Tense in Ancient Greek Reports

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Abstract
This paper shows that tenses in Ancient Greek reports have both an anaphoric and a shifted-indexical component. It develops a new account of Ancient Greek tenses that deals with this combination of features. Following Klein’s (1994) semantics of tense, I claim that tense indicates the relation between an anaphoric topic time and the moment of utterance, the now. As for Ancient Greek indirect discourse, I argue that the anaphoric component works exactly the same as in non-embedded discourse (contra von Stechow 1995). The indexical component, however, is different in that the now is not provided by the actual context of utterance, but by the reported context. The DRT account developed models this combination of features, taking also into account the role of aspect.

Keywords
tense; aspect; reports; Ancient Greek; indexicality/deixis; anaphoricity

1. Introduction

In Ancient Greek reports tenses are retained from the original utterance without modification. If someone said γράφω.PRS ‘I am writing’ this can be reported as εἶπον ὅτι γράφει.PRS ‘he said he was (lit. is) writing.’ Note that this is different in English where we find a past tense in the complement clause. In this paper I will first discuss two ways to deal with this retention of tenses in Ancient Greek reports: on the one hand, in line with for example Schlenker’s (2003) account of the Russian tenses, the Greek tenses can be analysed as indexicals provided that we extend the notion of indexicality to shifted indexicals: cases where not the actual but the reported context of utterance provides the now, relative to which the tenses are evaluated. Alternatively, following, for example, Higginbotham’s (2009) account of tense, the moment relative to which the tenses are
evaluated is provided by the linguistic context. I will then argue why the first approach is preferable over the second. In section 3 I will show that tenses in Ancient Greek reports do have an anaphoric component. However, rather than their now, it is their topic time that is provided by the linguistic context. I conclude that the Greek data require a novel account of tense that does justice to both its shifted-indexical and its anaphoric nature. I develop such an account in section 4.

Before we start, two preliminary remarks. First, in my usage of the word tense Ancient Greek has three tenses: a past, a present, and a future tense. This deviates from what we find in standard grammars, where the words tense is used for what I would call a tense-aspect pair (see e.g. Smyth 1984:412–413, Goodwin 1966:7). Table 1 gives the seven tense-aspect pairs for the indicative.

| IMPERFECTIVE | AORIST | PERFECT |
|--------------|--------|--------|
| PRESENT      | γράφω   | γέγραφα |
| PAST         | ἔγραφον | ἔγραψα  | ἐγεγράφη |
| FUTURE       | γράψω*  | ἔσομαι | γεγραφώς |

Table 1. Tense and aspect in the indicative for the verb γράφειν ‘to write’.

* The future is unspecified for imperfective/aoristic aspect.

The table shows that Ancient Greek has three aspects: imperfective, aoristic (= perfective) and perfect aspect. Imperfective aspect is traditionally called the aspect expressed by the present stem (e.g. Rijksbaron 2002) but since this may lead to confusion about the notions tense and aspect I do not follow that usage here and restrict the term present to denote one of the three tenses.

Second, Ancient Greek has several constructions to report utterances, thoughts, etc. Apart from a literal rendition (direct discourse, quotation), we find the following indirect discourse constructions: a ὅτι/ὡς ‘that’ clause with a finite verb which is optionally in the optative mood after a reportative verb in the past (oblique optative), an accusative plus infinitive construction, and (rarely with reports of utterances, but commonly with reports of knowledge) an accusative plus participle construction. The account developed in this paper is assumed to hold equally for all these different construction types.

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1) This use of the word tense is not restricted to grammars of Ancient Greek, but quite general: About English we often hear that the present progressive and the simple present tense are two different present tenses, the French Imparfait and Passé Simple are called two different past tenses etc.
2. Shifted Tenses

The contribution of tense in a normal, unembedded clause is clear. Consider (1) throughout the paper I mark the relevant verb forms in bold face):

(1) ἐτυράννευε δὲ ὁ Περίανδρος Κορίνθου
    reign.pst.ippv.3s prt the.nom Periander.nom Corinth.gen
    ‘Periander was reigning over Corinth’ Hdt. 1.23

Loosely speaking, the past tense of ἐτυράννευε ‘was reigning’ indicates that Periander’s reign was in the past of the now, the moment when Herodotus uttered this sentence. Similarly, a present tense would locate it at the moment of utterance and a future tense after the moment of utterance. In this respect, tense in Ancient Greek behaves the same as in English. This interpretation relative to the moment of utterance makes tenses indexical or deictic.

In indirect discourse, however, Ancient Greek tenses behave differently from English. As a rule, tenses in Ancient Greek are retained from the original utterance, without any modification. The present tense in (2), for example, is retained from the original utterance (νῆες ἐκεῖναι ἐπιπλέουσιν.prs ‘those ships are sailing against us’ or a sentence that expresses the same proposition in this context).

(2) τινες ... εἶπον ὅτι νῆες ἐκεῖναι ἐπιπλέουσιν.
    some.nom say.pst.aor.3p that ships.nom those.nom sail.against.prs.ippv
    ‘Some said that those ships were sailing against them.’ Th. 1.51.2

Note that this is different in English. The English translation has a past tense were sailing, since in this language tenses are not retained from the original utterance without modification.

How should we interpret this retention of tenses in Ancient Greek reports? It is clear that the tenses cannot be straightforwardly indexical, since the present tense of ἐπιπλέουσιν ‘are sailing’ is not interpreted with respect to the actual context of utterance, that is the context in which Thucydides uttered (2). Instead, it should be interpreted with respect to the context of the original utterance, i.e. the utterance that is reported in (2).

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2) In this paper I ignore some special uses of tenses, namely the historical present and the past tense of the so-called tragic and gnomic (past) aorists. See Bary (forthcoming) for the tragic aorist.
3) This semantics of tense will be refined slightly in the next section when I take aspect into account.
4) There can be a change in mood: after a reportative verb in the past, the optative may be used in the complement. For the loss of the past tense morpheme in this case, see section 3.3 about this phenomenon with infinitives.
There are in principle two possible analyses for this phenomenon. In order to see the difference it is crucial to distinguish two kinds of contexts: the context of utterance and the linguistic context. I use context of utterance in the Kaplanian sense as a tuple consisting of the speaker of the utterance, the moment of utterance and the place of the utterance (Kaplan 1989). The linguistic context contains at least the discourse so far.

With this distinction in place, a first option is to say that the now is still provided by some context of utterance, albeit not the actual context. When, in addition, we extend the notion of indexicality to cases where some context other than the actual is relevant, one could retain the indexical nature of tenses in Ancient Greek. Accounts in terms of shifted indexicality have been proposed by Schlenker (2003) and von Stechow (2003), among others, for Russian tenses and Bary and Maier (2003) for Ancient Greek.5

Alternatively, the now could be provided by the linguistic context and tenses would be anaphoric. For (2), this would mean that the present tense of ἐπιπλέουσιν ‘are sailing’ is an anaphor: it looks for a time in the linguistic context that can serve as its now. εἶπον ‘they said’ provides such a time, namely the time of the saying, and the present tense takes up this time, resulting in the interpretation that the sailing overlaps with the saying (Higginbotham 2009).

There are two reasons to prefer an analysis in terms of shifted indexicality over one in terms of anaphora. First, the phenomenon of shifted tenses is restricted to report constructions. We don’t find it in other constructions, as (3) to (5) illustrate:

(3) Περίανδρος δὲ ἦν Κυψέλου παῖς ... ἐτυφάννευε δὲ
Pi-er-i-an-dros nom prt be.pst.IPfv.3s Cypselus.gen son.nom reign.pst.IPfv.3s prt
ὁ Περίανδρος Κορίνθου
the.nom Periander.nom Corinth.gen
‘Periander was the son of Cypselus. He reigned over Corinth.’ Hdt. 1.23

(4) ἡνίκα δὲ δείλη ἐγήγεντο, ἐφάνερον οὖν κονιορτὸς
when prt afternoon.nom become.pst.IPfv.3s appear.pst.aor.3s cloud.of.dust.nom
‘when afternoon was coming on, there was seen a cloud of dust’ X. An. 1.8.8

(5) Τούτους δὲ συνέτασσον ἄρχοντες οἵδε ... καὶ ...
they.acc prt put.in.array.pst.IPfv.3p commanders.nom these.nom and
‘Artayctes the nom Chersmis.gen who.nom Sestus.acc

5) Strictly speaking, von Stechow doesn’t treat tenses in indirect discourse as shifted indexicals, since in his account tenses lose their indexical character after the feature deletion which he assumes. This technical difference is however not important for the point of this paper. What is important is that in both accounts the complement is interpreted with respect to the context the attitude holder locates himself at.
Whereas in (2) the present tense of ἐπιπλέουσιν indicates that the saying and the sailing overlap, this is not possible with two main clauses, as (3) shows, nor with a temporal subordinate clause, as (4) shows, or a relative clause, as in (5). In all these examples the two eventualities described overlap, but only in the indirect report construction does Ancient Greek use a present tense. In the other constructions a past tense is obligatory. Thus, only in reports can the now be shifted. This restriction would receive an ad hoc explanation on an anaphoric account of tense.

On the other hand, the drawback of the account in terms of shifted indexicality is that the notion of indexicality has to be extended to cases where the now is provided by a context of utterance different from the actual one. This is a smaller price to pay, though, as on this account the restriction to reports is clearly motivated: reports are the only constructions that introduce a non-actual context of utterance.

But there is a more fundamental problem with the anaphoric approach which has to do with de se, or, in this case, de nunc, belief (Lewis 1979). In short, the problem is that if a reported speaker (for example the some in (2)) is mistaken about the time when he utters or believes the present tense complement of the report, the anaphoric account ascribes him a belief about the time of the reported utterance itself, whereas the reported speaker actually has a belief about the time he thinks it is, which I will call the reported now. For a discussion of this point I refer the reader to von Stechow (1995), Kratzer (1998), and Bary and Maier (2009).

For these two reasons, an account in terms of shifted indexicals is preferable. Nevertheless, in the next section we will see that tenses make an anaphoric contribution too. It is however not the now that is provided by the linguistic context, but the so-called topic time.

3. Embedded Anaphoricity

In this section I will explicate the anaphoric contribution of tenses. In order to do so, I first introduce the notion of topic time and refine the semantics of the tenses as proposed in the previous section. Then I show in section 3.2 that the anaphoric nature of tenses is not restricted to normal ‘flat’ discourse, but is also
found in reports. Finally, section 3.3 discusses the temporal interpretation of infinitives.

3.1. Topic Time in Normal Discourse

Consider the sentence:

(6) He was ill.

Upon hearing this sentence, you need to know two things before you can give it a full interpretation. Not only do you want to know who he refers to, you also want to know what time the speaker is talking about. Adding some context, as in (7), solves both:

(7) Last year Mike didn’t celebrate Christmas. He was ill.

We now know that (6) is about Mike and about last Christmas. Apparently, in the same way something is missing when we don’t know who we are talking about, there is something missing as long as we don’t know what time we are talking about. Partee (1973) was the first to formulate the idea that utterances in general are made about specific times and Klein (1994) coined this time about which the utterance is made the topic time. In (7) this time is provided by the linguistic context, as is often the case. Hence, the topic time is an anaphor.

Following Klein (1994) (see also Gerö and von Stechow 2003, Paslawska and von Stechow 2003, and Bary 2009, among many others), tense indicates the temporal relation between the topic time (and not the time of the eventuality!) and the moment of utterance. The past tense indicates that the topic time \( t_{TT} \) precedes the moment of utterance \( n \) (for now), the present tense indicates that it is \( n \), and the future that it follows it:

\[
\begin{array}{ccc}
\text{past} & t_{TT} < n \\
\text{present} & t_{TT} = n \\
\text{future} & t_{TT} > n \\
\end{array}
\]

A graphical representation of the semantic contribution of the tenses is given in Figure 1.

![Figure 1. The semantics of tense.](image-url)
Aspect also concerns the temporal relation between the topic time and a second time, namely the time of the eventuality \( \tau(e) \), that is the time the eventuality actually takes up. The following discussion is based on Bary (2009). Focusing on the opposition between imperfective and aoristic aspect, the former indicates that the topic time is a non-final subset of the time of the eventuality: the eventuality continues after the topic time. In other words, it indicates that the eventuality is going on at the moment about which we speak and hence yields the *not (yet) completed* interpretation traditionally associated with imperfective aspect. Aoristic aspect indicates that the topic time includes the time of the eventuality: the whole eventuality takes place within the time about which we speak, which gives us the interpretation of completion:

\[
\begin{align*}
(9) \text{ IMPERFECTIVE: } & \tau(e) \supset \tau_{TT} \quad \text{‘going on’} \\
\text{ AORIST: } & \tau(e) \subseteq \tau_{TT} \quad \text{‘completed’}
\end{align*}
\]

Figure 2 represents the semantic contribution of aspect graphically.

To illustrate how this works, first an example with an imperfective past. Consider the second clause of (10):

\[
(10) \text{ Κῦρος δὲ οὔπω ἧκεν, ἀλ' ἔτι προσήλαυνε} \\
\text{Cyrus.nom prt not.yet be.present.pst.ipfv.3s but still march.to.pst.ipfv.3s} \\
\text{‘Cyrus was not yet present, but he was still marching on.’ X. An. 1.5.12}
\]

In (10), the topic time is fixed by the context as a time when Clearchus is riding through Menon’s army. The past tense of προσήλαυνε indicates that this topic time precedes the now. Its imperfective aspect indicates that the time of Cyrus march includes this topic time. This gives the correct truth conditions: at the end of the topic time, the time about which Xenophon speaks at this point in the story, the march is still continuing, which yields the effect of ‘going on’. A graphical representation is given in Figure 3.
(11) is an example with an aoristic past:

\[\begin{array}{ll}
\text{(11) } & \text{τό μευ νάκος ἐχθὲς ἐκλεψεν.} \\
& \text{the.acc I.gen skin-coat.acc yesterday steal.pst.aor.3s} \\
& \text{‘He(=Lacon) stole my skin-coat yesterday.’} \\
\end{array}\]

Here, the topic time is denoted by the adverbial ἐχθές ‘yesterday’. The aorist indicates that the eventuality described, the stealing of the skin-coat, takes place within this topic time (including the option that the two are exactly simultaneous). Figure 4 gives a graphical representation:

\[\begin{array}{c}
\text{n} \\
\tau_{TT} \\
\text{(the day before the utterance)} \\
\tau(\Theta) \\
\text{(the stealing)} \\
\end{array}\]

\text{Figure 4. Graphical representation of (11).}

In order to be more precise about the anaphoric nature of the topic time and the way its antecedent is determined in the context I present a formalisation of these ideas in Discourse Representation Theory (for an introduction to the framework, see Kamp and Reyle 1993), which as a dynamic theory is especially suited to deal with intersentential bindings. The key idea of DRT is that the hearer or reader incrementally constructs a logical form for the discourse as it unfolds. This logical form is called a Discourse Representation Structure (DRS), traditionally depicted as a box with two compartments. The top compartment contains the discourse markers that represent the objects that are introduced as the discourse proceeds. The bottom compartment contains conditions of
various kinds that encode descriptive information that is assigned to the
discourse markers. What follows is the analysis developed in Bary (2009) which
shares many intuitions and formalisations with previous accounts, in partic-
ular Hinrichs (1981), Kamp and Rohrer (1983), Partee (1984), Kamp and Reyle
(1993), and Kamp, van Genabith, and Reyle (2005).

Let’s first have a look at example (12) (= (3)) with two imperfective sen-
tences:

(12) Περίανδρος δὲ ήν Κυψέλου παις· … ἔτυφανες δὲ ὁ Περίανδρος Κορίνθου

It states that there is an eventuality \( e_1 \) of Periander being son of Cypselus, the
time of which \( \tau(e_1) \) includes the topic time \( t_1 \), which precedes the moment of
utterance \( n \).

As for the second clause of (12), we first construct the preliminary representa-
tion, following the two-stage presupposition-as-anaphora version of DRT (van
der Sandt 1992):
Since this sentence also has imperfect aspect, the eventuality described of Periander reigning $e_2$ includes the topic time $t_2$. In addition, (14) contains a new condition, in the form of a dashed box. This box is to be read as the instruction to bind the topic time $t_2$ to a time that precedes the now and has been introduced before. This new condition captures the observation that more often than not eventualities described in a discourse are interpreted in the temporal setting established by the linguistic context.  

The representations of the two clauses are merged. This is an operation which returns a new DRS the universe (i.e. the set of discourse markers) and conditions of which are the unions of the universes and conditions of the DRSs to be merged. When we apply this merge operation to (13) and (14), we get the left DRS in (15):

\[
\begin{align*}
&n e_1 t_1 e_2 \\
&\text{son}(e_1) \\
&\tau(e_1) \supset t_1 \\
&t_1 < n \\
&\text{reign}(e_2) \\
&\tau(e_2) \supset t_2 \\
&t_2 < n
\end{align*}
\]

Now we look for an antecedent for $t_2$ to bind to. By default it binds to the last mentioned topic time, here $t_1$, and we get the right DRS of (15). Due to their imperfective aspect, both eventualities described include $t_1$, which yields the interpretation that the eventualities overlap. The resulting overlap interpretation is graphically represented in Figure 5.

(16) has two clauses with aoristic aspect, which here, as often, leads to the interpretation of succession:

\[
\begin{align*}
&\kappaαι δύο τε αντί ένας νησύς της ‘Αθηνας
\end{align*}
\]

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8) Since the first sentence of (12) is not the first sentence of the discourse but related to what is told before, it is clear that its topic time is anaphoric too. For simplicity, I have presented the outcome of the resolution process. But even if it had been the first sentence of the discourse, it would have been natural to treat the topic time as an anaphor. In general, if the context lacks an accessible antecedent, the information associated with the anaphor (here, that it is a past time) will allow a co-operative reader or hearer to establish a discourse marker and attach the associated conditions. This phenomenon is called accommodation. The introduced discourse marker may then function as an antecedent for the anaphoric expression (here, the past tense marker).
Figure 5. Graphical representation of (15), overlap (t₁ and t₂ representing the topic times of the first and second clause, respectively).

�ικοδόμησε ὁ Ἀλυάττης ἐν τῇ Ἀσσησῷ, αὐτὸς τε ἐκ τῆς νοσοῦ ἀνέστη. ‘Alyattes built not one but two temples of Athena at Assesos, and recovered from his illness.’ Hdt. 1.22.4

Again, I take the context for the second clause to be the first clause, which is represented as (17):

As before, the past tense indicates that the topic time t₁ is in the past of n. Aoristic aspect specifies that there is an eventuality of Alyattes building temples temporally included in the topic time. But aoristic aspect makes an additional contribution: in comparison to imperfective aspect it introduces an extra time t₂, a time that immediately follows τ(e₁). This abutment relation is indicated by ⊃≺. As we will see, this condition accounts for the narrative progression that we often find with a sequence of aorists.

The preliminary representation of the second clause is (18):
Again, the topic time \( t_3 \) is an anaphor that is to bind to a previously introduced past time. (17) and (18) merge to the left DRS in (19). By default, \( t_3 \) binds to the time immediately following the previously mentioned eventuality and we get the right DRS in (19):

\[
\begin{array}{c|c|c|c|c}
 n & e_1 & t_1 & t_2 & e_2 & t_4 \\
\hline
\text{build_temples(e_1)} & \tau(e_1) \subseteq t_1 \\
& \tau(e_1) \supset t_2 \\
& t_1 < n \\
\text{recover(e_2)} & \tau(e_2) \subseteq t_3 \\
& \tau(e_1) \supset t_4 \\
& t_3 < n \\
\end{array}
\Rightarrow
\begin{array}{c|c|c|c|c}
 n & e_1 & t_1 & t_2 & e_2 & t_4 \\
\hline
\text{build_temples(e_1)} & \tau(e_1) \subseteq t_1 \\
& \tau(e_1) \supset t_2 \\
& t_1 < n \\
\text{recover(e_2)} & \tau(e_2) \subseteq t_2 \\
& \tau(e_1) \supset t_4 \\
& t_2 < n \\
\end{array}
\]

The temporal relations are represented graphically in Figure 6. The recovery \( e_2 \) indeed follows the building of temples \( e_1 \).

\begin{figure}
\centering
\begin{tikzpicture}
\node (n) at (0,0) {$n$};
\node (t1) at (-2,0) {$t_1$};
\node (t2) at (0,0) {$t_2$};
\node (e1) at (-1,-1) {$\tau(e_1)$};
\node (e2) at (1,-1) {$\tau(e_2)$};
\draw [->] (t1) -- (n);
\draw (t2) -- (e2);
\draw (e1) -- (t2);
\end{tikzpicture}
\caption{Graphical representation of (19), succession (\( t_1 \) and \( t_2 \) representing the topic times of the first and second clause, respectively).}
\end{figure}

One may wonder whether narrative progression should be attributed to the semantics of the aorist. Couldn’t it simply be Gricean reasoning (in particular his maxim of manner) that is responsible for the fact that people tell events in the order in which they occur? I think that pragmatic reasoning is indeed the reason that we don’t go back in time without explicit indication. But the difference between the aorist (progression) and imperfective (simultaneity) with respect to narrative progression cannot be attributed to this general principle but instead has to come from the aspects themselves. I captured this by letting only aoristic aspect introduce a time immediately following the time of the eventuality described. Notice that, although the introduction of this time is part
of the semantics of the aorist, the question which time is actually picked up is not part of semantics, but rather left to pragmatic reasoning for which only default rules are formulated.

In this section I have refined the semantics of tense. Tense indicates the relation between the now and the topic time, the time about which we speak at a given point in the discourse. We had seen in section 2 that Ancient Greek reports shift the now, but that this doesn’t make the tenses anaphoric. The other relatum of tense, however, the topic time, is an anaphor. It is often provided by the preceding discourse. In the next section, I will argue that this anaphoric nature of tense is not restricted to normal ‘flat’ discourse, but found in report constructions as well.

3.2. Topic Time in Reports

Indirect discourses consisting of more than one clause show that there is no difference between normal flat discourse and indirect discourse with respect to temporal anaphora. This is particularly clear in long embedded stories, such as (20), from the beginning of Herodotus book 1:

(20) Περσέων μὲν νῦν οἱ λόγοι Φοίνικας αἰτίους φασὶ γενέσθαι τῆς διαφορῆς· τούτους γάρ ἀποφεύγειν οἱ Φοίνικας ἀρματίως μακρὰς ναυτιλίαις... ...ἐς Ἀργος καὶ τοὺς Φοίνικας διακελευσαμένους ἔλθανεν. Τὰς μὲν δὲ πλέονας τῶν γυναικῶν πορφυγεὶν, τὴν δὲ Ἰόν... The Persian learned men say that the Phoenicians were the cause of the dispute. These (they say) ...began-to-make long voyages ...and came-to ...Argos ...and the Phoenicians incited one another and attacked (the women of Argos). Most of the women (they say) escaped: Io and others (they say) were seized.

In (20) we have one occurrence of a verb of saying φασί ‘say’ followed by a sequence of accusative plus infinitives depending on it ((20) being only part of this sequence consisting of eleven infinitives in total). As we can see here, a whole story (about how according to the Persians the Greeks and the Persians started to wage war on each other) is told in the form of an indirect report.
Interestingly, the way temporal relations are established here is exactly the same as in normal non-embedded discourse (with the difference, of course, that apart from the locations of the eventualities relative to each other, all eventualities are located with respect to the reported rather than the actual now). For example, the escape of most of the women is interpreted as following the attack, as one would expect with a sequence of aorists. Had this story been told in direct discourse using the corresponding indicative forms, we would have obtained the same interpretation of the discourse.

It follows that since temporal relations are attributed to the anaphoric nature of tense in non-embedded discourse and, as (20) shows, there is no difference in the way we construct the temporal structure of an embedded discourse, this anaphoric behaviour in indirect discourse should be attributed to tense as well. To my knowledge, however, no existing account of tense both generalises its anaphoric nature to embedded discourse and simultaneously deals with the phenomenon of the shifted now (section 2) properly. Von Stechow’s (1995) account, for example, would agree with the present account that for normal non-embedded discourses, like the ones in (12) and (16), the topic times are provided by the linguistic context. For indirect discourses, like the ones in (20), however, he claims that the time variables are existentially quantified over. With regard to (20), he would state that there is a time \( t_1 \) that (due to the perfective aspect of ὁρμῆσαι ‘attack’) includes the attack and there is a second time \( t_2 \) that (due to the perfective aspect of ἀποφυγεῖν ‘escape’) includes the escape. On this account the two times need not be related in any way. This is particularly surprising if one realises that had the two eventualities been expressed in flat discourse, as for example in (16), he would have recognised the anaphoric relation between them.

Section 4 offers an analysis of tense in Ancient Greek that can deal with both the anaphoric and the shifted nature of tenses in Ancient Greek reports. First, I will address a potential objection to the point made in the present section: Ancient Greek infinitives don’t have tense.

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9) The other infinitives also show behaviour typical of their aspects, but it would lead us far off to go into that. See for example Rijksbaron (2002:11,12) for the summarising aorist (here γενέσθαι ‘be’) and Kamp and Rohrer (1983) for similar French examples with the passé simple and imparfait. For an analysis of the temporal behaviour of Ancient Greek participles in discourse, see Bary and Haug (2011).

10) In a non-dynamic account, such as von Stechow’s, anaphoric topic times are modeled as a free variables, which means that they are treated as referential expressions that get their interpretation from an assignment function. It is then assumed that assignment functions are somehow fixed by an (unspecified) pragmatic module that takes the context into account.
3.3. Infinitives

Apart from the future infinitive, Ancient Greek infinitives don’t have overt tense morphemes. This may seem problematic for my claim that the anaphoric behaviour in indirect discourse should be attributed to tense. This is, however, not the case. There is a good reason to assume that declarative infinitives (the use of the infinitive after verbs of saying and thinking, as opposed to the so-called dynamic infinitive, after verbs of desire or will, see Rijksbaron 2002:96–98) are interpreted as if they are tensed (see e.g. Goodwin 1966:192 for the same intuition, and Stowell 1982 for a similar view on English). Had the infinitive been neutral with respect to tense, we would expect aorist, imperfective, and perfect infinitives to allow for a future (forward-shifted) interpretation, which they don’t. Both imperfective and perfect infinitives have both a present (simultaneous) and a past (backward-shifted) interpretation, aorist infinitives have only a past interpretation (which is not surprising given the well-known clash between the features present and aorist, see for example Bary (forthcoming)).

(21) ὑπώπτευον γὰρ ἤδη ἐπὶ βασιλέα ήνα·
  suspect.pst.ipfv.3p PRT PRT against king.acc go.ipfv.inf
  ‘For they suspected by this time that they were going against the king (at that moment).’
  X. An. 1.3.1

(22) Τίνας οὖν εὐχὰς ὑπολαμβάνετʼ εὐχεσθαι τοῖς θεοῖς
  what.acc PRT prayers.acc suppose.prs.ipfv.2p pray.ipfv.inf the.dat gods.dat
  τὸν Φίλιππον, ὅτ’ ἔσπενδεν
  the.acc Philip.acc when pour.libations.pst.ipfv.3s
  ‘What prayers then do you suppose Philip made to the gods when he was pouring the libations?’
  Dem. F.L 130,4

This restricted set of interpretations of the various infinitives suggests that the past tense morpheme is somehow ‘lost’ in the transition from the indicative form to the infinitive. I claim that even though tense is not morphologically expressed on (past and present) infinitives, it is still interpreted. Since the present tense has zero marking, the past and present forms of the indicative correspond to the same infinitival form and hence the imperfective and perfect infinitives are ambiguous between an interpretation that involves a present tense and one that involves a past tense. This is illustrated in Table 2, where the past tense prefix ἑ- is in bold face.

11) At the risk of stating the obvious, the terms simultaneous, backward-shifted, and forward-shifted should be interpreted as relations to the reported now (the time the reported speaker thinks it is) rather than to the time of the reported utterance itself (see section 2).
| indicative | infinitive |
|------------|------------|
| present imperfective | imperfictive infinitive |
| γράφω | γράφειν |
| past imperfective | |}
| γραφον | γραφειν |
| past aoristic | aoristic infinitive |
| γράφα | γράφη |
| present perfect | perfect infinitive |
| γέγραφα | γεγραφειν |
| past perfect | |}
| γεγράφη | |}
| future (aspectually neutral) | future infinitive |
| γράφω | γράφειν |
| Table 2. Greek infinitives of γράφειν ‘to write’.

One additional remark about the fact that the past and present forms of the indicative correspond to the same infinitive. Although the imperfective infinitive in principle may have a simultaneous and a backward-shifted interpretation, it receives a simultaneous interpretation in most cases (Rijksbaron 2002: 106). This preference fits in neatly with the anaphoric nature of tense. Recall that the present tense in Ancient Greek reports indicates that the topic time is the reported now (the time the reported speaker thinks it is, see section 2) and the past tense that it precedes the reported now. Since the reported now is always salient and hence available for anaphoric uptake, it is only when a second time is made very salient (for example in the form of a temporal clause, as in (22)) or world knowledge rules out a simultaneous reading that we get a backward-shifted interpretation. For the very same reason (23) has a simultaneous interpretation, if one interprets it out of the blue, and it is only when a second time is made salient, as in (24), that we get a backward-shifted interpretation:

(23) Mary said that she was ill.
(24) Sue asked Mary why she didn’t come to the party last Friday. Mary said that she was ill.

Having shown that Ancient Greek declarative infinitives should be interpreted as if they have tense morphemes, in the next section I will propose an account of tenses in Ancient Greek indirect discourse that deals with the observations that they are (i) shifted indexicals, that is, the tenses are interpreted with respect to the reported, rather than the actual now, and (ii) anaphoric in the sense that the topic time is provided by the linguistic context.
4. A DRT Account

Let’s recapitulate what we have seen so far: non-embedded tense indicates the relation between the topic time and the actual moment of utterance \( n \) (see (8)). In indirect discourse, it relates the topic time to the reported now \( n' \):

\[
\begin{align*}
\text{PAST} & \quad t_{TT} < n' \\
\text{PRESENT} & \quad t_{TT} = n' \\
\text{FUTURE} & \quad t_{TT} > n'
\end{align*}
\]

In both cases the topic time is an anaphor that picks up a salient time from the linguistic context. Aspect behaves exactly the same in both constructions: it relates the time of the eventuality to the topic time (see (9)).

All this comes together in example (20), of which a part is repeated here as (26):

(26) Περσέων μέν νυν οἱ λόγιοι … φασὶ … τοὺς Φοίνικας ὁρμῆσαι ἐπ' αὐτάς. Τὰς μὲν δὲ πλέονας τῶν γυναικῶν ἀποφυγεῖν

‘The Persian learned men say ... that the Phoenicians attacked them. Most of the women (they say) escaped.’

The first part of (26) is assigned the preliminary DRS in (27):

\[
\begin{array}{c}
\text{SAY}_{e_1}\lambda n' \\
\text{\ldots e_2 t_2 t_3} \\
\text{\ldots t_1} \\
\text{\ldots n e_1 t_1} \\
\end{array}
\]

\[
\begin{align*}
\tau(e_2) & \subseteq t_2 \\
\tau(e_2) & \supsetneq t_3 \\
t_2 & < n' \\
t_1 & = n
\end{align*}
\]

In the universe of the main DRS we find the discourse referents \( n \) for the actual now, that is the time that Herodotus made this utterance, \( e_1 \) for the reported speaking eventuality, and \( t_1 \) for the topic time of this eventuality. Due to the
present tense of φασὶ 'say' the topic time is the now ($t_1=n$), and due to its imperfective aspect, the topic time includes the time of the saying eventuality ($\tau(e_1) \supset t_1$).\footnote{φασὶ 'say' doesn't refer to a single speaking eventuality, but has an habitual/iterative reinterpretation here. It's the habit that includes the topic time (see Bary 2009).}

The embedded box inside the main DRS represents the content of the saying. Crucially, it has $n'$ instead of $n$. Technically, this $n'$ is a variable that is lambda-bound by $\lambda n'$ (and hence I could just as well have used any other variable, for example, $y$ and $\lambda y$). However, the semantics of the say-operator (e.g. von Stechow 1995) ascribes the content of the saying, which is a property of times, to the reported now, i.e. the time the reported speaker thinks it is. Thus, the result is indeed that the time that is relevant for the interpretation of the embedded clause is the reported now. More in particular, the (covert) past tense of δρυῆσαι 'to attack' indicates that its respective topic time is in the past of this reported now ($t_2 \prec n'$).

The aoristic aspect of δρυῆσαι indicates that the time of the attack includes its topic time. The condition $\tau(e_2) \supset \prec t_3$ is already familiar from (17). It makes available a second time $t_3$ to pick up, a time immediately following the attack, and in this way captures the observation that with a sequence of aoristic clauses we often find narrative progression.

The second part of the report is interpreted in the context of the first embedded clause. This is represented in (28). Here the merge operator (indicated by $\oplus$) that we already know from main clauses combines two embedded DRSs, both representing part of the content of the report.

(28)
As before, the aoristic aspect of ἀποφυγεῖν ‘to escape’ indicates that the time of the escape includes its topic time $t_4$. The dashed box inside the right embedded box indicates that this topic time is to be provided by the context. After the merge of the two embedded DRSs, the discourse referents from the context become available to bind to:

$$\text{(29)}$$

Note that the anaphoric condition requires that $t_4$ bind to a time that precedes the reported now $n'$. Technically, $t_4$ cannot find an antecedent outside the embedded context since $n'$, to which it is related, is lambda-bound by $\lambda n'$ (trapping). This means that the past times (not represented here) in the main DRS are not available to bind to. The only times that are available for anaphoric uptake are the times that, like $t_4$ itself, are part of the embedded story.\(^{13}\)

\(^{13}\) Maybe von Stechow’s (1995) move to drop the anaphoric nature of tense (in the form of an anaphoric topic time, not an anaphoric now) as soon as we switch to indirect discourse was dictated by the thought that anaphoric uptake would frustrate the de se interpretation of tense. As the analysis presented here shows, however, there need not be a clash between the two features as long as one restricts the uptake possibilities to the entities introduced in the same embedding, which in fact already follows from the semantics. Bary and Maier (2009) argue that (English) examples where there is an apparent anaphoric uptake outside the embedded context should be analysed along the same lines.

There is an alternative for an anaphoric account of tense that explains the same phenomena. Rather than stating that tenses themselves are anaphoric, one assumes that for a discourse to be coherent any discourse unit has to stand in some discourse relation to some other unit, and
By default, $t_4$ picks up $t_3$, the time immediately following the attack eventuality. Note that this process runs exactly parallel to that in (16) to (19). The resolution results in the DRS in (30):

\[
\text{(30) }
\]

Crucially, the mechanism does not only keep track of what happens at the main level, but also of the changing, complex attitudinal states of the agents (Kamp 2006).

The result is depicted in Figure 7 and 8 for the main DRS and the embedded content, respectively.

\[
\frac{}{\tau(e_1) \ (\text{say})}
\]

Figure 7. Graphical representation of (30) (leaving out the topic times), main DRS.

that discourse relations (for example, narration) come with temporal relations (for example, succession). This is, for example, how Segmented Discourse Representation Theory (SDRT, Asher and Lascarides 2003) deals with the phenomena in section 3.1. Although this is in principle a good alternative to an anaphoric account of tense, the central claim of this paper would hold all the same: one would need to restrict the accessibility of discourse units to those inside the embedded context.
If the reported speakers are not mistaken about the time, the two time lines can be mapped onto one. Since the reportative verb has a present tense in our example, this would result in an identification of $n'$ and $n$. Similarly, the speaking event $\tau(e_1)$ and hence $n'$ would be in the past of $n$ with a past tense, and in the future with a future tense.

5. Conclusion

In this paper I have shown that tenses in Ancient Greek relate the contextually given topic time to the moment of utterance and hence have both an anaphoric and an indexical component. This also holds for tenses in indirect discourse if one extends the notion of indexicality to cases where the reported rather than the actual now is relevant for their interpretation. I have modeled this combination of features in a DRT analysis of tense and aspect where the set of times that is available for anaphoric uptake by embedded topic times is restricted to the times that occur in the same embedding.

References
Asher, Nicholas and Alex Lascarides. 2003. Logics of conversation. Cambridge: Cambridge University Press.
Bach, Emmon. 1986. The algebra of events. Linguistics and Philosophy 9: 5–16.
Bary, Corien. 2009. Aspect in Ancient Greek: A semantic analysis of the aorist and imperfective. Ph.D. thesis, Radboud Universiteit Nijmegen.
Bary, Corien. (forthcoming). The Ancient Greek tragic aorist revisited. Glotta.
Bary, Corien and Dag Haug. 2011. Temporal anaphora across and inside sentences: the function of participles. Semantics and Pragmatics 4: 1–56.
Bary, Corien and Emar Maier. 2003. Ancient Greek monsters. Paper presented at Szklarska Poreba 4.
Bary, Corien and Emar Maier. 2009. The dynamics of tense under attitudes: Anaphoricity and de se interpretation in the backward shift past. In: H. Hattori (Ed.), New frontiers in artificial intelligence, pp. 144–166. Berlin: Springer.
Gerö, Eva-Carin and Arnim von Stechow. 2003. Tense in time: the Greek perfect. In Regine Eckardt, Klaus von Heusinger, and Christoph Schwarze (Eds.), Words in time: diachronic semantics from different points of view, pp. 251–269. Berlin: Mouton de Gruyter.
Goodwin, William W. 1966. Syntax of the moods and tenses of the Greek verb. London: MacMillan.
Higginbotham, James. 2009. Tense, aspect, and indexicality. Oxford: Oxford University Press.
Hinrichs, Erhard. 1981. Temporale Anaphora im Englischen. Zulassungsarbeit Universität Tübingen.
Kamp, Hans. 2006. Temporal reference inside and outside propositional attitudes. In: Klaus von Heusinger and Ken Turner (Eds.), Where semantics meets pragmatics, pp. 439–472. Amsterdam: Elsevier.
Kamp, Hans and Uwe Reyle. 1993. From discourse to logic. Dordrecht: Kluwer.
Kamp, Hans and Christian Rohrer. 1983. Tense in texts. In: Rainer Bäuerle, Christoph Schwarze, and Arnim von Stechow (Eds.). Meaning, use, and interpretation of language. pp. 250–269. Berlin: de Gruyter.
Kamp, Hans, Josef van Genabith, and Uwe Reyle. 2005. Discourse Representation Theory. In: Dov M. Gabbay and Franz Günthner (Eds.), Handbook of Philosophical Logic. Dordrecht: Springer.
Kaplan, David. 1989. Demonstratives, an essay on the semantics, logic, metaphysics, and epistemology of demonstratives and other indexicals. In: Joseph Almog, John Perry, and Howard Wettstein (Eds.), Themes from Kaplan, pp. 481–614. Oxford: Oxford University Press.
Klein, Wolfgang. 1994. Time in language. London and New York: Routledge.
Kratzer, Angelika. 1998. More structural analogies between pronouns and tenses. In Devon Strolovich and Aaron Lawson (Eds.), Proceedings of Semantics and Linguistic Theory VIII, 36–54. Ithaca, NY: CLC Publications.
Lewis, David. 1979. Attitudes de dicto and de se. The Philosophical Review 88: 513–543.
Partee, Barbara H. 1973. Some structural analogies between tenses and pronouns in English. The Journal of Philosophy 70(18): 601–609.
Partee, Barbara. H. 1984. Nominal and temporal anaphora. Linguistics and Philosophy 7: 243–286.
Paslawska, Alla and Arnim von Stechow. 2003. Perfect readings in Russian. In: Artemis Alexiadou, Monika Rathert, and Arnim von Stechow (Eds.), Perfect explorations, 307–362. Berlin: Mouton de Gruyter.
Reyle, Uwe, Antje Rossdeutscher, and Hans Kamp. 2007. Ups and down in the theory of temporal reference. Linguistics and Philosophy 30: 565–635.
Rijksbaron, Albert. 2002. The syntax and semantics of the verb in Classical Greek. Amsterdam: J.C. Gieben.
van der Sandt, Roba. 1992. Presupposition projection as anaphora resolution. Journal of Semantics 9: 333–377.
Schlenker, Phillippe. 2003. A plea for monsters. Linguistics and Philosophy 26:29–120.
Smyth, Herbert Weir. 1984. Greek Grammar. Cambridge, MA: Harvard University Press.
von Stechow, Arnim. 1995. On the proper treatment of tense. In: Mandy Simons and Teresa Galloway (Eds.), Proceedings of Semantics and Linguistic Theory V, 362–386. Ithaca and New York: Cornell University Press.
von Stechow, Arnim. 2003. Feature deletion under semantic binding: tense, person, and mood under verbal quantiers. http://www2.sfs.unituebingen.de/~arnimo/Aufsateze/vonstech.pdf.
Stowell, Tim. 1982. The tense of infinitives. Linguistic Inquiry 13:561–570.