Aspect and Event Structure in Vedic

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1 The Vedic Past Tenses

1.1 Introduction

Sanskrit presents a classic case of the evolution of aspect to tense.[1] For Proto-Indo-European, the aorist and perfect are reconstructed as purely aspectual categories, with respectively perfective and stative value.[2] In the language described by Pāṇini and used in the Brāhmaṇa literature, on the other hand, the aorist serves as a general past tense, while the imperfect and the perfect designate remote or historical past, the perfect being furthermore restricted to events not witnessed by the speaker.[3] In the intervening stage of Vedic Sanskrit, the past tenses show a complex mix of temporal, aspectual, and discourse functions. On top of that, Rigvedic retains the injunctive, a chameleon-like category of underspecified finite verbs whose many uses partly overlap with those of the past tenses. The present study of the Rigvedic system is offered as a preliminary step towards the reconstruction and theoretical interpretation of this aspect-to-tense trajectory.

The issues of tense/aspect theory that this forces us to face are of considerable interest in their own right as well. The "two-dimensional" framework introduced by Reichenbach (1947) has proved illuminating for English and other languages,[4] but its application to Vedic Sanskrit runs into a serious problem. It cannot provide a unitary representation for the aorist or for the perfect, or even distinguish them from each other in terms of the primitives that it provides. A less obvious variant of this problem arises even in English, where the distinction that Sanskrit makes overtly in the morphology appears covertly in the syntax. The solution I propose in this paper involves two refinements. The first is to specify, as part of the representation of certain tense/aspect categories, a particular assignment of the verbal predicate's event structure to the parameters that define their temporal relations. The second is to assume that general categories are *blocked* by specific categories, a move fairly standard in modern morphology (and, of course, in Pāṇinian grammar), but so far not exploited in the analysis of tense. With these added tools, the theory can make sense of most of the intricate data of Vedic, and succeeds in relating its seemingly exotic

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[1]Thanks to Cleo Condoravdi and Henriette de Swart for their searching comments on a draft. Naturally I am responsible for any remaning errors.

[2]Hoffmann 1970, Cowgill 1972, Beekes 1995:252.

[3]Pāṇini 3.2.110 ff. See Speijer 1886:246 ff., Liebich 1891, Renou 1925, Apte 1946:141-145. The reader should keep in mind that the Western names of the Sanskrit tenses are simply taken from the cognate tenses in Greek and must not be understood literally. While the Sanskrit "imperfect" is the etymological counterpart of the Greek imperfect, it has none of its imperfective semantics.

[4]See e.g. Dowty 1982, Partee 1984, Hornstein 1991, Kamp & Reyle 1993, Klein 1994, Schopf 1987, 1989, and Thieroff & Ballweg 1994; also Comrie 1979, 1985, Declerck 1991, and Binnick 1992 for critical discussion and alternative approaches.

tense inventory to categories long since known from other languages. Some famous problems of the English tense/aspect system find new solutions too, including tense shift in subordinate clauses and the "present perfect puzzle".

The remainder of section 1 presents the outlines of Vedic tense usage. Readers already familiar with the facts or primarily concerned with the general issues may wish to proceed directly to section 2, which lays out the Reichenbachian theory with the modifications I propose. Section 3 develops the analysis of Vedic and English and shows how it supports the modified theory.

1.2   The Aorist

The Vedic aorist[5] is said to have four main uses.[6] In non-finite and modal verb forms, it marks **perfective aspect**. In the indicative, on the other hand, it has a range of temporal meanings. In main clauses, it most often refers to the **immediate past**:[7]

(1)   a. vásann araṇyānyā́m sāyám ákrukṣad   íti   manyate
          staying forest-Loc   at night scream-**Aor**-3Sg unquote think-3Sg
          'In the forest at night, one imagines that someone has just screamed.' (10.146.4)

      b. citrám devā́nām úd agād   ánīkam, …ā́prā   dyā́vāpr̥thivī́
          bright   god-GenPl up rise-**Aor**-3Sg face,   …fill-**Aor**-3Sg heaven-and-earth-Acc
          antárikṣam
          middle-abode-Acc
          'The bright face of the gods has risen, …it has filled heaven and earth and the air between them.' (1.115.1)

But it also functions like the English pluperfect, to mark the **relative anteriority** of a subordinate clause with respect to the main clause. The event in this case need not be recent, either in relation to the time of speech or to the reference time of the main clause.

(2)   a. víśve devā́so amadann   ánu tvā; śúṣṇam píprum kúyavaṃ vr̥trám indra
          all   gods   rejoice-**Impf**-3Pl to you Śuṣṇa, P.-Acc, K.-Acc   V.-Acc I.-Voc
          yadā́vadhīr   ví púraḥ śámbarasya
          when smite-**Aor**-3Sg apart forts-Acc Ś.-Gen

          'all the gods cheered you, Indra, when you had smashed Śuṣṇa, Pipru, Kuyava, Vr̥tra and the forts of Śambara' (1.103.7-8)

      b. ugrám   ayātam.   ávaho   ha kútsam sám   ha yád vām
          terrible-Acc go-**Impf**-3Du took-**Impf**-2Sg Part Kutsa-Acc together Part when you-PlAcc
          uśánā́ranta   devā́ḥ
          Uśanā-Instr bring-**Aor**-3Pl gods
          'The two of you went to the terrible one. You took Kutsa, when the gods had united you with Uśanā.' (5.31.8)

      c. sávanaṃ vivér   apó   yáthā purā́ mánave gātúm áśret
          oblation   work-**PresInj**-3Sg work-Acc as   formerly Manu-Dat way-Acc provide-**Aor**-3Sg
          'The oblation has fulfilled its purpose, as it once prepared the way for Manu.' (10.76.3)

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[5]The aorist is formed from a special aorist stem, with augment and secondary P/N endings.

[6]The basic doctrine on Vedic tense was worked out by Delbrück 1876, 1897, with refinements by Renou 1925 and Hoffmann 1967. For a concise summary, consult Macdonell 1916:341-343.

[7]All examples are from the Rigveda (text according to van Nooten and Holland 1994, translation following Geldner 1951). To save space, my interlinear glosses omit the unmarked categories Nominative and Singular for nouns, and Active voice and Present tense for verbs.

The fourth traditionally recognized use of the Vedic aorist is to make a **statement of fact** *(Konstatierung*, Hoffmann 1967:155).[8] The aorists said to have this function typically occur amidst imperfects, often at the end of a narrative, or with a change in point of view, as in (3c). They may carry the story forward or summarize it and comment upon it. Hoffmann contrasts this function of the aorist with the imperfect's function of "reporting narration" *(berichtende Erzählung)* (p. 160) and with the injunctive's function of "mention" or "mentioning description" *(erwähnende Beschreibung)* (p. 163).

(3) a. nā́tārīd   asya sámr̥tiṃ vadhā́nāṃ
         not bear-**Aor**-3Sg his   impact-Acc weapon-GenPl
         'He failed to withstand the impact of his weapons.' (1.32.6)

     b. satrā́bhavo   vásupatir vásūnāṃ   dátre   víśvā adhithā̄   indra
         totally become-**Impf**-3Sg wealth-lord wealth-GenPl portion-Dat all-AccPl put-Mid-**Aor**-3Sg I.-Voc
         kr̥ṣṭíḥ
         people-AccPl
         'You have become the supreme overlord of wealth, you have supplied all peoples with
         their portion, Indra' (4.17.6)

     c. ní   āvidhyad   ilībíśasya dr̥ḷhā́ ví śr̥ṅgíṇam abhinac   chúṣṇam índraḥ
         down strike-**Impf**-3Sg I.-Gen   forts-Acc apart horned-Acc split-**Impf**-3Sg Śuṣṇa-Acc Indra
         . . . vájreṇa   śátrum   avadhī́ḥ   pr̥tanyúm
         . . . thunderbolt-Instr enemy-Acc slay-**Aor**-2Sg hostile-Acc
         'Indra struck down Ilībiśa's forts and split apart the horned Śuṣṇa . . . you have slain the
         enemy (o Indra)' (1.33.12)

The link between these four functions is certainly not obvious. What exactly do the temporal meanings "recent past" and "relative anteriority" have to do with one another? What does either of them have to do with the discourse function of "statement of fact"? And what do any of these have to do with the telicity that the aorist marks in non-indicative contexts? Part of the problem is to discover what *kind* of connection we should be looking for: a basic meaning from which the several functions are synchronically derivable? or a natural diachronic path that connects them, grounded in principles of language change? And the answer to that depends on whether the tenses have a single lexical meaning with structural ambiguity, a single meaning with different pragmatic uses, or are genuinely polysemous.

I will argue that the tenses have synchronically unitary meanings, that these meanings give rise to distinct readings through alternative assigments of event structure into the temporal parameters, and that each such reading determines a particular range of discourse functions. Aside from the empirical evidence, this is more likely than the opposite direction of dependency[9] for several conceptual reasons. First, temporal relations make better descriptive primitives because they are invariant across sentence types and literary genres, which such discourse categories as "narration", "statement of fact", and "mention" are not. The latter don't even describe the functions of the tenses across all their indicative uses, being applicable only to declarative main clauses, though the tense distinctions in questions and restrictive relative clauses are in fact entirely parallel. But even for declarative main clauses the discourse categories are far from well-defined. (We can identify a narrative well enough by its sequential progression of temporal reference points, but what exactly

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[8]Delbrück refers to this as the historical aorist (1876), or the aorist of "assertion" *(Behauptung)* (1897).

[9]Attempts to base the theory of tense on discourse categories include Weinrich 1964, and (in a completely different tradition) Lascarides and Asher 1993.

is a "statement of fact", as opposed to a "mention"?) For tenses and aspects, on the other hand, there exist reasonably well worked out descriptive frameworks, most prominent among them the Reichenbachian theory, a modified version of which I will be adopting here. It has the added virtue of giving us a handle on the co-occurrence restrictions between the individual tenses and various classes of adverbs, and on the restrictions of certain tenses to particular aspectual classes of verbs, because it provides an explicit way of relating the meanings of the tenses to the meanings of the adverbs and of the verbs that they are associated with. I believe that this approach also furnishes a promising starting point for an understanding of the diachrony.

1.3   Imperfect and Perfect

Returning to our review of the Vedic past tenses, the imperfect is comparatively straightforward.[10] It is used for narrating sequences of past events, and picks out a specific, localized past time of the historical or remote past (Delbrück 1876:90 ff., 1897:268 ff., Hoffmann 1967:151).

(4)   ástabhnāt   síndhum arṇaváṃ   …viśvā́mitro yád   ávahat   sudā́sam
      stay-**Impf**-3Sg river-Acc   flowing-Acc …V.   when carry-**Impf**-3Sg Sudās-Acc
      ápriyā́yata   kuśikébhir índraḥ
      be-pleased-**Impf**-3Sg K.-InstPl   I.
      '(the sage) dammed the flowing river …When Viśvāmitra brought Sudās, Indra was pleased
      with the Kuśikas.' (3.53.9)

The perfect, on the other hand, seems even more heterogeneous than the aorist.[11] From a class of achievement verbs, it forms **stative presents,** very likely the Indo-European perfect's primordial function (Cowgill 1972:928):

(5)   *veda, ciketa* "knows" (from *vid, cit* "find out"), *jujoṣa* "enjoys", *cakāna* "likes", *bibhāya* "fears", *tasthau* "stands", *śiśrāya* "rests on", *dadhāra* "holds", *ānaśa* "has", *babhūva* "is".

These perfects predicate only the state itself, not the change of state that may have brought it about. They have strictly present time reference, and are co-ordinated with regular present tense verbs:[12]

(6)   ká īṣate   tujyáte   kó bibhāya
      who flee-**Pres**-3Sg rush-**Pres**-3Sg who fear-**Perf**-3Sg
      'Who is fleeing and rushing, who is afraid?' (1.84.17)

In all other uses, the perfect refers to the past. Some of these are shared with the aorist, others are the exclusive domain of the perfect. To begin with the latter, the most salient perfect-specific function is to introduce an existential or universal *quantification over past times*. Predicates interpreted distributively, denoting multiple events, nearly always have the perfect in reference to past time (Renou 1925:23). The text in (7) nicely illustrates of the contrast between the perfect with distributive reading and the imperfect with individual/collective (single-event) reading.

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[10]Morphologically, it consists of the present stem plus the augment (prefixed *a-*) and secondary (short) P/N endings.

[11]The perfect is formed athematically from its own special stem (normally reduplicated), with a set of special P/N endings. The classification of the perfect's meanings and uses presented here follows Delbrück 1876:6-88, 1897:178-229, 269-275; see further Renou 1925 and Hoffmann 155, 160.

[12]Unlike most other uses of the perfect, the stative present perfect has a past form, the "pluperfect", formed from the perfect stem with augment and secondary P/N endings, and functionally equivalent to an imperfect. The non-finite counterparts of stative present perfects are "passive" participles such as *sthita* "standing", *śrita* "leaning, depending on", similar to English "adjectival passives" such as *seated, broken, interested, tired*.

(7) dáme-dame   . . . agnír hótā ní sasā́dā yájīyān.   agnír hótā ní asīdad
house-Loc-house-Loc . . . Agni priest down sit-**Perf**-3Sg more sacrificing Agni priest down sit-**Impf**-3Sg
yájīyān   upásthe mātúḥ
more sacrificing lap-Loc   mother-Gen
'Agni the expert priest sat down in every house.' [Several sittings, perfect.] 'Agni the expert
priest sat down on his mother's lap.' [One sitting, imperfect.] (5.1.5)

(8) shows an analogous contrast between the individual/collective aorist in (8a) and the distributive
perfect in (8b), both with the verb *vad* "speak", and both referring to recent past.

(8)   a. prá maṇḍū́kā avādiṣuḥ
          Pref frog-Pl   speak-**Aor**-3Pl
          'The frogs have spoken.' [in chorus, aorist] (7.103.1)

       b. drúṇa   íd bhūtím   ūdima
          wood-Gen just origin-Acc speak-**Perf**-1Pl
          'We have just spoken about the origin of wood.' [each of us in turn, perfect] (1.161.1)

The distributive reading typically occurs with plural or collective subjects or objects. Indeed, with
universally quantified plurals, the perfect is mandatory:

(9) tám   evá víśve papire   suvardŕ̥śo bahú sākáṃ sisicur   útsam   udríṇam
that-Acc Prt all-Pl drink-**Perf**-3Pl sun-seeing-Pl much together pour-**Perf**-3Pl source-Acc watery-Acc
'All who see the sun have drunk from that (well). They have all drawn deeply from the
abundant water source' (2.24.4)

    A telling contrast occurs in the creation hymn 10.129. It first says that certain things did not
exist — being did not exist, death did not exist *(ā́sīt,* imperfect) — and then concludes: nothing
existed *(ā́sa,* perfect).

    The perfect is obligatory, even with singular nominal arguments, when the verb is modified by
a adverb of quantification, either universal (such as "always" in (10)) or existential, such as "many
times" (Renou *ibid.)*:[13]

(10)   a. sádā kavī́   sumatím ā́ cake-**Perf**-1Sg váṃ
           always seer-DuVoc favor-Acc Part enjoy   you-DuGen
           'I have always sought your favor, O seers.' (1.117.23)

        b. śáśvat puróṣā́   ví uvāsa   devī́
           always formerly Dawn Part shine-**Perf**-3Sg goddess
           'The goddess Dawn has always shone forth in the past.' (1.113.13) [Contrast (1b),
           about the particular current sunrise.]

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[13]Such adverbs include *purutra* "in many places, in many ways" (2.18.7, 3.61.7, 7.1.9, 7.1.16, 8.33.8), *purudhā* "in
many ways" (3.55.19), *viśvadhā* "at all times" (5.8.4) *bhū́ri* "many times" (1.120.10, 1.165.7, 2.29.5, 7.56.23, 8.62.10),
satrā in the meaning "always, everywhere" (3.51.6, 3.51.6, 5.60.4, 6.34.4), *nahi* in the meaning "never" (1.24.6, 1.39.4,
1.167.9, 6.25.5, 8.3.13, 10.131.3, and distributive (*āmreḍita*) compounds (e.g. 1.131.5, 1.168.1, 3.29.15, 3.36.1, 3.38.7,
3.38.7, 4.54.5, 5.52.17, 5.61.1, 6.15.8, 6.27.3, 6.30.2, 6.32.5, 6.36.5, 6.47.18, 6.47.21, 6.74.1, 7.6.3, 7.15.2, 7.18.24,
7.26.2, 8.4.10, 8.13.7, 8.48.9, 8.70.14, 9.77.3, 9.107.19, 9.110.5, 10.27.22, 10.28.7). Contrast e.g. 2.23.17, 5.11.6,
10.46.3 (single event, imperfect tense).
    The imperfects in 10.43.6, 9.110.4, and 10.56.5 seem to be genuine exceptions to the generalization. An apparent
exception is *sóme-soma ā́bhavaḥ* "you have appeared at every soma" in 8.93.17, if the Padapāṭha's analysis *ā́ ábhavaḥ*
(imperfect) is right. However, the meter does not support a disyllabic reading of *ā́-,* and so a possible alternative
reading is *ā́ bhavaḥ,* with a generically interpreted injunctive, meaning "you appear at every soma". Even though the
Rigveda's text and the Padapāṭha analysis must have been edited into final shape very early, the injunctive was then no
longer a live grammatical category, and so the compilers of tended to supply missing augments in their morphological
analysis wherever this could be done without changing the actual wording of the text (Hoffmann 1967:146).

c. purutrā́ vā́cam pipiśúr vádantaḥ
   in many ways voice-Acc ornament-**Perf**-3Pl speaking-Pl
   'In speaking, they have modulated their voices in many ways.' (7.103.6)

The perfect is also the normal past tense of generic and habitual sentences:[14]

(11) a. ná sóma índram ásuto mamā́da
     not soma Indra-Acc unpressed please-**Perf**-3Sg
     'Unpressed soma has not [ever] pleased Indra.' (7.26.1)

   b. tuvám jigetha ná dhánā rurodhitha
      you win-**Perf**-3Sg not prize-Pl retain-**Perf**-3Sg
      'You have [always] won and not kept the booty' (1.102.10)

This holds also for generalizing relative clauses ("whoever, whatever", "in whatever way"), e.g. (12a),[15] and generalizing questions ("who (all)", "whatever" etc.), e.g. (12b).[16]

(12) a. yác ca papaú yác ca ghāsím jaghā́sa
     what-Acc and drink-**Perf**-3Sg what-Acc and food-Acc eat-**Perf**-3Sg
     "Whatever it (the horse) has drunk and whatever food it has eaten" [let it all be for the gods] (1.162.14)

   b. ká ī́m dadarśa
      who him see-**Perf**-3Sg
      'Who has (ever) seen him?" [Implication: no-one has.] (8.100.03)

In contrast, questions about specific past occasions, asking for particular answers, and relative clauses with referential heads, have imperfect tense:[17]

(13) a. kó apaśyad índram
     who see-**Impf**-3Sg Indra-Acc
     'Who saw Indra?' [Implication: I did.] (5.30.1)

   b. káḥ kumārám ajanayad; rátham kó nír avartayat
      who boy-Acc engender-**Impf**-3Sg cart-Acc who Pref make-**Impf**-3Sg
      'Who conceived the boy? Who made the chariot?' [Implication: someone did.] (10.135.5)

   Aorist-like uses of the perfect include simple "statements of fact" similar to (3), interspersed in aorist-like fashion with imperfects in a narrative context.

(14) a. ā́ dade vas trī́n yuktā́n
     to give-**Perf**-Mid-3Sg you-PlDat three-Acc yoked-Acc
     'I received three (chariots) in harness for you.' (1.126.5)

   b. yé cid dhí pū́rva r̥tasā́pa ā́san sākám devébhir ávadann r̥tā́ni
      who-Pl Prt Prt ancestors truth-seeking be-**Impf**-3Pl together gods-Instr speak-**Impf**-3Pl truths-Acc
      té cid ávāsur nahí ántam āpúḥ
      they Prt stop-**Aor**-3Pl not end-Acc reach-**Perf**-3Pl
      'Our ancestors, who after all were committed to the truth, and spoke the truth with the gods, even they ceased, even they never reached the end.' (1.179.2)

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[14]Delbrück 1876:107. See also 1.23.22, 1.102.10, 1.162.14, 10.11.5.
[15]See also 1.162.9, 1.179.5, 5.85.5, 8.45.25.
[16]See also 1.164.4, 1.165.2, 4.13.5, 4.23.2, 4.25.1-2, 5.74.7, 8.100.3, 10.10.6, 10.51.2, 10.102.10, 10.114.9.
[17]The implications indicated are clear from the context. See also 8.45.37, 10.135.5.

c. urú   kṣáyā́ya   cakrire
   wide-Acc dwelling-Dat make-**Perf**-3Pl
   [They conquered (impf. *ataran)* heaven, earth, and the waters,] 'they made themselves a wide homeland.' (1.36.8)

A case can be made for the stronger claim that the perfect's potential uses include *all* uses of the aorist. Even the recent past and anterior past, the prime territory of the aorist,[18] seems to be in principle available to the perfect as well. The evidence is that if a root for one or another reason lacks aorist forms, and there is no suppletive root to fill the gap, its perfect forms are used in the aorist's functions. Such roots are *ruc* "shine" and *su* "press", whose basic diatheses make no aorists in the Rigveda[19], and *vakṣ* "grow".[20] The place of their missing aorists is taken by the perfect, as in the following examples with recent past meaning:[21]

(15) a. úpo   ruruce   yuvatī́r ná yóṣā
        forth Prt shine-**Perf**-3Sg young   like woman
        '(Dawn) has shone forth like a young woman' (7.77.1)

      b. putráḥ kā́ṇvasya vā́m   ihá suṣā́va   somiyám mádhu
        son   Kaṇva   you-Dat here press-**Perf**-3Sg somic   juice-Acc
        '[come here, gods, for] the son of Kaṇva has pressed some soma juice for you here.' (8.8.4)

The challenge of providing a unitary characterization, then, seems even more formidable for the perfect than for the aorist. But even the perfect's apparent functional diversity is nothing compared to that of the injunctive.

1.4   The Injunctive

This most various of verbal categories, retained from Indo-European in early Vedic but lost in later Sanskrit, can assume virtually any temporal and modal value in context. It marks only aspect (by the contrast of present stem vs. aorist stem) and person/number (by means of secondary endings). Injunctive forms typically pick up their tense/mood reading from a fully specified verb in their discourse context:[22]

(16) a. ádhvānayad   dur[ā́]   dambháyac ca
        smoke-out-**Impf**-3Sg fortresses-Acc sack-**Inj**-3Sg and
        'He smoked out the fortresses and sacked them.' (6.18.10)

      b. ā́d ít paścā́ bubudhānā́ ví   akhyann, ā́d íd rátnaṃ dhārayanta
        the Part afterwards awakened   around look-**Aor**-3Pl, then Part jewel-Acc hold-**Inj**-3Sg
        dyúbhaktam
        heaven-bestowed-Acc

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[18]When the reference time of a subordinate clause is a definite anterior point of time, it sometimes has imperfect tense, e.g. "since *(yad)* the rains came…, *(āyan*, imperfect), the frogs' croaking resounds *(sam eti*, present)" (7.103.2), similarly 10.43.7. The imperfect is also possible when the events are contiguous; see below.).

[19]What does occur are passive aorists *(aroci* 3x, *asāvi* 7x) and causative aorists *(arūrucat* 3x).

[20]No aorist except for the late and obviously secondary *aukṣīs* (10.27.7).

[21]Other examples of perfects of recent past with these verbs are: 3.61.5, 4.5.15, 6.62.2, 9.83.3 *(ruc)*; 9.107.1, 1.137.1, 4.16.1, 7.22.1, 8.17.1, 9.107.1 *(su)*; 1.146.01, 3.5.7, 3.9.3, 7.8.2, 8.12.4, 8.12.7 *(vakṣ)*. Perfects of anteriority of these verbs (paralleling the other main use of the aorist) are: 4.16.4, 4.45.5, 4.7.11. Since *hu* "sacrifice" has no aorist in Vedic, the anterior perfect *(juhve* 6.2.3) should perhaps be interpreted in the same way.

[22]See Kiparsky 1968. However, I now prefer to treat the phenomenon semantically, rather than by a syntactic rule of "conjunction reduction".

> 'Then, when they had afterwards woken up, they looked around and held on to the jewel that heaven had bestowed on them.' (4.1.18)

Injunctives also fill in for missing forms in the paradigm of the imperative (Hoffmann 1967:269, fn. 5), and appear optionally in several other functions that can be considered temporally unmarked: performatives (Hoffmann 1967:251 ff.),

(17) a. índrasya nú vīríyāṇi prá vocam
I.-Gen   Part exploits Pref call-AorInj-1Sg
"I hereby proclaim the heroic deeds of Indra." (1.32.1) [proem]

b. subaddhā́m amútas karam
well-tied-Acc from there make-AorInj-1Sg
'I hereby tie her firmly from there.' (10.85.25) [wedding liturgy]

generic and universally quantified sentences that do not have specifically past time reference (Hoffmann 1967, Ch. 3),

(18) a. divé-dive   sū́riyo darśató bhūt
day-Loc-day-Loc sun   visible   become-**AorInj**-3Sg
'Every day the sun appears.' (6.30.2)

b. tuvám vikṣú   pradívaḥ sī́da   āsú
you   peoples-Loc continually sit-**Inj**-2Sg these-Loc
'You continually sit among these peoples.' (6.5.3)

and prohibitions, where the particle *mā* is joined with the present injunctive to prohibit an ongoing event ("inhibitive" prohibitions), and with the aorist injunctive to prohibit a future event ("preventive" prohibitions), (Hoffmann 1967. Ch. 2). It is clear that the injunctive should be treated as a form which has no tense and mood specifications. The question for any theory which treats the present as zero tense, and the indicative as zero mood, is this: how should we distinguish the present indicative from the more radically underspecified category of the injunctive?

2 Tense Theory

2.1 The Reichenbachian Framework

Temporal relations hold among three *temporal parameters*, E,R,P and a constant, S:

(19) a. E (event time, the time during which the event unfolds)

b. R (reference time, the time referred to)

c. P (perspective time, the "now" point of temporal deixis)

d. S (speech time, the actual moment of utterance)

Following Dowty 1979, I assume that the values of the parameters are intervals, and treat points as degenerate intervals. S will be assumed to be a point.

Most versions of the theory treat S as a parameter rather than as a constant relative to a speech act. They rather uncomfortably divide the function of P time between R and S, in a way which precludes a consistent interpretation of both. The simplest motivation for distinguishing speech

time S and "now" time P is the historical present, where they are obviously different times.[23] Even if the historical present were treated as a stylistic convention outside of the theory of grammar, the analytical "overload" of S is undeniable in analyses of complex sentences which assign distinct S times to main and subordinate clauses even when the latter do not denote speech acts (e.g. Hornstein 1991, see section 3.3 below). In the present analysis, it is P that temporally links main and subordinate clauses, while S remains fixed to actual speech time. The idea of adding a parameter of P time is due to Kamp and Reyle 1993:594 and Eberle & Kasper 1994:157, who show that Reichenbach's R parameter is also trying to do too many things at once.[24] This said, for purposes of most of the present discussion, we will consider only the case where S and P coincide, and omit S from the tense formulae.

Temporal relations are defined by the relations of immediate precedence (A—B, read "A immediately precedes B") and temporal inclusion (A $\subseteq$ B, read "A is included in B"). The default temporal relations for verbs unmarked for tense and aspect are the following inclusion relations:

(20)   a. $P \subseteq R$

       b. $E \subseteq R$

       c. $S \subseteq P$

A finite verb not marked for tense will thus be assigned a present tense reading. Morphologically marked tenses and aspects function to defeat these defaults. Morphology that defeats (20a) by specifying a precedence relation between R and P may be called *tense* (E,R—P = past tense, P—E,R = future tense). Morphology that defeats (20b) by specifying a precedence relation between E and R may be called *aspect* (E—P,R = perfect, P,R—E = prospective[25]). In addition, marked aspects may specify the assignment of a predicate's event structure into the temporal parameters in the four ways detailed in the next subsection. This makes aspect a semantically more diverse category than tense, and allows a language to have several "perfects".

For English, the present, past, perfect, and past perfect have the specifications shown in (21). The first line shows the underspecified lexical representations of the tense-aspect combinations, the second shows the default assignment by (20), and the third shows the resulting fully specified temporal relations.

(21)

	Present	Past	Pres.Perfect	Past Perfect
Specification		E,R—P	E—R,P	E—R—P
Default	E⊆R, P⊆R	E⊆R	P⊆R	
Output	E⊆R, P⊆R	E⊆R, R—P	E—R, P⊆R	E—R—P

For easier visualization of the temporal relations in complex sentences, I will sometimes show temporal inclusion as vertical alignment, like this:

(22) a. Past: E   b. Present Perfect: P
              |
                   |
           R — P   E—R

Note that (20) does not include a default relation P $\subseteq$ E, and if it did, the specifications for the past and for the present perfect in (21) and (22) would come out wrong. This means that for

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[23]For Vedic examples of the historical present, see Macdonell 1916:340, Whitney 1889:278.

[24]Their demonstration involves "extended flashbacks" (section 3.4 below).

[25]English *be going to* (Matthews 1989) and the second (remote) future of Sanskrit are perhaps instances of this category.

present tense the system does not specify an intrinsic inclusion relation between E and S/P. I take this to be the correct result because of cases such as *the boat leaves tomorrow*, where we clearly have S,P—E. Rather, I assume that present tense is an unmarked tense which covers those temporal relations for which there is no marked tense in the system. In other words, the interpretation of present tense is the result of *blocking* by tenses with temporally more restricted meanings. We shall see several cases below where the blocking mechanism is necessary to avoid complex or even impossible specifications of tense categories.

Vedic shares with English the categories of past tense (R—P, the Vedic imperfect) and perfect aspect (E—R). The two languages diverge in how they divide the perfect into a marked and an unmarked subcategory. English distinguishes past perfect (pluperfect) from present perfect, Vedic distinguishes the resultative perfect (its aorist "tense") from the unmarked perfect-at-large (its perfect "tense").

In the terminology adopted here, the Vedic aorist and perfect are aspects, not tenses. However, there will be no harm in continuing to refer to them together as tenses, in keeping with traditional terminology, as long as we don't forget that they are both aspectual in the sense that they mean that event time precedes reference time (E—R), whereas the imperfect means that reference time precedes perspective time (R—P).

2.2 Perfect Aspect

Any analysis of the perfect must account for its apparent polysemy. The Vedic aorist and perfect divide among themselves all the readings (23a-d) of the English perfect,[26] plus another, the stative present perfect:

(23)   a. **Resultative:** The police have caught the suspect in Berkeley.

       b. **Universal:** I have known Max since 1960.

       c. **Existential**: Fred has been to Paris.

       d. **Recent past:** General Mohammed Aidid has died in Mogadishu at age 61. [From an obituary.]

       e. **Stative Present:** [I've got (=I have) something to tell you.[27]]

Opinions are divided on whether there are several structurally and semantically distinct kinds of perfect (McCawley 1971, 1981, Mittwoch 1988, Michaelis 1994) or a single perfect which receives several pragmatic interpretations (McCoard 1978, Matthews 1989, Declerck 1991, Klein 1992). Vedic strongly supports the former view. The fact that it groups the readings into two morphologically distinct categories, aorist and perfect, shows that the relevant readings must be grammatically distinct. As for how that distinction is to be made in the grammar, the Vedic data support a semantic approach in the spirit of Mittwoch's, over both McCawley's syntactic approach and Michaelis' construction grammar approach. In the particular semantic account I will defend, the different types of perfect correspond to different ways of relating the event structure specified by the lexical content of the verb to the temporal structure E—R denoted by perfect aspect. A

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[26]At this point only the most salient reading of each example is relevant. Most of the examples are in fact ambiguous; in particular the Existential reading is almost always available. The reader is asked to disregard the other readings for the moment; we will be returning to them shortly.

[27]The only example in English, and probably not synchronically a perfect anyway: speakers who use *gotten* as the past participle of *get* still say *have got*.

particular perfect category in a language can be specified for which of these possible temporal interpretations it requires or allows.

a. The **resultative** reading, also called the state reading, is confined to accomplishment and achievement predicates, which are characterized by a change of state component in their lexical semantic form (Vendler 1957, Dowty 1979, Foley and van Valin 1984, Rappaport Hovav and Levin 1996). An accomplishment predicate, such as *catch, hide*, denotes an event ϵ consisting of an activity leading to a change of state. An achievement predicate, such as *die, arrive*, denotes an event consisting of a change of state. The resultative reading of the perfect arises when the change of state corresponding to an accomplishment or achievement predicate is temporally located at the edge between time E and time R in the perfect's temporal schema. In the case of accomplishment predicates, the change of state is temporally located at the onset of R time, and hence the activity leading up to it must immediately precede R. For example, in (23a) *catch the suspect*, the activity of pursuing the suspect is located at E, i.e. it extends from some time prior to R up to R, the change of state is located at the edge between E and R, and the result state begins at that point. Because $P \subseteq R$, the sentence entails (or at least implicates) that the suspect is currently in custody — the so-called "current relevance" property of the resultative reading. In the case of achievement predicates, the change of state is again temporally located at the onset of R time, with the same "current relevance" implications, but no activity is located at E.

b. The **existential** reading, also known as the experiential reading, is obtained when the whole event denoted by an atelic or an iterative telic verbal predicate (a state or process) is fully contained in the interval E. The resulting predicate asserts that one or more events of that type occurred during that interval. The event does not have to extend throughout the entire interval E to the beginning of R (as in the universal reading), and the implicature is that it does not. For example, (23b) asserts that Fred has visited Paris on one or more occasions during a period E extending from some past time up to time R, and implicates that he is not currently visiting Paris.[28]

c. The **universal** reading (or continuing reading) arises when the event denoted by an atelic or an iterative telic verbal predicate is coextensive with the interval E. For a sentence with a perfect to be true in the universal reading, the state or process must last for the entire duration of the period terminating at R. For example, (23c) means that the knowing extends through the entire time from 1960 up to R, which in this case is the present.

The universal reading requires an adverb specifying a duration (such as *always, since 1960* or *for two years*) and so it is tempting to derive it as a special case of the existential reading, resulting from cancellation of the existential reading's implicature that the event does not obtain throughout E, by the explictt adverb. Such a unification of the universal and existential readings would have to overcome at least three prima facie objections. First, the boundaries that define the duration are

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[28]Of course, the previous example (23a) can be assigned an existential reading too. For (23a) to be true on the existential reading, there must have been at least one complete catching event within a subinterval of E extending from some past time up to time R. Thus the existential reading of (23a), unlike its more salient R-reading we considered earlier, does not entail that the suspect is currently in custody.

The existential reading is associated with the presupposition that a recurrence of the event type in question is possible (McCawley 1981, Piñon 1996). In particular, the referents of the NP arguments must exist at P time, and the event must be of a repeatable type. (23c) thus implies that Fred is still living and that Paris exists, and that he might visit it again. In contrast, (24a) is incongruous because Nazi Germany no longer exists, and (24b) is incongruous because one can only be born once.

(24)   a. #Fred has been to Nazi Germany. [Uttered in 1997.]

            b. #Fred has been born in Paris.

understood in an inclusive way in the existential reading but in an exclusive way in the universal reading (Mittwoch 1988). The sentence

 (25) I have been in Hyderabad since 1977.

is false on the existential reading if I last was in Hyderabad in 1977 or if I have just landed on my first visit there; it is the intervening time that counts (exclusive boundaries). For the universal reading of (25) to be true I must have been there in 1977 and I must be there now (inclusive boundaries). This difference between the universal and existential readings constitutes a bar to the proposed unification (unless it can be shown to follow somehow from the interpretation of existential and universal quantification). The second objection is that some languages (such as German) do not allow the universal reading of the perfect (or allow it only in restricted circumstances). Any claim that the universal reading is derived from the existential perfect would then have to be complemented with an explanation for why the derivation fails in German. The third objection is that there are, conversely, languages with a special perfect that is restricted just to the existential reading, such as the Hungarian indefinite tense discussed by Piñon 1996. At least in these languages the existential perfect cannot be an implicature of the universal perfect.

d. The status of the **recent past** or "hot news" reading is dubious. Michaelis 1994:127, fn. 4 suggests that it is an implicature of the resultative reading.[29] This is plausible because the resultative reading situates an event at a time which verges on P time, and locates the result state at P time. It would fit well with Vedic, where the aorist has precisely the resultative and recent past functions. I will adopt this idea here and treat the recent past and resultative readings as special cases of a single reading, here referred to as the R-reading.[30] It is this reading which characterizes the Vedic aorist. The other three readings devolve by default onto the perfect.

e. In the **present state** reading, the reference interval is included in the result state corresponding to the verbal predicte. The change of state is not assigned to any temporal parameter, but remains implicit. It is thus not part of this reading of the perfect, though it may pragmatically inferred. This yields a purely stative interpretation, and strictly present time reference.[31]

Let ϵ be the event denoted by a verbal predicate, e the temporal trace of the activity leading up to the change of state, and r the temporal trace of the result state. Then we can depict the four different temporal structures of the perfect as follows:

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[29]It has also been claimed that it is a variant of the existential perfect (McCoard 1978, McCawley 1981), but the problem with that is that recent past perfect is not subject to the abovementioned constraint on the existential perfect that the re-occurrence of the event type should be possible. Moreover, the Hungarian existential perfect has no recent past reading (Piñon 1996).

[30]This does not imply a commitment to Michaelis' treatment of the R-reading (or any of its other readings either) as conventionalized constructions or "formal idioms" whose properties cannot be derived from the semantics of the perfect. I believe that the present analysis shows that the types of perfect represent the possible assignments of event structure to the perfect's temporal parameters, that each type's properties are predictable, and that the types are cross-linguistically represented.

[31]There is an analogy between the present state reading and the middle (such as *this wood cuts easily*). In the middle, it is the causal component of an accomplishment predicate that is left implicit. Only the change of state is syntactically visible. This could be the rationale behind the probable historical identity of the Indo-European perfect and middle.
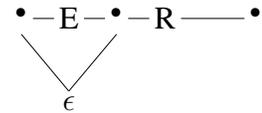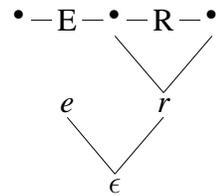
(26) a. R-reading:

$$\bullet-E-\bullet-R-\bullet$$
$$e \qquad r$$
$$\epsilon$$
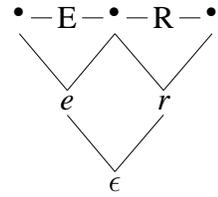
b. Existential reading:

$$\bullet-E-\bullet-R \text{———} \bullet$$
$$\epsilon$$
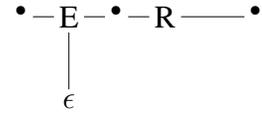
c. Universal reading:

$$\bullet-E-\bullet-R \text{———} \bullet$$
$$\epsilon$$

d. Present state reading:

$$\bullet-E-\bullet-R-\bullet$$
$$e \qquad r$$
$$\epsilon$$

We are now ready to lay out the the specifications of the Vedic past tenses. The aorist's distinctive property over and above the the perfect is that it requires the R-reading ((26a), symbolized in the table by the ad hoc notation $E\text{—}R_r$).

(27)

	Present	Imperfect	Perfect	Aorist
Specification		R—P	E—R	$E\text{—}R_r$
Default	$E\subseteq R$, $P\subseteq R$	$E\subseteq R$	$P\subseteq R$	$P\subseteq R$
Output	$E\subseteq R$, $P\subseteq R$	$E\subseteq R$, R—P	E—R, $P\subseteq R$	$E\text{—}R_r$, $P\subseteq R$

It is the R-reading that lies behind the four temporal and aspectual functions of the aorist listed in section 1.2. The "recent past" and "current relevance" implications of the R-reading are consequences of the particular way the R-reading maps telic events into E and R time. They are not properties of the perfect generally, but of the R-reading in particular.

Once the aorist is so specified, it is not necessary to restrict the meaning of the perfect to exclude the R-reading. In fact, it is not possible to do so because the perfect has in principle the full range of perfect functions. It is simply that the aorist, being specifically restricted to the R-reading, blocks the perfect from being assigned that reading. The perfect picks up the remaining perfect readings consistent with the temporal schema (E—R), viz. the existential, universal, and present state readings ((7), (9)-(12), and (6) respectively). And in those few verbs which lack an aorist (see (15)), the perfect picks up the R-reading as well.

2.3 The Injunctive as a Tenseless Verb

The Reichenbachian representational schema provides a ready means of assimilating the tenselessness of the injunctive to the tenselessness of the other non-indicative verb forms. Their common

characteristic is that they are not specifiable, inherently or by the default rule (20), for the parameter P. Thus they have no past tense (R–P), no future tense (P—R), and no present tense (P⊆R, S⊆P). But they can be aoristic (E—R), because aspect does not involve specification of the parameter P. In discourse, injunctives may become temporally localized via another verb form's P by what we can think of as temporal anaphora, as in (16). They can also be localized at speech time by the temporal equivalent of deixis, as in (17), or remain temporally unlocalized, in which case they are interpreted as "timeless" generic verb forms, as in (18). Since the neutralization of the P parameter provides a basis for the injunctive's different uses, the postulation of a special discourse function of "mentioning" for it is unnecessary.

2.4   Why the imperfect is the narrative tense

Default discourse conventions on temporal sequencing relate to reference time (R). In the absence of information to the contrary, successive R times "move forward" (Dowty 1982, Partee 1984). Thus, letting R_a and R_b stand for the reference times of sentences A and B,

(28)   a. $R_a = R_b$, if at least one of them denotes a state or process;

         b. If $R_a \neq R_b$, and A precedes B, then R_a—R_b.

(28) is defeasible in the sense that it provides only a default inference about the order of narrated events. It can be thwarted by specifying a contrary sequencing through adverbs and other temporal information.

Purely pragmatic accounts of these phenomena (such as Lascarides & Asher 1993) fail to address the fact that languages differ systematically in whether they allow inferences based on real-world knowledge to override order of narration. English tolerates texts such as *John came to work late yesterday. He got up only at 10.* The German translation requires a past perfect in the second sentence.[32] In Vedic, as well, (28) seems to be more rigorously enforced; I have found no example where imperfects narrate events in the "wrong" order. This suggests the following generalization:

(29)   a. *Vedic, German*: R must be fixed by temporal adverbs or narrative context.

         b. *English*: R must be fixed by temporal adverbs, narrative context, or inference.

The extra option of fixing R by inference in English would also allow such "out of the blue" cases as *Oops, the lights just went out.*, *Did you see that huge wasp fly by?*, or *I didn't hear. I had the water running.*, (cf. Michaelis 1994:146). Because there is no narrative context or adverbial specification of time, German would here use the perfect and Vedic the aorist. For the same reason, English can use past tense in reference to an indeterminate remote past time, (e.g. *Who killed Julius Caesar?*, Partee 1984), where German would tend to use the perfect.

The fact that the past but not the perfect is used in narrative can then be explained as follows. Verbs in the same stretch of discourse have the same P time. But the perfect's P time is included in R time (see (21) and (27)). Therefore, if two perfects fall in the same discourse, the R time of one cannot precede the R of the other (for both R_i and R_j include P). Even though the perfect places an event in the past, a sequence of perfects cannot provide the succession of R times that "drives the narrative forward", because the R times of all perfects in a stretch of discourse necessarily overlap, so that perfect aspect cannot be subject to (28). This contrasts with past tense (the

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[32]See Matthews 1994:87-88 for illuminating remarks on this point.

Vedic imperfect). Each past tense can have its own R time, because there can be arbitrarily many successive intervals R_i, R_j... which all precede P. Each reset R time includes a new E time. This unlimited supply of R/E times is exploited by the narrative convention (28), which makes each new R point in a narrative sequence (and therefore each E included in it) a temporal successor of the last one. A sequence of telic past tense verbs is thus understood as referring to successive events. Consequently, Vedic narrative, which is governed by (28), uses the imperfect but not the perfect or aorist.

This much establishes why the imperfect (and only the imperfect) is used for narrative in Vedic. We must still explain its other salient property, that it typically refers to the remote past, clearly not simply a consequence of its narrative function. Nor can it be due to an inherent meaning such as "remote past", at least on the minimal theory of tense assumed here, which simply does not allow for such a meaning. To be sure, we could add machinery for specifying degrees of temporal distance, and this may indeed be necessary for other tense systems (Comrie 1981). But for Vedic at least there is a more attractive account which is consistent both with the simple theory and with the simple representation of the imperfect as a general past (R—P). This is to derive the imperfect's restriction to remote past as a *blocking* effect. The idea is that reference of the imperfect to the recent past is pre-empted by the aorist, which is restricted to recent past in virtue of its resultative meaning. Expression of the remote past then falls by default to the imperfect. As often, when the semantic range of a category is complex or impossible to specify positively, it turns out that the blocking mechanism assigns it the "elsewhere" function relative to one or several more specific categories.

To see in detail how this blocking of the perfect by the aorist works in Vedic, we must take a closer look at the functions of the aorist. Our goal is to derive them from the aorist's temporal schema E—R_r.

3   Event structure and the aorist

3.1   The aspectual function of the aorist

The Vedic aorist is restricted to *telic* verbs (Delbrück 1897:239). The telicity of the aorist is a consequence of its resultative character. The aorist requires the R-reading of the perfect (E—R), which maps the change of state to the edge between E and R. Telic predicates have an event structure which provides such a change of state. Atelic predicates do not, hence cannot be assigned an R-reading, so their aorist would be uninterpretable.[33]

Specifically, Vedic verb roots can be grouped into three *Aktionsart* types:[34]

(30)   a. Resultative (achievements and accomplishments, so-called "aorist roots"): *vr̥t* "turn, become", *vr̥dh* "grow", *sthā* "stand up", *krand* "cry out", *hr̥* "take", *bhū* "become", *dyut* "flash", *skand* "leap", *bhī* "become scared", *budh* "wake up, take notice", *vap* "strew", *jan* "be born", *ram* "calm down", *tyaj* "leave".

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[33]It would not be possible to conversely derive the resultative character of the aorist from its restriction to telic predicates. The assumption that the aorist is simply a perfect that happens to be restricted to telic predicates would allow existential and universal perfect readings for those predicates, contrary to fact.

[34]A caveat is in order here: in addition to the synchronic variation due to the aspectually flexible class of telic/atelic roots, there is much ongoing historical change. At any given stage of the language, the morphological properties for a given verb may in part reflect its Aktionsart at an earlier period.

b. Irresultative (states and processes): *as* "be", *vas* "dwell", *śī* "lie", *ās* "lie", *īṣ* "move", *iṣ* "desire", *bhā* "shine", *vā* "blow" (wind), *rud* "weep", *plu* "float", *jīv* "live".

c. Resultative/irresultative. These verbs are lexically compatible with both a resultative and an irresultative reading. They may be apectually specified either syntactically at the VP level (e.g. indefinite bare plural objects force an atelic reading on the VP) or morphologically (by aspectual affixes): *bhar* "bring, carry", *kram* "step", *ruh* "climb", *dhāv* "run", *pū* "cleanse".

In principle, all inherently telic verbs form aorists, often directly from the root (or with a semantically empty thematic suffic -*a*). Telic/atelic verbs also form aorists, but normally by means of a perfectivizing stem-forming suffix -*s*. Inherently atelic roots do not form aorists in Rigvedic. On the other hand, many atelic verbs form a present tense without a stem-forming suffix with either perfectivizing or imperfectivizing function.

Originally, stative present perfects probably also did not occur with inherently atelic verbs. Such perfects as (5) were formed from achievement predicates by making their result state coextensive with R and suppressing the change of state component. However, the same mechanism of change by which middles become underlying statives can operate for present perfects as well. When an underlying achievement predicate changed in meaning, or went out of use in the other tenses, the stative present perfect derived from it could be reinterpreted as a basic stative verb with perfect inflection. For example, when the present tense *bibheti* changed its meaning from "become afraid" to "be afraid", there would no longer have been any reason to treat the perfect *bibhāya* as containing an implicit change of state component.

Thus, even when temporally interpreted as in the indicative, aorist and perfect are subject to constraints based on their aspectual nature.

The clearest aspectual contrast between aorist and non-aorist injunctives appears in prohibitions. As noted earlier, preventive prohibitions take the aorist injunctive, while inhibitive prohibitions take the present/imperfect injunctive:

(31)   a. mā́ párā gāḥ
       not away go-**AorInj**-3Sg
       'Don't go away.' (3.53.2) [Addressed to someone who is present.]

   b. akṣaír mā́ dī́vyaḥ
      dice-Instr not play-**Inj**-3Sg
      'Don't gamble (any more).' (10.34.13) [Addressed to a gambler.]

Assume that prohibitions, like all modal verb forms, are tenseless, i.e. they are not specified for the parameter P.[35] The injunctive's basic property is precisely that it is not specified for the parameter P (section (1.4)). Suppose further that the imperative and the prohibitive request the addressee to bring it about that the event denoted by the verb respectively should and should not obtain at R. Applied to a non-aorist predicate (E⊆R), the prohibitive, marked by the particle *mā*, yields an inhibitive prohibition, for ¬(E⊆R) is true for any time R at which the event is not taking place. Applied to an aorist predicate (E—R), it yields a preventive prohibition, since ¬(E—R) on the R-reading can be true at R only if the event has never occurred.

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[35]This generalization seems to be empirically correct but would of course itself have to be explained.

3.2 Adverbs

The co-occurrence of adverbial modifiers and tense depends on several dimensions of the adverbs' meaning: whether they quantify over times, whether they denote points or non-point intervals, whether they denote times anterior to, included in, or posterior to P, and whether they are deictic or not.

The Vedic data in (8)-(12) showed that the aorist is excluded with adverbs requiring universal or existential quantification over times. With past time reference, such adverbs require the perfect.[36] The relevant class of adverbs is that which is semantically incompatible with the R-reading. Compare the English examples in (32):

(32)   a. I have broken my leg. [Salient R-reading.]

   b. I have often broken my leg. [No R-reading.]

   c. Whenever I have tried this run, I have broken my leg. [No R-reading.]

While (32a) has an R-reading, implying that my leg is still broken, (32b,c) do not have such a reading. In Vedic, since the aorist is restricted to the R-reading, it is incompatible with quantificational adverbs. They require the perfect, which allows the universal and existential readings.

The R-reading of the English present perfect admits deictic adverbs that specify a point included in P ((33a)).[37] It excludes adverbs that denote a point anterior to P ((33b)), and those that denote an interval ((33c,d)).

(33)   a. The convict has escaped now (already, at this point). [*Now* specifies a point included in P; R-reading OK.]

   b. #The convict has escaped three hours ago (yesterday, in 1960). [*Three hours ago* specifies a point that precedes P; no acceptable reading.[38]]

   c. #The convict has escaped twice nowadays (currently, these days). [*Nowadays* specifies an interval that includes P; no acceptable reading.]

   d. The convict has escaped recently (in the past, during the Reagan administration). [*In the past* specifies an interval that precedes P; existential reading only.]

We can understand this distribution if we suppose that the R-reading temporal adverbs specify the edge between E and R, the point at which the change of state is located. The R-reading of the present perfect is then incompatible both with adverbials denoting a time anterior to R and with adverbs denoting an interval.

The same restriction holds by and large for the aorist of recent past in Vedic, as befits its status as a perfect with an R-reading. It is readily accompanied by adverbs denoting an interval that includes present time, such as *idā* "now", *adya* "today", and *(u) nu* "just now, already", as in (34).[39]

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[36]Similarly, reference to time that extends from the past into the present requires the perfect, e.g. 6.34.1 *purā́ nūnáṃ ca* "formerly and now" (Renou 1925). The adverb *jyok (jiyok)* takes the aorist in what could be interpreted as the universal reading ("for a long time now"), but Hoffmann (1967:157) suggests that the Rigvedic instances (except perhaps for 1.33.15) are resultative ("long since").

[37]The requirement that the point included in P must be specified deictically, rather than by adverbs denoting an absolute point of time, is not special to the perfect, but a general constraint on reference to any time that includes P time. E.g. *on Friday* means last Friday or next Friday, not the current day, even if it happens to be a Friday.

[38]Such sentences can be amnestied under rather special conditions (Crystal 1966:19, fn., and Meyer 1992, Ch. 8, Declerck 1991:333). E.g. (33b) is OK if the adverb is read as a separate intonational phrase.

[39]Other examples of this kind are 1.124.1, 4.34.4, 4.54.1, 6.47.22, 7.20.2, 8.27.11.

(34) a. ā́po   adyā́nv acāriṣaṃ
water-PlAcc today Prt go-**Aor**-1Sg
'I have visited the waters today' (1.23.23)

b. asmā́bhir u nú praticákṣiyābhūt
we-Instr   Prt now regard-Ger become-**Aor**-3Sg
'Now she has become visible to us' (1.113.11)

It does not occur with adverbs denoting an anterior time (such as *purā* "in the past"), or with adverbs denoting a present interval, such as *nūnam* "nowadays", which always take the perfect:[40]

(35) yáṃ   gā́va āsábhir   dadhúḥ   purā́ nūnáṃ ca sūráyaḥ
which-Acc cows mouths-Inst suck-**Perf**-3Pl before now   and sponsors
'which formerly the cows sucked with their mouths, and these days the sponsors of the sacrifice do' (9.99.3)

So far we have seen how the aorist comes by its recent past function and its telic/perfective aspectual value. We must now say how the aorist gets its second main temporal function, of expressing relative anteriority. For that, a short detour into the interpretation of tense in subordinate clauses is necessary.

3.3   Subordination of tense

For tenses in complements and relative clauses we require three additional rules:

(36) a. *Tense subordination*: P_{sub} coincides with the temporal trace of the event denoted by the main clause.

b. *Independent tense:* P_{sub} may include P_{main}. (optional)

c. *Sequence of tense:* If P_{sub}— P_{main}, the verb of the subordinate clause has past tense.

where P_{sub} and P_{main} respectively symbolize the P times of subordinate and main clauses. The main difference with respect to other Reichenbachian treatments (such as Hornstein 1991) is that (36a) does not anchor the P time of the subordinate clause to the E time of the main clause, but to the event itself. The different ways of relating event structure and the temporal parameters shown in (26) then predict different temporal relations between main and subordinate clause. Of course, (36a,b) apply both in English and in Vedic, whereas (36c) does not apply in Vedic.

Consider first a future subordinated to a past:

(37) a. John said that he would leave. [(i) …and he did; (ii) …and he will.]

b. John said that he will leave. [(i) *…and he did; (ii) …and he will.]

(37a) and (37b) both assert that John said that he would leave at some time after he spoke; (37b) in addition places this departure after P time: it can be true only if John has not yet left.[41]

Writing the main clause above the subordinate clause in the temporal representations of complex sentences, (37a) and (37b) look like this:

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[40]*purā* can also occur with present tense even if it refers to the past, a fact for which I know of no explanation. In two interesting examples (8.66.7, 8.99.1) it occurs with *both hyaḥ* "yesterday" and *idā* "now" combined asyndetically; on Geldner's translation "yesterday at this time" these would be problematic; however, the translation "yesterday and now", which would be consistent with my proposal as a universal perfect, seems equally possible to me. The aorist *avr̥tsata* in 8.1.29 seems to refers to a repeated action, so perfect tense would have been expected.

[41]John might have explicitly stated that he would leave some time after the current P time, or he might have left the time open, in which case the extra component of futurity in (37a) is an assertion by the speaker.

(38) a. R,E — P   b. R,E — P
         | |
         ϵ ϵ
         | |
      P — R,E   P — R,E
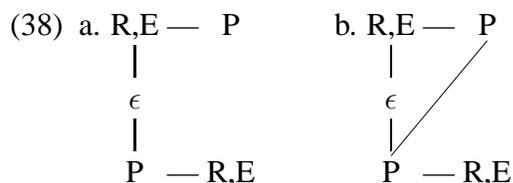
The rules in (36) derive (38) as follows. By (36a), the P_{sub} time relative to which the leaving is in the future is anchored to the saying event ϵ. The past tense *said* locates the saying event (and P_{sub} with it) at E_{main}/R_{main} preceding P_{main}. This renders the temporal relations of (37a), where P_{sub} precedes P_{main}, so that we get past tense by (36c). A second reading is derived by letting P_{sub} include P_{main} by the optional rule (36b). This locates the leaving event after P_{main}, which is to say after the current speech time. In this reading, P_{sub} overlaps P_{main}, and (36c) is therefore inapplicable, yielding (37b).

Both (37a) and (37b) are unambiguous, because the past tense by (36c) identifies the application of (36b) in (37b), and (36c) is the only source of (36b), for *would* is not an independent past tense. Ambiguities are created whenever (36b) applies without bleeding (36c), and also whenever a subordinate past tense has an independent source.

As an example of the first type of ambiguity, let us take (39).

(39) John will say that he lives in California.

By (36a), P_{sub} is anchored to the saying event, which is temporally located in the future. Therefore, all readings of (39) imply that John will say at some future time that he lives in California at that time. In addition, (36b) allows P_{sub} to be synchronized with P_{main}, yielding a second, more restrictive reading (40b) with the additional entailment that he lives in California now.

(40) a. P— E,R   b. P— E,R

       | |

      ϵ ϵ

       |

   P,R,E   P,R,E
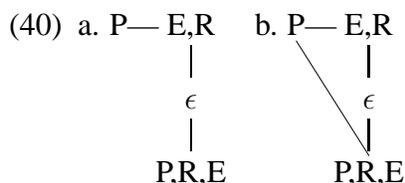
Because neither reading shows the relation P_{sub}—P_{main}, (36c) is inapplicable and the two interpretations of (39) are morphologically identical.

As an example of the second type of ambiguity, consider the examples in (41), discussed by Enç 1987.

(41)   a. John knew that Mary is pregnant.

        b. John knew that Mary was pregnant.

For (41a) to be true, Mary must have been pregnant both when John knew she was and she must still be pregnant at the current P time (here including S time). (36a) always anchors P_{sub} to the knowing event, which is temporally located in the past. In this reading, the subordinate clause is temporally unmarked ("present"). (36b) applies, bleeding (36c).

(42)   E,R — P

      |

     ϵ

      |

   P,R,E
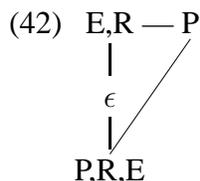
If (36b) does not apply, the subordinate clause gets past tense by (36c), and we derive the reading of (41a) on which Mary was pregnant when John knew she was (see (43a)).

(43) a. E,R — P   b.   E,R — P   c.   E,R — P

     | | |

    ϵ ϵ ϵ

     | |

   P,R,E   R,E — P   R,E — P
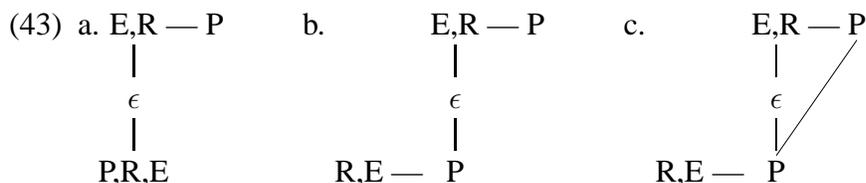
If the subordinate clause is past (R—P), (36b) may again apply or not, yielding (43b) and (43c), both of which mean that Mary was pregnant before John knew it, and she was no longer pregnant when John came to know it. In either case, P_{sub}—P_{main}, so (36c) applies, with the result that (41a) has three readings. ((43b,c) can be distinguished by whether deictic time adverbs in the subordinate clause (such as *three weeks ago*) refer to the time of the embedded event or to current P time.)

Subordinate past perfects show a similar ambiguity.

(44)   a. John heard that the convict has escaped.

        b. John heard that the convict had escaped.

In addition, both sentences are ambiguous between the usual readings of the perfect (existential, resultative etc.). On the R-reading, (44a) implies that the convict is still at large at speech time. Sentence (44b), even on the R-reading, does not.

Sequence of tense provides another argument that the structural distinction between the R-reading of the perfect and the existential/universal readings is structurally represented. Declerck 1991:174 points out that while the resultative perfect never triggers tense shift from present to past in subordinate clauses, the existential and universal readings can, citing contrasts of the type:

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(45)   a. #I have finally realized that the earth was round. [Resultative]

b. I have always known that the earth was round. [Universal]

c. I have often thought that the earth was round. [Existential]

Such data refute the view that sequence of tense is a purely morphological phenomenon, as Declerck makes clear. They are incompatible with all classical Reichenbach-style theories, which traffic only in the temporal parameters and assign perfects the single representation E—R,P. In these, the interpretation of tense in subordinate clauses must be a matter of associating one of their temporal parameters with a temporal parameter of the main clause.[42] The problem is solved if the P time of the subordinate clause is anchored not directly to one of the temporal parameters of the main clause, but to the event itself, which is then interpreted as discussed in section 2.2. The contrast seen in (45) is then accounted for by the respective representations of the R-reading and the existential and universal perfects that we already motivated above:

(46) a. E — R,P   b. E — R,P

ϵ ϵ

P,R,E   P,R,E
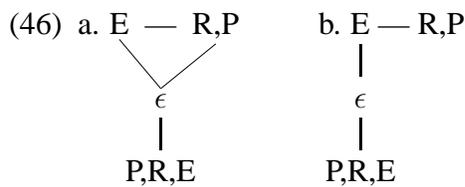
In the R-reading of the present perfect, the subevents of a telic event are contained in E and R,P respectively. P_{sub} does not precede P_{main} but includes it, and (36c) is inapplicable. In the existential and universal readings, the entire event is respectively contained in and coextensive with E (the simplified notation in (46b) collapses the latter two readings). In this case, P_{sub} precedes P_{main} and (36c) duly applies to give a past tense in the subordinate clause.

What it means for Sanskrit to lack sequence of tense, then, is that rule (36c) does not apply. More generally, its subordinate clauses are deictically independent with respect to the main clause, with no shift of person, spatial orientation, or any other deictic category.

A sentence with a telic predicate, such as (47a), has only the independent past tense reading. The shifted reading is not available because resultative predicates do not allow the temporal relation E,P⊆R, a prohibition which applies to the plain and shifted present alike, as (47b) shows.

(47)   a. John heard that the convict escaped. [The escape preceded the hearing.]

b. #The convict escapes. [OK only as a historical present.]

(36) should probably be generalized to main clauses in the scope of *implicit* perspectival predicates. Several authors have interpreted main clause past perfects in "flashbacks" and free indirect speech along these lines (Banfield 1982, Declerck 1991, Ch. 2, Kamp and Reyle 1993:594, Eberle and Kasper 1994:157):

(48) John came to work at noon yesterday. He had woken up at 10. He had made coffee and eaten breakfast.

If each past perfect in (48) has the same R as the past tense of the first clause, then how can they constitute a narrative progression? On the other hand, if each has a different R, why do they all denote events anterior to the event of first clause? The solution is to assume that such past perfects

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[42]For example, Hornstein's (1991) sequence of tense rule associates the subordinate clause's P with the main clause's E, and shifts the morphological tense from present to past when the main clause's E is a past time. For the perfect, this would predict that tense shift would be triggered not only by the existential and universal perfect (45b,c), but also by the resultative perfect (45a), contrary to fact.

are governed by the perspective time of the first clause, even though they are not syntactically subordinated to it. We can think of them as subordinated to a perspectival operator which extends over a stretch of discourse. Even apart from past perfects, this is clearly necessary anyway for past tenses in such cases as:

(49)   a. What was your name again?

        b. Tarzan was not yet king of the jungle. That would come later.[43]

Sequences of past perfects allow distinct R times, and that enables them to advance the narrative (just like sequences of plain past tenses, see section 2.4). But the successive R times of the past perfects all precede the P time of their clause, and this is anchored to the event denoted by of the first clause, and so cannot advance beyond it.[44]

3.4   The past perfect

With respect to point-denoting adverbials in the R-reading, the past and future perfects differ from the present perfect in a surprising way. The present perfect is not compatible with adverbials denoting a specific past time (see (33b)). But the past perfect is not only compatible with such adverbials, it even allows two distinct readings with them! The time adverbial may be read as specifying either the *terminus ante quem* of the event (reading 1) or the culmination of the event itself:[45]

(50) The convict had escaped at 3.
      Reading 1: At 3, the convict had already escaped [the actual time of escape may have been earlier].
      Reading 2: The convict had escaped, and the escape took place at 3.

These data pose a famous problem for the theory of tense (Klein 1992). The ambiguity of the past perfect illustrated in (50) has been taken to show that in the representation of the past perfect, redisplayed in (51a), the adverb can associate either with the reference time R (reading 1) or with the event time E (reading 2). But then, why is even the latter reading unavailable in the present perfect, which has the representation (51b)?

(51)   a. **Past perfect:** E—R—P

        b. **Present perfect:** E—R, P$\subseteq$R

Klein suggests a pragmatic constraint to the effect that event times and reference times cannot be simultaneously fixed to specific intervals. But this does not look like a pragmatic constraint because it is neither motivated by rational communicative principles nor defeasible by explicit contrary information. Michaelis 1992 also points out that the constraint is undermined by the well-formedness of discourses such as (52), in which these two times are in fact fixed.

(52) [It was 1972.] Harry had joined the navy in 1960.

Still, why cannot both times be specifed by time adverbials in a sentence? Michaelis proposes placing a construction-specific constraint on the R-reading. But we can do better than that.

Consider first the analysis (50) embedded under a past tense, which also has two readings:

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[43]I owe this example to a lecture by J. McCawley.

[44]But if the last sentence in (48) is changed to past tense *(He made coffee and ate breakfast),* the inference is that the event took place *after* John came to work.

[45]I assume the same would be true in Vedic, but I cannot offer any evidence one way or the other.

(53) John heard that the convict had escaped at 3.
   Reading 1: John heard that at 3, the convict had already escaped [the actual time of escape may have been earlier].
   Reading 2: John heard that the convict had escaped, and that the escape took place at 3.

The reading as an embedded perfect with sequence of tense from (36c) is excluded by the constraint mentioned in fn. 37 (erasing the adverb or substituting a deictic adverb such as *then* would render it acceptable). The reading as an embedded past perfect is fine, though, with $R_{sub} = at\ 3$:

(54)   E,R — P
                   |
                   ϵ
                   |
         E — R — P
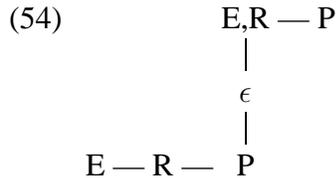
But as we know already from section 2.2, this representation has two readings. In the existential reading (reading 1 of (53)) there was an escape during the interval E_{sub}. In the R-reading (reading 2), there was an escape that culminates at time R. As this analysis correctly predicts, reading 1 does not entail that the convict was still at large at 3 (he or she might have been caught again by that time), while reading 2 does entail that.

The upshot is that there is no shift of past to past perfect in sequence of tenses as many writers have supposed. The apparent "past perfect as backshifted past" is really the existential reading of the past perfect. This fits well with our previous observation (see (45)) that the existential reading of the present perfect functions like a past tense in triggering sequence of tense. As for the present perfect, its R time cannot be modified by past tense adverbs because it includes P time and S time.

The assumption that (36) is triggered by implicit operators (section 3.3, see (48)) makes it possible to extend the analysis of the overtly embedded case in (53) to explain the ambiguity of (50). Again, the existential reading yields reading 1 of (50), and the resultative reading yields reading 2.

The ambiguity of the future perfect follows analogously from its temporal specification E—R, P—R.

(55) The convict will have escaped tomorrow at 3.
   Reading 1: Tomorrow at 3, the convict will already have escaped.
   Reading: The convict will complete an escape tomorrow at 3.

As before, reading 1 is the existential reading (the escape falls within E, before 3) and reading 2 is the R-reading (the escape culminates at the E/R edge, i.e. at 3).[46] Again, there is no need to assume that the past tense "becomes" a perfect in infinitives. The perfect's own meaning is responsible for all its uses.

We are at last ready for the Vedic aorist of relative anteriority. Let us suppose that temporal conjunctions relate the reference times R of the main clause and the subordinate clause. In particular, the conjunction *when*, and its Sanskrit counterparts *yat* and *yadā*, align R_{sub} and R_{main}, so that "A when B" and "B when A" both mean that the R times of A and B coincide. If A and B have the same tense, then their E times will be included in the same R time.[47] But if the tenses of

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[46]Note that the constraint of fn. 37 has no effect on future and modal perfects.
[47]Things are not quite so simple, of course. (56) could mean that the party was held just before John's departure (a goodbye party), right after it (a good riddance party, perhaps), during his departure, though surely not years earlier or later.

A and B differ, their E times can diverge. Taking (2b) as our example, let A = "You took Kutsa", and B = "The gods had united you". Then (57) diagrams the temporal relations asserted by "You took Kutsa when the gods had united you". Given the meanings of the tenses, the culmination of the uniting event at the E_{sub}/R_{sub} edge must precede the taking event at E_{main}, which is the right temporal interpretation of the sentence.[48]

(57)   E,R — P

        ϵ

    E — R,P
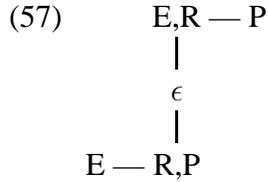
The analysis of the Vedic aorist of relative anteriority as the functional analog to the English (or more accurately, the German) past perfect makes some additional predictions. First, if implicit operators can trigger (36) over a stretch of discourse, we predict that the aorist of relative anteriority should occur also in main clauses, to mark relative anteriority with respect to a previous event in the discourse. Such a use of the aorist of anteriority was suggested in passing by Hoffmann 1967:158, and the following seem plausible examples of it:[49]

(58) a. yújaṃ hí mā́m ákr̥thāḥ
         ally-Acc but me   make-**Aor**-2Sg
         'But you had made me your ally!' (5.30.8)

      b. antár hí ákhyad   ubhé   asya dhéne
         among for see-**Aor**-3Sg both-Du-Acc his   breast-Du-Acc
         'For he had seen both his breasts among them.' (5.30.9)

      c. stómena hí diví́   devā́so agnī́m ájījanan
         praise-Instr for sky-Loc god-Pl fire-Acc engender-**Aor**-3Sg
         'For the gods had engendered Agni in heaven with praise.' (10.88.10)

Secondly, our analysis of the aorist of anterior time predicts that the aorist of relative anteriority (unlike the aorist of recent past, see section 3.2) might occur with adverbs that specify a past point in time. This expectation is confirmed as well:[50]

(59) yáthā purā́   mánave gātúm áśret
     as   previously Manu-Dat path-Acc provide-**Aor**-3Sg
     'in the same way that it had previously readied a path for Manu' (10.76.3)

In this section I have sketched out a semantic account of the temporal relation between subordinate and main clauses, in which rules (36a,b) do most of the work, coupled in English with the sequence of tense rule (36c). With the additional assumption that tenses can be subordinated to abstract operators in discourse, the account generalizes to free indirect discourse and flashbacks. It also solves the present perfect puzzle without positing either unmotivated pragmatic constraints or construction-specific grammatical properties of the R-reading. The aorist of relative anteriority is

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(56)   When John left, Mary threw a party.
In Vedic as well, contiguous events do not require the aorist of anteriority, e.g. "when the gods put (*adadhur*, imperfect) the sun into the sky, then (= from that point onwards) all the worlds could see *(prāpaśyan,* imperfect)" (10.88.11), similarly 8.12.30. The imperfect is possible for the same reason that the English and German translations allow the simple past rather than the pluperfect, namely that no temporal separation between the main clause and subordinate clause events is intended.

[48]Being subject to rule (36c), English would here use the past perfect.

[49]Others are 1.24.8, 4.1.8, 4.18.5, 5.30.4, 10.45.4.

[50]Another example is *ajaniṣṭa* "had been born (then)" in 5.32.3.

the result of applying (36a,b) to the aorist's tense specification. This completes my argument that the temporal and aspectual uses of the aorist are specializations of the R-reading.[51]

3.5 Questions

In the presence of adverbial Wh-questions, the existential reading, however far-fetched, is always available. As noted by Michaelis 1994, the R-reading is crisply excluded unless the adverbial relates to the result state:

(60)   a. (#)Where have the police caught the suspect? [No R-reading, only the existential reading "In what places have the police caught the suspect (over the years)?]

   b. #Where has general Aidid died? #At what age has general Aidid died? [No R-reading; the existential reading presupposes resurrection[52]]

   c. Where have you hidden my watch? [R-reading OK.]

   d. (#)Where have you found my watch? [Existential reading only.]

   e. (#)When have you hidden my watch? [Existential reading only.]

   f. How have you worded the letter? [R-reading OK.]

   g. (#)How have you found the letter? [Existential reading only.]

The subcategorized adverbials associated with *hide* and with *word* in (60c,e,f) specify a property that comes to obtain when the change of state takes place, while non-subcategorized adverbials associated with *die* and *find* in (60b,d,g) specify a property that obtains at the time when the when the activity leading up to it terminates. For example, the locative in (60c) specifies the location of the watch from the time it was hidden, whereas the locative in (60d) specifies the location of the watch at the time it was found.

According to a suggestion by Michaelis, in the R-reading the change of state is an assertion and the activity reading up to it is a presupposition, and the unacceptable Wh-questions in (60) are ruled out because an element in a presupposition has been questioned. This is known on other grounds to be unacceptable:

(61)   a. What did Mary believe/#know that John took?

   b. Who did John read a/#the book by?

Why should this be so? Looking back at (26) we see that the R-reading is the only reading of the perfect in which the change of state and the activity leading up to it are temporally distinguished. In the existential and universal readings, the entire event is respectively contained in or coextensive with E. Thus it is only when the activity and the resulting change of state are temporally distinguished that they are separated into an assertion and a presupposition.

Analogous facts hold in Vedic. The aorist is rare in Wh-questions, as well as in adverbial relative clauses (e.g. *yatra, yathā*). The cases that do occur seem to conform to the restriction that the Wh-question should be about the resultant state:[53]

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[51]The analysis could be extended to *before* and *after* clauses, but since Sanskrit does not have them, they can be bypassed here.

[52]Because of the "repeatability" property of atelic predicates mentioned at (24).

[53]Rhetorical, exclamative questions seem to be exempt from the constraint, e.g. 1.54.1, 4.23.1,3-5 (see Grassmann's comments *s.v. kathā*). (The English examples in (60) may have such readings too). *aśret* in 10.76.3 is not a conterexample because it is an aorist of relative anteriority (see (59)).

(62) a. káṁ svid árdham párāgāt
      which Prt side Pref turn-**Aor**-3Sg
      'Which way has she turned?' (1.164.17)

      kúva tyā́   valgū́   puruhutā́   adyá dūtó   ná stómo
      where those-DuAcc handsome-DuAcc much-invoked-DuAcc today messenger like praise
      avidat
      find-**Aor**-3Sg

      'Where has the song of praise reached the two beautiful much-invoked ones today?'
      (6.63.1)

4 Conclusion

Vedic supports Reichenbach's two-dimensional theory of tense and aspect with two modifications. The first modification is to allow tenses and aspects to be characterized at a finer level of granularity, by specifying the relation of the predicate's event structure to the temporal parameters. This allows the different readings of the perfect to be represented grammatically, a move necessary because these readings correspond to distinct aspect categories. In Vedic, while the imperfect is a past tense (R—P), the aorist and perfect constitute two distinct species of perfect aspect (E—R), the former a specialized resultative perfect and the latter a general perfect. The aorist's diverse temporal and aspectual functions were shown to follow from a particular assignment of the event structure of telic predicates to the perfect's temporal parameters E and R.

For the Vedic perfect, on the other hand, there is no simple positive characterization that picks out all its functions to the exclusion of those of the aorist. It just covers what is left of that aspect's territory when the specific functions of the aorist are subtracted. In this respect, the unification of the tenses relies crucially on the blocking of general categories by special categories. So does the analysis of the imperfect remote past function. Only if the aorist pre-empts the imperfect in the recent past temporal function, and the perfect in the resultative aspectual function, can the meaning of all three categories be specified in a way compatible with the theory. The beauty of blocking is that it eliminates complex and unnatural disjunctive categories by reducing them to general "elsewhere" cases relative to more narrowly specified categories with unitary properties.

The discourse functions of the tenses were argued to be consequences of their temporal and aspectual properties. Such categories as "mentioning", "reporting", and "statement of fact", previously used to define the Vedic tenses' functions, prove to be epiphenomenal.

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