hitopadeśa* 4.5)

Here the S argument of the intransitive verb appears in the instrumental and does not show verbal agreement, just like the A argument of transitive verbs in both the ergative and the passive. This therefore reflects a nominative-accusative alignment of the participle (since S is treated like A), and more specifically a morphosyntactic patterning identical to a passive. This relatively rare use appears to represent the influence of the finite passive on the *ta*-participle, based on their superficial identity with transitive verbs. It appears, then, that despite the non-passive nature of the *ta*-participle, it could nevertheless be associated with the passive, even to the extent of being reconfigured to align more closely with it.

This evidence of association and influence between ergative and passive is perhaps surprising, since even in relation to transitive verbs, where ergative and passive are superficially identical in terms of morphosyntactic alignment, they should still be fundamentally distinct in terms of more purely syntactic phenomena: with the passive of a transitive verb, we expect the O argument to be the syntactic subject, while in the ergative we expect the A argument to show properties of syntactic subjecthood. However, in Sanskrit all syntactic

tests for subjecthood beyond agreement and case assignment target agents (or the most agentive argument), even in the passive.[30]

For example, one widely used test for identifying subjects relates to control of the subject of verbal adjuncts. In an ordinary active finite sentence, it is the nominative argument (of transitive or intransitive verb) that controls the subject of an absolutive clause:

(25)	*pāduke*	*ca*	*asya*	*rājyāya*	*nyāsaṃ*	*dattvā*
	sandal.ACC.DU	and	his	royal.power.DAT	symbol.ACC	give.ABS
	punaḥ	*punaḥ*	*nivartayām-āsa*	*tato*	*bharataṃ*	
	again	again	return.PERF.CAUS.3SG	then	B.ACC	

'But having$_{ij/*}$ given his sandals as a symbol of his royal power, Bharata's older brother$_i$ repeatedly urged Bharata$_j$ to return'. (*Rāmāyaṇa* 1.1.30)

With the *ta*-participle, it is standardly the nominative subject of an intransitive verb and the instrumental argument of a transitive verb which control the absolutive:

(26)	a. *guror*	*udayanaḥ*	*śrutvā*	
	teacher.GEN	U.NOM.SG.M	hear.ABS	
	nāga-lokaṃ	*gatas*	*tataḥ*	
	nāga-world.ACC	go.TA-PTC.NOM.SG.M	then	

'After listening$_i$ to his guru, Udayana$_i$ went to the world of the snake-people'. (*Bṛhatkathāślokasaṃgraha* 5.142)

b. *ehi*	*iha*	*ca*	*mayā*	
come.IMPV.2SG	here	and	I.INS	
āhūya	*spṛṣṭaḥ*	*pṛṣṭhe*	*nirāmayaḥ*	
summon.ABS	touch.TA-PTC.NOM.M	back.LOC	healthy.NOM.M	

'Having$_{ij/*}$ summoned (him) 'come here!', I$_i$ touched his$_j$ back (and he$_j$ was) healed'. (*Bṛhatkathāślokasaṃgraha* 9.79)

This looks like clear evidence for the subjecthood of the instrumental, which is what we expect for the (non-passive) ergative *ta*-participle. However, in the finite passive too it is the agent, not the grammatical subject, which controls the subject of the absolutive:[31]

30 See e.g. Hock 1982; 1986; 1987; 1990; 1991a; 1991b. As discussed by Hock (1986), there are infrequent examples of 'loose' constructions violating the standard patterns discussed here, but they do not undermine the significance of the generalisations.

31 Note that in this example, the instrumental agent of the passive not only controls the absolutive, but is also the antecedent of the reflexive pronoun *sva-* in *sva-śvasaiḥ*

(27) *mat-paraṃ* *durlabhaṃ* *matvā*
me-after hard.to.obtain.ACC think.ABS
nūnam *āvarjitaṃ* *mayā*
now offered.NOM me.INS
payaḥ *pūrvaiḥ* *sva-niḥśvāsaiḥ*
libation.NOM ancestor.INS.PL self-sigh.INS.PL
'The libation offered by me is now partaken of by my ancestors$_i$, made tepid by their$_i$ sighs, (on) thinking$_i$ that (it will be) hard to obtain after my death'. (*Raghuvaṃśa* 1.67)

Thus the ergative of transitive verbs and the passive are not distinguished by this syntactic test, and the same applies to all other syntactic tests for subjecthood known to us.[32] The status of the ergative *ta*-participle in Classical Sanskrit is therefore somewhat problematic. Although it is not a passive construction, it was morphosyntactically and syntactically indistinguishable from the passive when formed to transitive verbs, and shows evidence of occasional reanalysis and realignment as a passive. We might therefore say that while the *ta*-participle is not passive, it is less emphatically not a passive than the finite active; that is, the *ta*-participle is a non-passive (active) formation which nevertheless shows some association with the passive.

Returning to our data, although the participle is closer to the active than to the passive, the finite passive is also closer to the participle than it is to the finite active. So rather than seeing finite active and participle as constituting a single 'active' category opposed to the passive, we may rather be seeing an opposition between active and passive in which the finite categories stand most distant, and the participle stands in between, closer to the active, but nevertheless closer to the passive than the finite active.

8.2 A Note on Genre

In this paper we have treated our data as representing 'Sanskrit' understood as a relatively homogenous language form, while acknowledging that the texts from which our data comes vary considerably in terms of date and genre. To some extent this is a reasonable simplification, since in many respects Sanskrit changed relatively little after the late Vedic period, when Pāṇini's grammar of the language was codified. At the same time, variation in idiom between different

'by their own sighs'. Further examples are offered by Hock (1982, 132; 1986, 22), and Söhnen-Thieme (2019, 7), but in all of their examples the agent phrase is unexpressed.

32 See Hock 1986.

genres of Sanskrit can be significant at all periods of the language.

We noted above one small respect in which we found no significant variation: the adherence, or otherwise, to the Pāṇinian prescriptions restricting particular patterns to particular roots (i.e. ACC-ACC and its relatives to a specific subset of transitive roots). That is not to say that such patterns do not exist somewhere in Sanskrit literature, only that they did not appear in our data.

One small respect in which we do see variation between genres is in the relative frequency of the passive constructions in comparison with active causatives. We categorised part of our data according to three broad genres: Classical kāvya (including dramatic texts and verse narrative literature like the *Kathāsaritsāgara*), Epic Sanskrit (i.e. the *Mahābhārata* and *Rāmāyaṇa*), and *purāṇa* literature. Of 570 causative tokens from the kāvya literature, 44 (7.7%) were finite passives, 234 (41.1%) participles, and the rest active causatives. For the epics, of 498 tokens only 12 were finite passives (2.4%), and 158 (31.7%) participles. The purāṇas show a relative frequency of finite passives between that of the epics and the kāvya literature, but a higher proportion of participles than either: of 427 tokens for the purāṇas, 21 are finite passives (4.9%), and 196 participles (45.9%). The notably lower figures for the epics – less than a third of the proportion found in kāvya, for the finite passive – perhaps reflects something of the earlier pattern, found in Vedic, where passive causatives to transitive roots are largely unattested. In other respects, however, the three genres are not significantly different. For example, in comparing the relative frequency of ACC-ACC and related constructions (i.e. ACC-O, PC-S and NOM-ACC) vs. OBL-ACC and related constructions (OBL-O, PC-O and OBL-NOM), there is no significant difference: 136 (23.9%) of the kāvya tokens represent the ACC-ACC 'family', compared with 109 (21.9%) of the epic tokens, and 82 (19.2%) for the purāṇas.

It was not the aim of this paper to investigate chronological or genre variation in detail, however, and beyond these small observations, we leave it as a task for future work to investigate the variation between different texts and genres in respect of the causativisation and passivisation patterns discussed in this paper.

8.3 Summary

In this paper we have offered a detailed investigation of the interaction of causative and passive in Sanskrit. The corpus-based nature of the language, and practical complications in the data restricting usable token counts, combined with the multifaceted nature of the phenomena in question, render the underlying patterns obscure. Using fine-grained statistical analysis, we have demonstrated that even this problematic data can provide clear support for otherwise obscured syntactic patterns.

Our analysis has firstly adduced statistical support for the assumption of a relation between the ACC-ACC active causative and the PC-S passive causative, and between the OBL-ACC active and the PC-O passive. While it is clear that there are no hard grammatical constraints on the formation of the different types of active or passive causatives in Sanskrit, our data does not provide sufficient evidence to draw firm conclusions regarding the importance of contextual vs. lexical or grammatical constraints in the choices between ACC-ACC and OBL-ACC, and between PC-S and PC-O. We have also adduced statistical support for the presumed but never proven associations between OBL-ACC and O-ACC and between ACC-ACC and ACC-O.

In addition, we have shown that in the causative the *ta*-participle correlates both with the finite active and with the finite passive: NOM-ACC correlates with ACC-ACC and PC-S, and OBL-NOM correlates with OBL-ACC and PC-O. The participle correlates more closely with the active than with the passive, as expected given its status as an ergative (non-passive) construction, but also correlates more closely with the passive than does the active, supporting some paradigmatic association between *ta*-participle and passive, and showing that the *ta*-participle stands paradigmatically somewhere between active and passive.

Overall, we have shown that detailed statistical analysis of corpus data can yield new and interesting results for Sanskrit syntax, even on complex topics such as the syntax of the causative or the status of the *ta*-participle.

Data sources

The figures presented in this paper were based on data extracted (using Python) from a corpus of electronic texts collated from a number of sources by the authors and processed to produce a standardised encoding. The following list includes only those texts which yielded examples of causatives from the ten roots treated in sections 6-7 above.

From GRETIL: (gretil.sub.uni-goettingen.de):

Mahābhārata, Rāmāyaṇa, Agni Purāṇa, Bhāgavata Purāṇa, Brahma Purāṇa, Brahmāṇḍa Purāṇa, Garuḍa Purāṇa, Kūrma Purāṇa, Liṅga Purāṇa, Mārkaṇḍeya Purāṇa, Matsya Purāṇa, Nārada Purāṇa, Narasiṁha Purāṇa, Revakhanda of the Vāyu Purāṇa, Śiva Purāṇa, Vāmana Purāṇa, Viṣṇu Purāṇa, Śarīputraprakaraṇa, Veṇīsaṃhāra, Priya darśikā, Rātnavalīnāṭikā, Abhijñānaśākuntala, Mattavilāsaprahasana, Pādatāḍitaka, Bṛhatkathāślokasaṃgraha, Daśakumāracarita, Hitopadeśa, Kathāsaritsāgara, Pañcatantra, Śukasaptati, Tantrākhyāyika, Kubjikāmātātantra, Mātṛkābhedatantra, Mṛgendrāgama, Paraśurāma Kalpasūtra, Sārdhatriśatikālottarāgama, Ṭoḍalatantra,

Vinasikhatantra, Brahma Saṁhitā, Kṛṣṇāmṛṭamahārṇava, Sātvatatantra, Vaikhānasamantraprasna, Nāradasmṛti, Nyāyakusumāñjali, Śikṣasamuccaya, Yājnavalkyasmṛti, Atharvaveda, Gopatha Brāhmaṇa, Kauṣītaki Brāhmaṇa, Maitrāyaṇī Saṃhitā, Pañcaviṃśa Brāhmaṇa, Śatapatha Brāhmaṇa; Śiva Upaniṣad.

From Titus (titus.uni-frankfurt.de):

Aitareya Āraṇyaka; Aitareya Brāhmaṇa, Jaiminīya Brāhmaṇa, Kapiṣṭhala-Kaṭha-Saṃhitā, Taittirīya Brāhmaṇa, Taittirīya Samhitā; Bṛhadāraṇyaka Upaniṣad, Chāndogya Upaniṣad, Kauṣītaki Upaniṣad, Taittirīya Upaniṣad.

Courtesy of Matthias Ahlborn:

Abhiṣekanāṭaka, Avimāraka, Bālacarita, Cārudatta, Dūtaghaṭotkaca, Karṇabhāra, Mudrārākṣasa, Pañcarātra, Pratijñāyaugandharāyaṇa, Pratimānāṭaka, Svapnavāsavadatta, Ūrubhaṅga.

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Appendix: Examples of Finite Passive Causatives

(1) han 'kill'
(a) PC-S: none.
(b) b) PC-O:

itarau	*tu*	*hasti-bala-kāmukau*
other.NOM.DU	but	elephant-strength-longing.NOM.DU
hastinā	*eva*	***ghātyetām***
elephant.INS	indeed	beat.CAUS.PASS.IMPV.3SG

'But **let** the other two, longing for the strength of elephants, **be beaten** by the elephant'. (*Mudrārākṣasam* 5.208)

(2) pac 'cook'
(a) PC-S: none.
(b) PC-O:

sa-nāma-homa-saṃpāta-ghṛte	***pācyatām***
with-name-oblation-residue-ghee.LOC	cook.CAUS.PASS.IMPV.3SG

'Let it (an effigy) **be fried** in the ghee residue of the named oblation'. (*Nārada Purāṇa* 1.90.113)

(3) grah ‘seize’
(a) PC-S:

taiḥ	*kila*	*asāv*	*ittham*	***agrāhyata***
they.INS.PL	apparently	he.NOM	as-follows	seize.IMPV.CAUS.PASS.3SG

‘Apparently he **has been persuaded** (lit. ‘caused to seize (their argument)’) by them as follows’. (*Daśakumāracarita* 2.4)

(b) PC-O:

yo	*niyogī*	*na*	*jānāti*	
which.NOM	official.NOM	not	know.3SG	
kṛtsna-āyāsena		*saṃyuktaḥ*	*sa*	
complete-fatigue.INS.SG		linked.NOM.M	this.NOM.M	
nṛpa-bhaktān		*varān*		*kṣitau*
king-worshippers.ACC.PL		best.ACC.PL		earth.LOC
tair	***nigrāhyate***		*punaḥ*	
they.INS.PL	seize.CAUS.PASS.3SG		again	

‘The official who does not know the best king-worshippers on earth, he is **held back** (lit. ‘caused to be seized’) by them again, having been befallen by complete fatigue’. (*Nārada Purāṇa* 2.6.11)

(4) dā ‘give’
(a) PC-S:

tena	*deva*	*yadi*	*nyāyyaṃ*	*pitṛ-draviṇam*		*āvayoḥ*
thus	king.VOC	if	justice.NOM	paternal-wealth.ACC		us.GEN.DU
bhrātṛjāyā		*tataḥ*	*sā*	*nau*	*vyutthitā*	***dāpyatām***
sister-in-law.NOM.F		thus	this.NOM.F	us.DAT.DU	swerving NOM.F	give.CAUS.PASS.3SG

‘Thus, your majesty, if there is justice let the wayward sister-in-law **be caused to give** the patrimony to both of us’. (*Bṛhatkathāślokasaṃgraha* 4.25)

(b) PC-O:

atha	*tat-siddhi-lubdhatvād*		*avocaṃ*
then	this-success-desire.ABL		say.AOR.1SG
upadeśo	*mama*	*apy*	*eṣa*
advice.NOM.M	I.GEN	also	this.NOM.M
tāḥ	*sakhīr*	*aham*	
they.ACC.F.PL	friends.ACC.F.PL	I.NOM	
yuṣmābhir	***dāpyatām***		
you.INS.PL	give.CAUS.PASS.IMP.3SG		

‘Then I said, desiring to succeed, to my dear friends: **let** this my advice also **be** (caused to be) **given** by you’. (*Kathāsaritsāgara* 3.6.106)

(5) kṛ ‘do’
(a) PC-S:

candra-āsannair	*hi*	*nakṣatrair*
moon-in.conjunction.INS.PL	indeed	star.INS.PL
lokaḥ	*kāryāṇi*	***kāryate***
world.NOM	duty.ACC.PL	do.CAUS.PASS.3SG

‘People **are** (lit. the world is) **caused to do** their duties by the constellations in conjunction with the moon’. (*Bṛhatkathāślokasaṃgraha* 15.6)

(b) PC-O:

vegavatyā	*tataḥ*	*saha*
V.INS	then	with
naravāhanadattasya	*vivāhaḥ*	***kāryatām***
N.GEN	marriage.NOM	do.CAUS.PASS.IMPV.3SG

‘Then **let** the marriage of Naravāhanadatta with Vegavatī **be caused to be carried out**’. (*Bṛhatkathāślokasaṃgraha* 15.13)

(6) hṛ ‘carry’
(a) PC-S:

kaccid	*abhyāgatā*	*dūrād*	*vaṇijo*	*lābha-kāraṇāt*
perhaps	arrived.NOM.PL	far.ABL	merchant.NOM.PL	gain-purpose.ABL
yathā-uktam	***avahāryante***	*śulkaṃ*	*śulka-upajīvibhiḥ*	
as-stated	put-down.CAUS.PASS.3PL	tax.ACC	tax-subsister.INS.PL	

‘Perhaps the merchants who come from afar for gain **are caused to put down** (i.e. pay) the stated tax by the tax collectors’. (*Mahābhārata* 2.5.103)

(b) PC-O:

dhana-hīnena	*deho*	*’pi*	***hāryate***
wealth-deprived.INS	body.NOM	even	take.CAUS.PASS.3SG

‘Even the body **is caused to be taken (away)** by/from the man deprived of wealth’. (*Kathāsaritsāgara* 3.5.28)

(7) jñā ‘know’
(a) PC-S:

tena	*hi*	*mad-vacanād*	***vijñāpyatām***	*upādhyāyaḥ*	*somarātaḥ*
thus	indeed	my-command.ABL	know.CAUS.PASS.IMPV.3SG	teacher.NOM	S.NOM

‘Thus indeed let the teacher Somarāta **be informed (lit. caused to know)** at my command’. (*Abhijñānaśākuntala* 5.5)

(b) PC-O:

yad-arthaṃ *vayam* *āhūtās* *tat* ***samājñāpyatām***
why we.NOM.PL summoned.NOM.PL that.ACC know.CAUS.PASS.IMPV.3SG
'Let it **be made known** why we have been called here'.
(*Bṛhatkathāślokasaṃgraha* 8.35)

(8) śru 'hear'
(a) PC-S:

pālakaḥ ***śrāvyatāṃ*** *sūnor* *vṛttāntam*
prince.NOM hear.CAUS.PASS.IMPV.3SG son.GEN news.ACC
'Let the prince **be caused to hear** the news of his son'.
(*Bṛhatkathāślokasaṃgraha* 3.79)

(b) PC-O:

tāta *ghoṣavatī-ghoṣa-saṃgītaṃ* ***śrāvyatām***
father.VOC lute-sound-concert.NOM hear.CAUS.PASS.IMPV.3SG
'Father, **let** the concert of lutes **be caused to be heard**'.
(*Bṛhatkathāślokasaṃgraha* 5.144)

(9) paṭh 'recite'
(a) PC-S:

na *vyāpāra-śatena* *api* *śukavat* ***pāṭhyate*** *bakaḥ*
not action-hundred.INS even parrot-like recite.CAUS.PASS.3SG heron.NOM
'The heron **is not caused (i.e. taught) to recite** like a parrot (is), even if one tries a hundred times'. (*Hitopadeśa* 0.42)

(b) PC-O: none.

(10) dṛś 'see'
(a) PC-S: none.
(b) PC-O:

Padmāvatī *tato* *devī* ***darśyate*** *ca* *acirāt*
P.NOM then queen.NOM see.CAUS.PASS.3SG and soon
'Then queen Padmāvatī **is** also soon **revealed**'. (*Kathāsaritsāgara* 3.1.117)