PROIEL Guidelines for Annotation

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Contents

1   Introduction

The system of annotation presented here is based on dependency grammar enriched with secondary dependencies (slashes, see section 13) reminiscent of the structure sharing mechanism in Lexical-Functional Grammar. Much of the scheme is adapted from the *Guidelines for the Syntactic Annotation of Latin Treebanks (v. 1.3)*[1] and its ultimate source, the *Guidelines for Annotations at Analyical Level of the Prague Dependency Treebank.*[2] However, there are several important differences that are adressed in a separate document which also discusses questions of conversion.

Since we use a dependency grammar, word order is not modelled at all in our syntactic trees. The information about word order is rather stored in a separate layer where each word is given a linearisation index corresponding to its position in the sentence. This means that there is no left-to-right ordering in our trees. In this document, the ordering often but not always approximates the linear order of the sentence. In the annotation interface, the left-to-right ordering of trees is decided by the dependency tree grapher and is purely conventional.

Word order

2   Sentence boundaries

The division of the text into sentences has been done automatically. It is based on the punctuation used in the source text, which will not always correspond to meaningful syntactic units. In the case of the Latin Vulgate, the source text had no punctuation at all, so we have 'imported' punctuation from another, slightly different text (the Clementine Vulgate). This means that there is even more potential for errors.

In the first step of the annotation process, therefore, the annotator is asked to verify that the sentence boundary has been set correctly. Whether two main sentences with καί, *et* or a similar conjunction between them have been conjoined or not depends on the punctuation used by the editor. The annotators should in general not change this, but only verify

Grouping of main clauses

- that there are no 'off-by-one' errors, ie. cases where the sentence boundary is wrong by a couple of words. This can happen if there are important textual deviations between the Clementine Vulgate and our text. Also, subjunctions like *quia* are often placed together with direct speech ('mixed speech'), but should belong with the verb of saying.

- that there are no subordinate clauses which have been assigned to the wrong governing main clause

Notice that the most frequent off-by-one-error occurs when a subjunction like *quia* is put in the same sentence as direct speech. In such cases, the subjunction should be dependent on the verb of speech (normally via the relation COMP),

'Mixed' speech

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[1]http://nlp.perseus.tufts.edu/syntax/treebank/1.3/docs/guidelines.pdf
[2]http://ufal.mff.cuni.cz/pdt2.0/doc/manuals/en/a-layer/html/index.html

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but not itself have any dependent, because the direct speech is marked off as a
separate sentence. Notice that sentences introduced by subjunctions should be
considered indirect speech if this is possible, ie. if there is no evidence from e.g.
pronouns to indicate that the quote is direct.

Indirect speech should depend on, and be grouped with, the sentence containing the verb of speech. Direct speech should be separated off as main clauses.
If a sentence contains both a verb of saying and some direct speech, it is possible
to analyse this as two separate sentences, see the next section.

There are cases where one main clause is entirely included in another main
clause as a parenthetical sentence. Since we consider direct speech as main
clauses, this is the case whenever a verb of speech is inserted parenthetically
into a sequence of direct speech, as in the following example (Acts 25.5):

> οἱ οὖν ἐν ὑμῖν, φησίν, δυνατοὶ συνκαταβάντες εἴ τί ἐστιν ἐν τῷ ἀνδρὶ
> ἄτοπον κατηγορείτωσαν αὐτοῦ.
>
> *Qui ergo in vobis, ait, potentes sunt, descendentes simul, si quod est
> in viro crimen, accusent eum.*

This should be split into to sentences, a PRED and a PARPRED. Disregarding
the internal structure of the main clause, the analysis will look the following
way:

(1)

```
                              Root
                         /            \
                    PRED              PARPRED
                  accusent              ait
                     |
                  Sentence
                 /        \
        qui ergo in vobis potentes sunt descententes
        simul si quod est in viro crimen eum
```
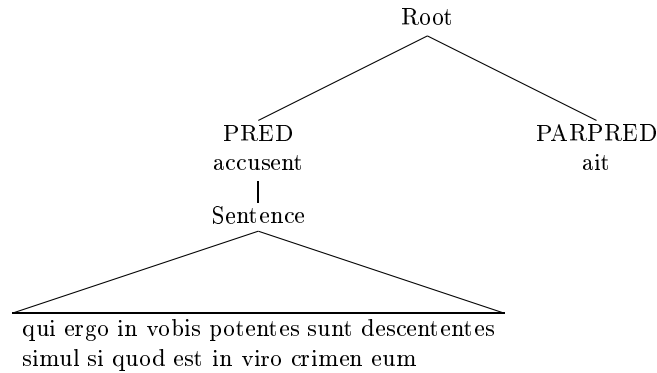
But there are also longer parenthetical sentences, especially in Paul. For the
purpose of the sentence boundaries, the whole should be treated as one sentence.
In analysing the syntactic dependencies, the verb of the parenthetical sentence
should be made dependent directly on the sentence root (and not on the main
clause) via the relation PARPRED (parenthetical predication).

2.1 Changing sentence boundaries

The GUI will provide a possibility to change the sentence boundary one word
at a time in order to correct for small errors in the segmentation. However,
a more common error occurs when two sentences which should have been two
independent as grouped together. The annotators should solve this by attaching

each of them as PREDs to the sentence root. In this way it is possible to make two independent questions into two sentences:[3]

(2)
```
                      Root
                     /    \
                  PRED    PRED
                 sinite   estis
                   |     /  |  \
                  OBJ  ADV OBL  PIV
                  eam quid illi molesti
```

Sinite eam! Quis illi molesti estis?
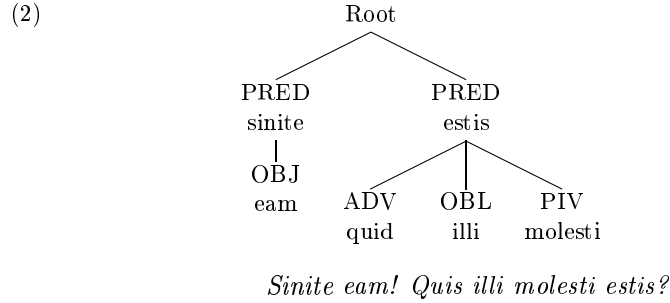
The same technique can be used when direct speech cooccurs with other elements:

(3)
```
                            Root
                          /      \
                       PRED      PRED
                        dic      licet
                     /   |   \     |
                   Aux  OBL  COMP COMP
                  ergo nobis videatur dare
                          /    |      |
                        SUB   OBL    OBL
                        quid  tibi    an
                                    /    \
                                  OBL    OBL
                               Caesari   non
```

Dic ergo nobis quid tibi videatur. Licet censum dare Caesari an non?
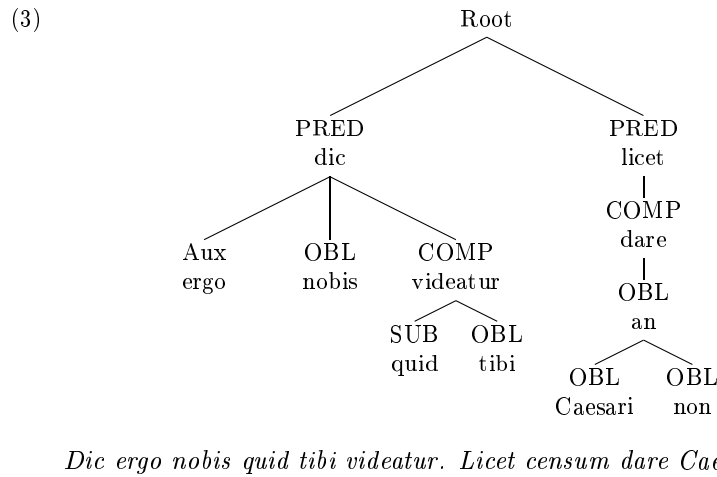
The precondition for using several PREDs directly under the root is that the two sentences can be properly ordered, ie. all elements of the first PRED must precede all elements of the second PRED. If this is not the case, the relation PARPRED must be used instead. Also, no slashes are allowed between two such sentences, since they will be converted to completely independent sentences in a later stage.

Notice that only PRED, PARPRED and VOC relations are allowed directly under the root.

3   Tokenization

The words to be analyzed and represented in the dependency tree do not always match those in the text. Sometimes elements which need to be treated as **Clitics, krasis**

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[3]In the following example we ignore the necessary slash from *molesti* to *estis*, see section 13.

separate tokens in the syntactic model are run together in the text. This is the case with *krasis* in Greek, and with enclitic *-que* in Latin. The conjunction cum negation *neque* has also been split into a conjunction part *que* and a negation part *ne*.

4   The verb

The verb is the central element of every predication. We model this by taking the verb to be the head of all other elements in its sentence (except subjunctions, see section 9.2). We also let the verb "stand in" for the sentence as a whole, which means that it is annotated with the function of the whole sentence (unless, again, a subjunction is present). This structure is apparent in example 1: although the internal structure of the main clause is not shown in the figure, we see that the main verb dominates all the other elements of its sentence.

Main clauses   Main clauses do not have a function within some larger sentence, therefore their verbs are attached to the root via the relation PREDication:

(4)
```
                Root
                 |
                PRED
                dico
               /    \
            Aux      OBL
            enim     vobis
```

Dico enim vobis
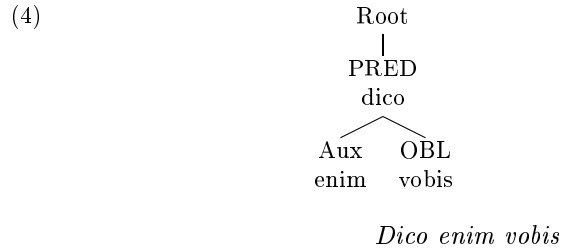
Subordinate clauses   In subordinate clauses introduced by a subjunction, the subjunction is assigned the relation which corresponds to the function of the clause, and the verb is attached to the subjunction via the relation PRED:

(5)
```
                Root
                 |
                PRED
                dicite
                 |
                COMP
                quia
                 |
                PRED
                 est
                 |
                XOBJ
              necessarius
                 |
                OBL
               Domino
```

Dicite quia Domino necessarius est
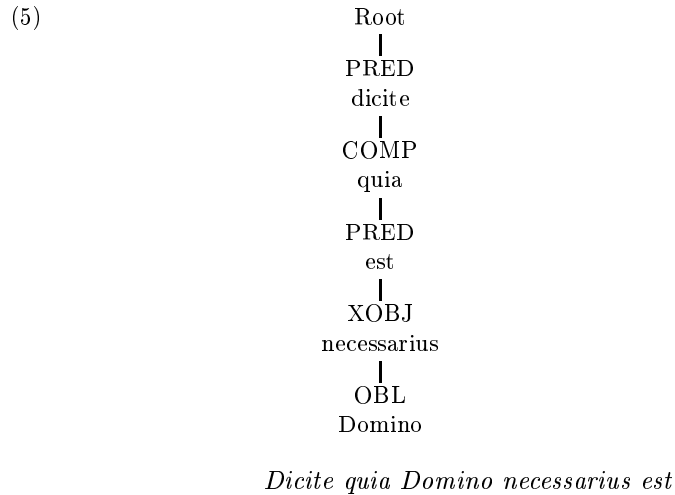
For more on subordinate clauses with subjunctions, see section 9.2. Sometimes the subjunction is missing even in sentences where we would expect one, see section 9.3.

In other contexts (relative clauses, accusative with infinitives, absolute constructions, dominant participles, conjunct participles and governed infinitives), verbs will be annotated with the function of the whole construction, see section 9. This means that a verb should always be present: if it is not in the text, it will have to be inserted, see section 11. **Other embedded predications**

Auxiliary verbs are attached to the main verb via the relation Aux: **Auxiliary verbs**

(6)
```
              Root
               |
             PRED
            dictum
            ╱      ╲
         Aux        OBL
         est       uobis
```

Dictum est vobis

Since we only allow PRED, PARPRED and VOC under the root, it is necessary to supply an empty verb whenever none is present. For example, when Jesus asks the disciples how many baskets of bread they distributed, the disciples answer 'seven': **Non-verbal predication**
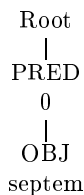
(7)
```
              Root
               |
             PRED
               0
               |
             OBJ
            septem
```

5 Exclamations

We use the relation VOC for all kinds of exclamations. These are placed directly under the root, as they are external to the sentence. In the syntactic annotation we annotate form and not function, so this relation is not only used for vocative nouns, but also for nominative and accusative exclamations as well as for different interjections etc. **Vocatives, interjections**

(8)

```
                          Root
              ┌────────────┴────────────┐
             VOC                       PRED
           Catilina                  habemus
                                        │
                                       OBJ
                                    consultum
                        ┌───────────────┼───────────────┐
                       ATR             ATR            APOS
                     senatus            in              et
                                        │         ┌──────┴──────┐
                                       OBL       APOS         APOS
                                        te     vehemens       grave
```

Habemus senatus consultum in te, Catilina, vehemens et grave

(9)

```
                Root
            ┌─────┴─────┐
           VOC         PRED
          amen         dico
                        │
                       OBL
                      vobis
```

Amen, dico vobis
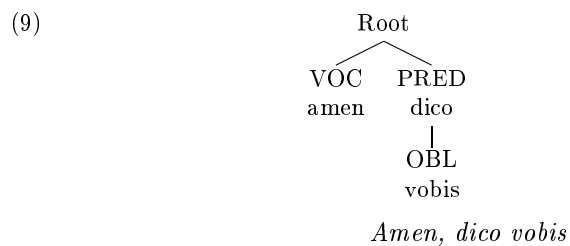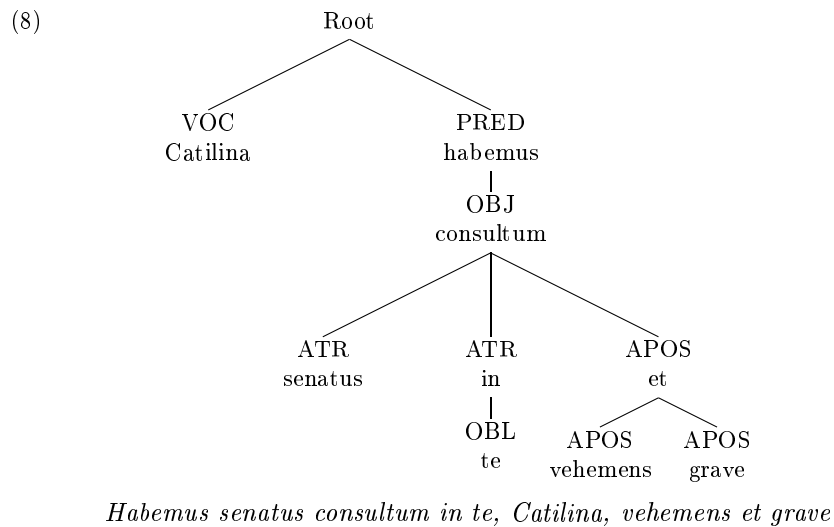
Some sentences consist of only an exclamation. In such cases there is no need to introduce an empty PRED-node:

(10)

```
      Root
       │
      VOC
     osanna
       │
      ADV
       in
       │
      OBL
    excelsis
```

Osanna in excelsis
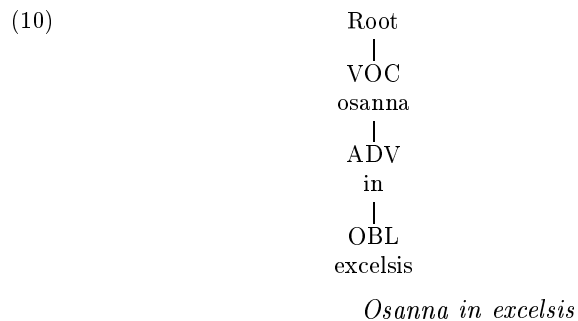
Notice in particular that *ecce* and ἰδού belong here.

6 Non-verbal sentence-level grammatical relations

In this section we describe sentence-level grammatical relations, ie. relations that must have a verbal node as a head. These are SUBject, OBJect, OBLique, AGent, PIV (predicative complement) and ADVerbial, as well as some supertags described in section 6.7

6.1   Subject

In the typical case, SUB relates a nominative noun to its verb:

(11)
```
                        Root
                         |
                        PRED
                       expellit
           ┌──────────┬────┴────┐
          ADV        SUB       OBJ       OBL
         statim    Spiritus    eum        in
                                          |
                                         OBL
                                       desertum
```
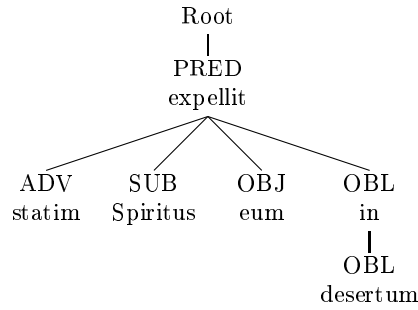
statim Spiritus expellit eum in desertum

But on some occasions, we also find partitive expressions (genitive nouns and prepositional phrases) which are subjects and must be given the relation SUB: **Partitive subjects**

(12)
```
                        Root
                         |
                        PRED
                      dixerunt
               ┌─────────┴────────┐
              SUB                 OBL
               ex                  ad
               |                   |
              OBL                 OBL
           discipulis           invicem
               |
              ATR
              eius
```
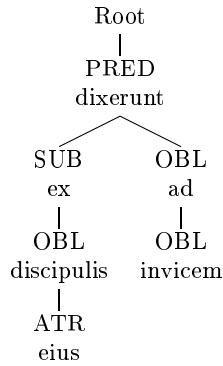
ex discipulis eius dixerunt ad invicem

Note that more generally, preposition phrases can serve as subjects in Greek when they are nominalised by the article:

(13)
```
                        Root
                         |
                        PRED
                       ἐξῆλϑον
                         |
                        SUB
                        παρ'
                    ┌────┴────┐
                   OBL       Aux
                  αὐτοῦ       οἱ
```
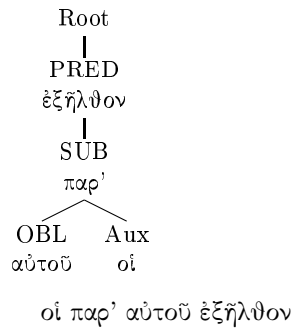
οἱ παρ' αὐτοῦ ἐξῆλϑον

Note that infinitives are never subjects, but rather COMPs, see section 14.7.

Subjects can also be nouns in oblique cases in an absolute construction, see section 9.7. **Subjects in absolute constructions**

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6.2 Object

In the typical case, OBJ relates an accusative noun to the sentence:

(14)
```
                        Root
                         |
                        PRED
                       intravit

          Aux        ADV        OBJ          ADV
          et        iterum    Caphernaum     post
                                              |
                                             OBL
                                             dies
```

iterum intravit Capharnaum post dies
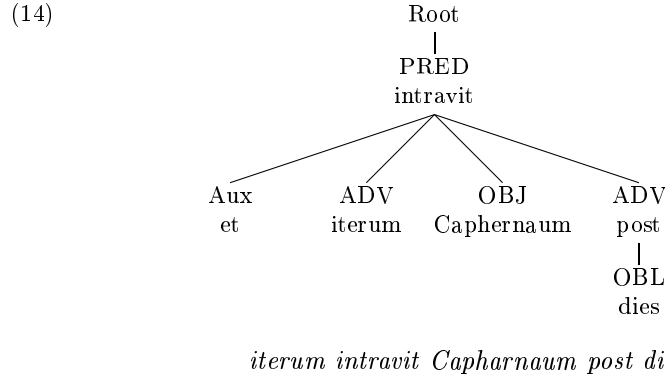
As with subjects, we sometimes find partitive expressions which are objects. They are given the relation OBJ:

Partitive objects

(15)
```
                   Root
                    |
                   PRED
                  afficient

            OBL       OBJ
           morte       ex
                        |
                       OBL
                      vobis
```

morte afficient ex vobis
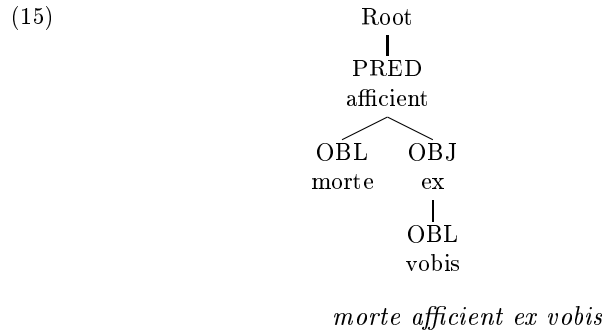
Partitive objects raise a problem which does not occur with partitive subjects, since they must be distinguished from normal governed genitives as we find, f.ex. with *meminisse*. The relation OBJ should only be assigned if an accusative could be substituted. If in doubt, consult section 6.7.

Some verbs, like *docere*, take two accusatives. It is possible in such cases to assign two object to the verb. However, this should only be done if both accusatives could become subjects in a passive construction. If only one of the accusatives can be the subject in a passive construction, the other accusative must become an OBL or an ADV.

Double accusatives

6.3 Obliques

We use the relation OBLique to attach those arguments of the verb which are not subjects or objects to the clausal node. By *argument* we mean any syntactic element seen as required by a verb. This could be a genitive, as with *meminisse*; a dative, as with *sucurrere*; an ablative, as with *uti*; a prepositional phrase, as with *pertinere* and in general with motion verbs; and even an adverb, as with *tractare*. It is not always clear whether a noun phrase is an oblique argument

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or not; or whether a genitive is a partitive object or an oblique argument. If in doubt consult section 6.7. Oblique arguments include non-accusative "objects" as well as prepostional arguments.

(16)
```
                Root
                 |
                PRED
                dixit
              /  |   \
           Aux  OBL   SUB
           et   mihi  angelus
```

et dixit mihi angelus
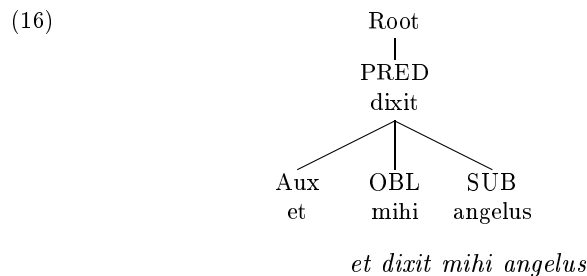
We include all directional expressions here (goal and source) here when they are used with motion verbs. This goes both for prepositions and adverbs, so e.g. *huc* should very often be an OBL. Other prepositions that are necessary to the meaning of the verb, such as in e.g. *pertinere ad*, also belong here:

(17)
```
            Root
             |
            PRED
           introibo
           /    \
         Aux    OBL
         et     ad
                 |
                OBL
                eum
```

et introibo ad eum
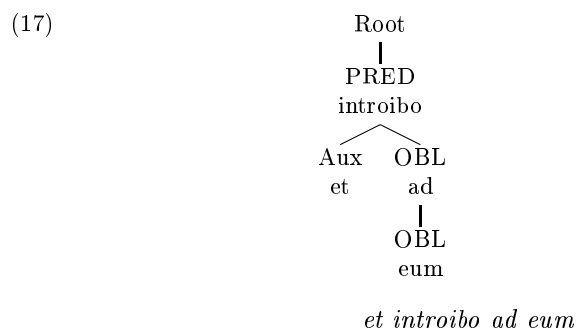
A restricted group of adjectives such as *similis, dissimilis* also take complement nouns. We relate these nouns to their adjectives via the relation OBL:

(18)
```
              Root
               |
              PRED
              erat
             /    \
          SUB     PIV
          iris    similis
                    |
                   OBL
                   visioni
                    |
                   ATR
                 zmaragdinae
```

iris erat similis visioni zmaragdinae
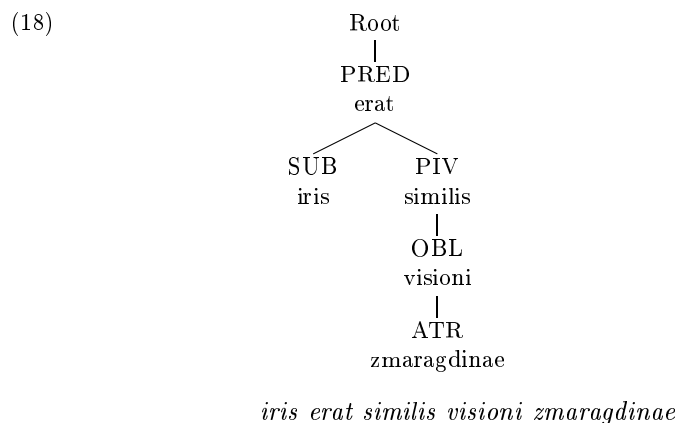
As the last example illustrates, the complement of the preposition is also considered an oblique argument (of the preposition), no matter the function of the phrase as a whole:

(19)

```
              S
              |
            PRED
            cenabo
              |
            ADV
            cum
              |
            OBL
            illo
```
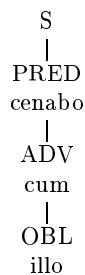
cenabo cum illo

6.4 Agents in passive constructions

We use the relation AGent to attach agent expressions to the sentence: **PPs as agents**

(20)

```
              Root
               |
             PRED
            obicuntur
          ╱    |    ╲
       SUB    OBL    AG
       quae   tibi   ab
                      |
                     OBL
                     his
```
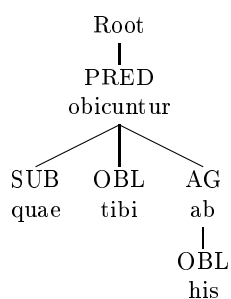
quae tibi obicuntur ab his

The same relation AGent is used whenever the agent is expressed by a pure case form rather than a prepositional construction: **Pure case forms**

(21)

```
                    Root
                 ╱        ╲
              VOC          PRED
              καὶ       πεπραγμένον
                      ╱   |    |    ╲
                   Aux   SUB   Aux    AG
                   ἰδοὺ  οὐδὲν ἐστὶν  αὐτῷ
                          |
                         ATR
                         ἄξιον
                          |
                         OBL
                        θανάτου
```
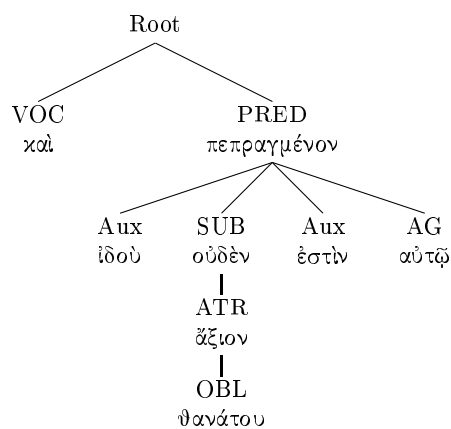
ἰδοὺ οὐδὲν ἄξιον θανάτου ἐστὶν πεπραγμένον αὐτῷ

6.5 Adverbials

We use the relation ADVerbial to attach adverbial expressions to the sentence. Such expressions can take various forms: adverbs, preposition phrases, nouns (in oblique cases), participles and gerunds. In some cases, it is not clear whether they are adverbials or oblique arguments, and in that case, sections 6.7 and 15.1 should be consulted:

Adverbs

(22)
```
              Root
               |
              PRED
            epulabatur
           /          \
        ADV            ADV
      cotidie        splendide
```

epulabatur cotidie splendide

Preposition phrases

(23)
```
                    Root
                     |
                    PRED
                  moechatus
              /    |     |      \
           ADV    Aux   OBJ     ADV
           iam    est   eam      in
                                  |
                                 OBL
                                corde
                                  |
                                 ATR
                                 suo
```

iam moechatus est eam in corde suo

Noun in oblique case

(24)
```
                        Root
                         |
                        PRED
                       dicunt
           /        /         \          \
         Aux      ADV         OBL        SUB
         et       die          ei      discipuli
                /    \
             ATR     ATR
            primo  azymorum
```

Et primo die azymorum dicunt ei discipuli

We also consider predicative/conjunct participles and adjectives, as well as gerunds, to be adverbial, but they special because they are cases of embedded predications with their own argument structure. Moreover, they are special

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in that they cannot take a subject dependent. They are further described in section 9.9. In the nominal domain, we do not try to separate predicative nouns from appositions, see section 8.3.

Adverbial accusatives are also ADVs and annotators should beware that *multum, multa*, πολλά and the like are often ADV and not OBJ.

The relation ADV is also used for sub-sentence-level modifiers of adjectives, prepositions and other adverbs:

ADV modifying non-verbal elements

(25)

```
            Root
             |
           PRED
           erat
             |
            PIV
           dives
             |
            ADV
           valde
```

erat valde dives

(26)

```
                        Root
                         |
                       PRED
                       factae
           ┌─────────┬──────┴──────┐
          Aux       SUB          ADV          ADV
          sunt    tenebrae        per           in
                                  |          ┌───┴───┐
                                 OBL        ADV     OBL
                                terram     usque   horam
                                  |                  |
                                 ATR                ATR
                                totam              nonam
```

tenebrae factae sunt per totam terram usque in horam nonam

(27)

```
                        Root
                         |
                       PRED
                      veniunt
           ┌─────────┬──────┴──────┐
          Aux       ADV          ADV          OBL
           et       mane         una          ad
                     |            |            |
                    ADV          ATR          OBL
                   valde      sabbatorum   monumentum
```

et valde mane una sabbatorum veniunt ad monumentum
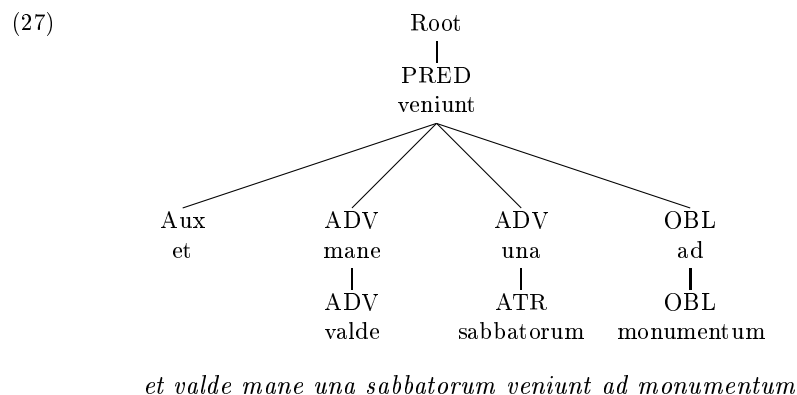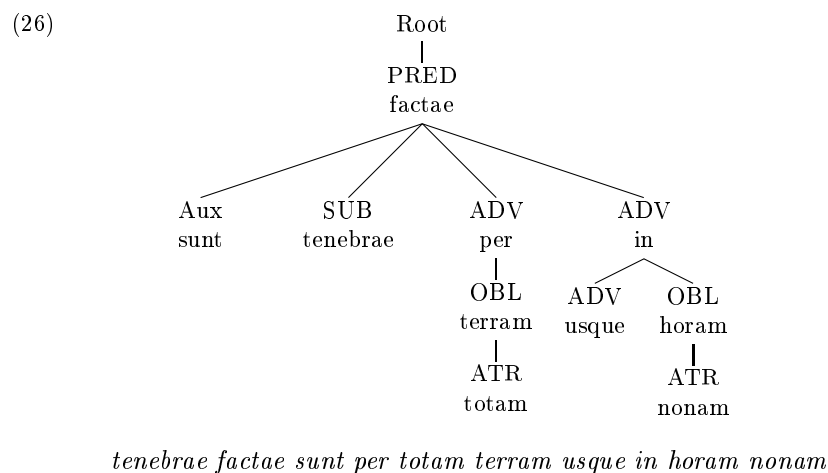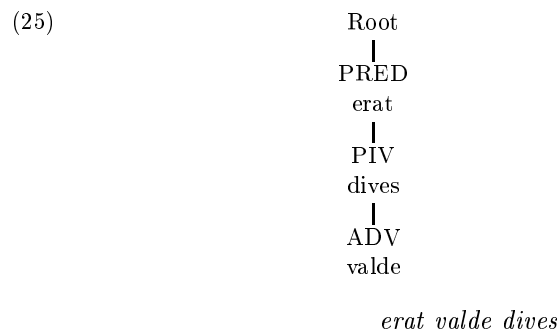
6.6 Predicative complements

The relation PIV (for predicative) is used for subject and object complements[4] which are introduced by verbs like *esse, uideri, appellari, fieri* (subject complements) and *facere, creare* (object complements), as well as in verbless absolute ablatives (see section 9.7). The relation itself does not make clear whether we are dealing with a subject predicative or an object predicative. Instead, we use the slash notation to mark this, see section 13.

Note that predicatives can be of many different syntactic categories: adjectives, nouns and preposition phrases are typical examples:

(28)
```
            Root
             |
           PRED
             |
            est
           /   \
        SUB     PIV
        /          \
   Cicero ◄······· consul
   Cicero consul est
```
Nominative noun

(29)
```
                  Root
                   |
                 PRED
                   |
              creaverunt
              /    |     \
           SUB    OBJ     PIV
           /       |        \
      Romani   Ciceronem ◄······· consulem
      Romani Ciceronem consulem creaverunt
```
Accusative noun

(30)
```
            Root
             |
           PRED
             |
           erat
           /   \
        SUB     PIV
        /          \
    navis ◄········· in
                      |
                     OBL
                      |
                    mari
                      |
                    ATR
                      |
                   medio
```
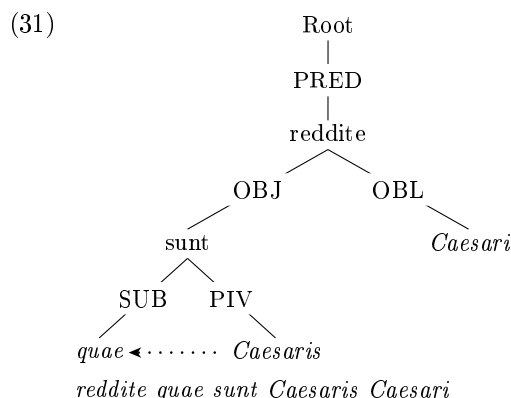
---

[4]Technically, PIV is equivalent to XOBJ as explained in section 15.5. We keep the distinction in the web interface since it is familiar from school grammar, but all PIVs will be converted to XOBJ. Annotators can therefore use this distinction as they please.

navis in medio mari erat

(31)
```
                    Root
                     |
                   PRED
                     |
                  reddite
                 /        \
            OBJ            OBL
            /                 \
         sunt                Caesari
        /    \
    SUB      PIV
     /         \
  quae ◄······· Caesaris
```

reddite quae sunt Caesaris Caesari

6.7 Supertags

The distinctions that we attempt to make in our syntactic model are not always crystal clear. Section 15 offers some supplementary advice on the use of some relations. In order to preserve the quality of the data, we also provide certain supertags which the annotators should use when they are in doubt, instead of simply choosing one of the alternatives. These are:

- PER for peripheral (not subject or object) elements, ie. OBL or ADV. This should be used whenever it is not possible to decide whether an element is an argument or an adjunct.

- ARG for arguments, to be used whenever it is not possible to decide whenever an element is an OBJect or an OBLique.

- NONSUB for non-subjects, ie. elements that are either OBJets, OBLiques or ADVerbials

In addition there are supertags for verbal functions, see section 9.10 and a supertag for adnominal functions, see section 8.

6.8 Auxiliary words

Items that are not covered by these tags are simply given the tag Aux, which serves to mark auxiliary verbs, modal particles, focus particles, negation etc. Information about these items is always recoverable from the categorial information in their morphology. The intuition behind the relation Aux is that it serves to mark off 'grammatical words' as opposed to 'lexical words'. There are certain adverbs whose meaning can sometimes be so weakened that they appear as grammatical words (*ergo* signalling simple progression for example), so the distinction between Aux and ADV is not always clear.

17

It is important to attend to scope issues: auxiliary verbs should be attached via Aux to their verbs; focus particles and constituent negation should be attached to the items they take scope over. In general, a scoping item is considered to scope over its mother node and all nodes dominated by its mother, and it should be placed accordingly. For more on this, see section 14.3.

7 Noun phrases without nouns

Sometimes a sentence-level function is not filled by a noun, but by an adjective, participle or a numeral. Such elements should be given the appropriate function in the sentence, and should *not* be related to an empty node representing the 'elliptical' subject, object or otherwise:

(32)
```
                      Root
                       |
                     PRED
                   biberunt
                   /      \
              SUB          OBL
            omnes           ex
                            |
                           OBL
                           illo
```

omnes ex illo biberunt

(33)
```
                      Root
                       |
                     PRED
                 responderunt
                       |
                     SUB
                  prudentes
```

responderunt prudentes
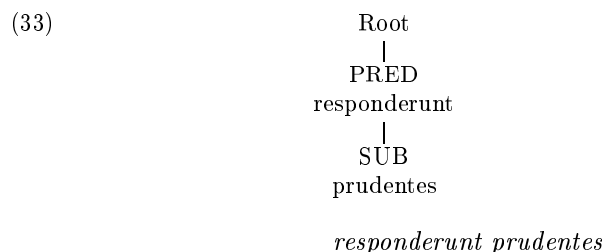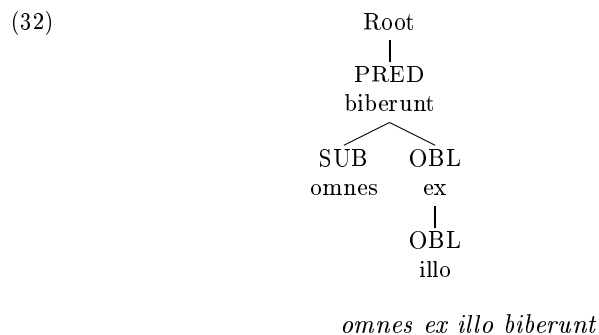
Before opting for such an analysis, the annotators should make sure that the adjective/participle is not predicative. The example above means 'The wise one answered'. If the sentence meant 'Being wise, they answered', *prudentes* would have been an XADV, see section 9.9.2.

As we have seen in the sections on the subject (6.1) and the object (6.2) even prepositional phrases can be subjects and objects, especially when they express partitivity. Another construction, which is fairly frequent in Greek, is the nominalisation of prepositions and adverbs in constructions like οἱ παρ' αὐτοῦ 'the ones around him' or οἱ νῦν 'people nowadays'. In such cases, the preposition should be the head and the article an Aux, as usual:

(34)

```
                          Root
                           |
                          PRED
                        ἐξῆλθον
                           |
                          SUB
                          παρ'
                         ╱    ╲
                      OBL      Aux
                     αὐτοῦ      οἱ
```

οἱ παρ' αὐτοῦ ἐξῆλθον
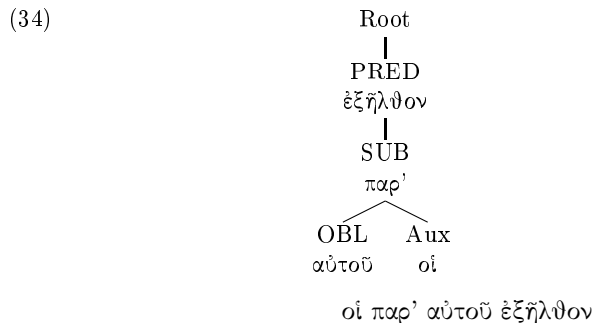
Sometimes there are several adjectives, participles and/or numerals. In such cases annotators will have to make a choice as to what is the head of the construction and what is the modifier/attribute. In general, the element which is most central to establishing the referent should be the head.

8 Adnominal tags

8.1 General

Dependents of nouns can be of various types. There are negations, emphatic particles etc. which are related via Aux, but with due consideration of scope issues (see section 14.3). In general, 'grammatical words' will bear the relation Aux, whereas 'lexical words' which are dependents of nouns will have various relations depending on their function. We recognise 4 main types:

ATR - attributes are elements which serve to restrict the reference of a noun. For example, in *canis albus* the adjective *albus* serves to restrict the possible reference of the noun *canis*. Attributes can be adjectives, prepositional phrases, relative clauses, participles, genitives, number words - but these categories can also have other adnominal functions, so it is important to pay attention here.

APOS - appositions are elements which serve to further elaborate on a nominal referent, without restricting the reference. Examples are *consul* in *Cicero consul, frater* in *Marcus frater*. Appositions are mostly nouns in the same case as their head, and non-restrictive relative clauses.

PART - partitives are elements which tell us to which group or whole the noun belongs. They are typically realised by genitives or by prepositions like *ex, de*, ἀπό etc.

NARG - some elements can be said to be *arguments* of nouns. The most clear example is the object genitive, as in *spes uincendi* or *amor fati*. Arguments can also be realised as prepositional phrases, as in e.g. *Dei amor erga nos*. Here *erga* is an argument of amor (and *nos* is in turn an argument of *erga*). Note that subject genitives are counted among the normal possessive genitives, as attributes.

These categories are further explained and exemplified in the following sections. There is also supplementary information in section 15. If in doubt annotators should use the supertag ADNOM.

8.2 Attributes

Attributes are given the tag ATR. Here is an example with an adjective and a possessive pronoun:

(35)
```
                    Root
                     |
                    PRED
                     est
                   /      \
              SUB            PIV
             Pater        perfectus
            /     \
         ATR        ATR
        vester    caelestis
```

pater vester caelestis perfectus est.
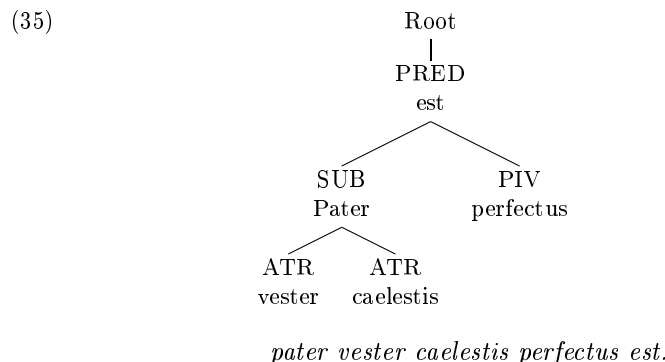
Here is a subtree involving a descriptive genitive and a numeral which is an attribute of the genitive noun:

Descriptive genitives

(36)
```
            SUB
            puer
             |
            ATR
          annorum
             |
            ATR
           decem
```

puer decem annorum
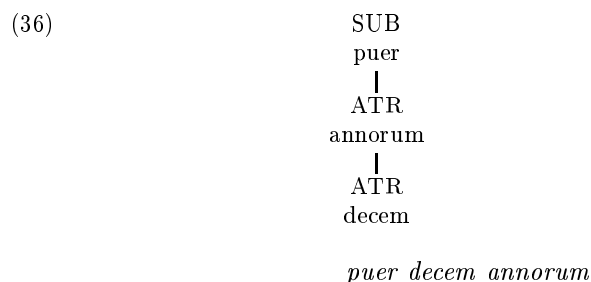
There are various other possibilities not illustrated here, such as possessive genitive (*patris filius*) and definitive genitives (*arbor fici*). Also, restrictive relative clauses are considered attributes, see section 9.4.

8.3 Appositions

Appositive nouns are attached to their head noun via the relation APOS. Such nouns are never restrictive (if they are, they are attached via the relation ATR instead), and we do not attempt to keep apart predicative appositions from other appositive nouns.

(37)
```
                    Root
                     |
                    PRED
                   detexit
                   /      \
              SUB          OBJ
            Cicero      coniurationem
              |              |
            APOS           ATR
           consul        Catilinae
```
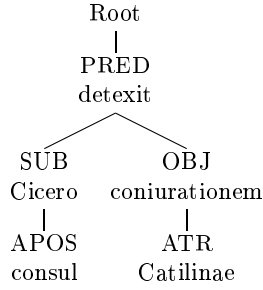
Cicero consul coniurationem Catilinae detexit

We do not attempt a differentiation between the two meanings 'Cicero the consul uncovered Catiline's conspirary' and 'Cicero uncovered Catiline's conspiracy while he was a consul'. Non-restrictive relative clauses are also considered appositions, see section 9.4.

Notice in particular that 'second names', and modifiers of names, as in *Maria Magdalena* or *Iesus Christus*, are always considered appositions. **Names and modifyers of names**

8.4 Partitives

Adnominal partitive expressions are typically realised as genitives or preposition phrases:

(38) (a)
```
          Root                    (b)          Root
           |                                    |
          PRED                                 PRED
         mortuus                              mortuus
         /     \                              /     \
      Aux       SUB                        Aux       SUB
      est       unus                       est       unus
                 |                                    |
               PART                                 PART
                ex                                  eorum
                 |
               OBL
                eis
```
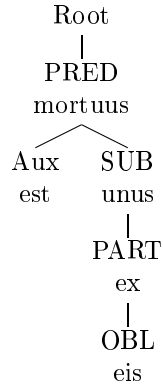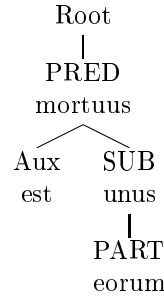
Unus ex eis mortuus est   *Unus eorum mortuus est*

Notice that PART is reserved strictly for adnominal partitives. It should *not* be used for partitive objects. These are OBJs, and only the morphology signals that they are partitives. This means that *ut ab agricolis acciperet de fructu vineae*, there is no partitive: *de fructu vineae* is a normal object of *acciperet*.

8.5 Arguments of nouns

Nouns, especially deverbal nouns, can take arguments just like verbs.[5] A clear case are so-called objective genitives, but also other items like prepositional phrases can be NARGs:

(39)
```
                        Root
                         |
                        PRED
                         est
                       /      \
                  SUB           PIV
               baptismus      ingressio
                                 |
                               NARG
                                in
                                 |
                               OBL
                            sanctitatem
                                 |
                               ATR
                               Dei
```

baptismus est ingressio in sanctitatem Dei
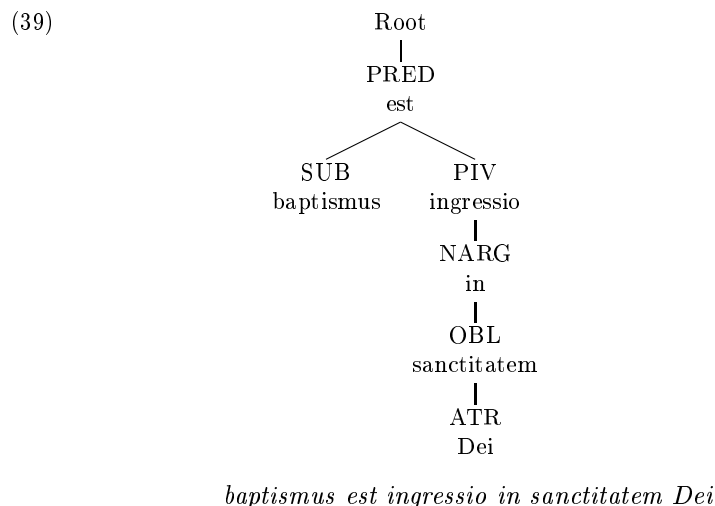
Verbal nouns, such as infinitives and gerundives, are typically NARGs when they are dependent on nouns:

(40)
```
              Root
               |
              PRED
               |
               est
              /   \
           SUB     PIV
           /        \
      spes ◄········ in
        |             |
       ATR           OBL
        |             |
      tota        confirmatione
```

Tota spes uincendi est in confirmatione
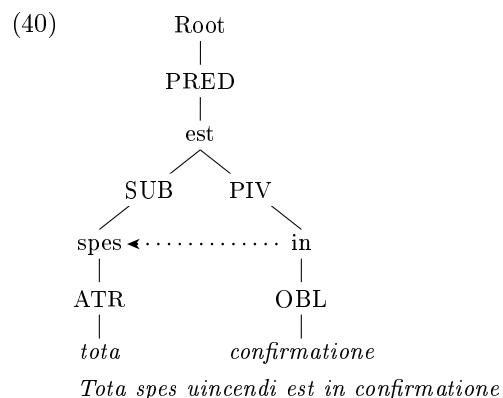
In such cases, there is not always a clear subject in the sentence. But if there is one, it should be marked by a slash arrow. Consult sections 14.6 and 14.7 for further information.

9 Embedded predication

Embedded predications are divided in two major classes according to whether **Open and closed predications**

---

[5] However, nouns very rarely take direct object arguments, although some exceptions are found e.g. in early Latin.

they can have their own, overt subject or not. Predications which cannot have an overt subject are called *open*, because their subject is supplied from outside the construction. They include some infinitives, such as the complement infinitives of *posse* - witness the grammaticality of *potesne mihi auscultare* as opposed to **potesne te mihi auscultare* - and conjunct participles, whose subject is always coreferent with some other element of the sentence, but never expressed as a dependent of the participle. Open predications are further discussed in section 9.9. Sections 9.1 to 9.8 describe various kinds of closed predications.

The distinction between open and closed predications has to do with being a sentence or not. 'Real' subordinate sentences, introduced by subjunctions, have all it takes to be a sentence: a subject, a predicate, aspect, voice, etc. etc. Accusative with infinitive structures and absolute construction and even the *ab urbe condita*-construction also have these characteristics. So we can refer to these as subordinate *sentences*. Conjunct participles are also like sentences in some ways, but differ in a crucial respect, since they do not have their own subject.

9.1 The basic types of subordinate clauses

Traditional grammar divides subordinate clauses into three groups: substantival sentences, adjectival sentences and adverbial sentences. This distinction reflected in our annotation.

9.1.1 Substantival sentences

Substantival sentences are also called complement sentences because they complement the main verb. They often seem to have the same functions as nouns, most often as objects, but sometimes as subjects. However, we do not attempt to keep such functions apart, but use COMP for all of them. We treat them this way, because in a sentence like *dicitur Homerum caecum fuisse*, it is not easy to tell whether *Homerum caecum fuisse* is the subject of *dicitur* or rather the object of an impersonal construction.

Substantival sentences are typically AcIs, indirect questions and subordinate clauses introduced by *quod, quia* and ὅτι (in the meaning 'that', not 'because', which introduces an adverbial sentence). Notice that in Biblical Greek ἵνα is also used to introduce complement clauses much more regularly than in Classical Greek. In Latin, complement clauses can also be introduced by *ut, ne, quominus* and *quin.*The criterion is that the sentence is selected by the verb: *persuadere* selects an *ut*-sentence, f.ex., so this sentence is a COMP. The same goes for locutions like *prohibeo quominus* and *haud dubito quin.* Sometimes a subordinate clause is not introduced by any subjunction at all and such subordinate clauses are always COMPs.

Notice that an *ut*-sentence which depends on *persuadere* differs from the *ut*-sentence which can be added to any verb, to express intention. A fairly comprehensive list of verbs that take completive *ut* in Latin is: *accidit, adhortor, adipiscor, admoneo, caveo, cogo, concedo, constituo, contendo, contingit, convenit, decerno, denuntio, deprecor, dico, edico, efficio, enitor, evenit, facio,*

Types of complement sentences

fit, flagito, hortor, impello, impero, impetro, incito, interdico, interest, iubeo, laboro, mando, mereo, moneo, obsecro, opto, oro, permitto, persuadeo, peto, placet, posco, postulo, praecipio, praescribo, precor, rogo, scribo, sequitur, sino, statuo, studeo, suadeo, subigo, volo No such list is available for Biblical Greek or the other languages, but the intuition to follow is that with verbs with the above semantics, the *ut*-sentence belongs closer to the verb than in other cases, where it introduces an adverbial sentence.

For guidelines on how to annotate the various complement sentences, consult sections 9.2 (finite sentences with subjunctions), 9.3 (finite sentences without subjunction), ?? (accusative with infinitive) and 9.5 (indirect questions).

Our representation is therefore:

(41)
```
              Root
               |
              PRED
               |
             dicitur
               |
              COMP
               |
             fuisse
              /  \
           SUB    PIV
           /        \
    Homerum ◄······· caecum
    dicitur Homerum caecum fuisse
```
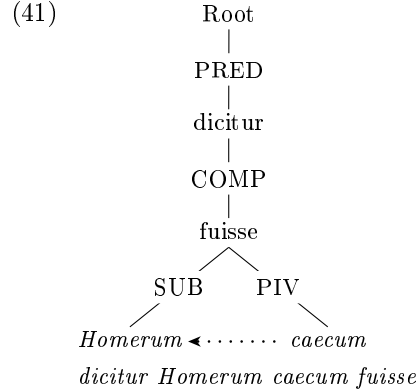
Notice that the so-called nominative with infinitive is treated differently:

(42)
```
              Root
               |
              PRED
               |
             dicitur
              /  \
           SUB    XOBJ
           /        \
    Homerus ◄······· fuisse ◄.
                       |       :
                      PIV      :
                       |       :
                     caecus ·
    dicitur Homerus caecus fuisse
```
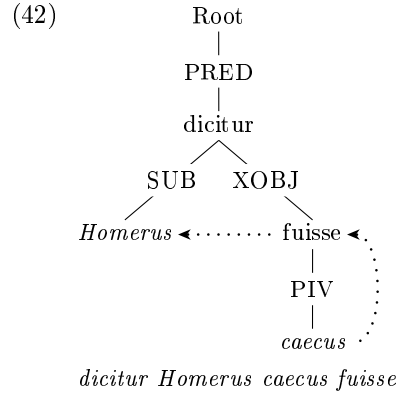
In the nominative with infinitive, the infinitive no longer has its own subject, so it is an XOBJ and not a COMP.

Another common variant of the complement clause is the indirect question:

9.1.2 Adjectival sentences

Relative sentences are adjectival in the sense that they have the same functions as adjectives. They are often adnominal (ADV and ATR), but can also be

'substantivized' and used directly for sentence-level functions without having a antecedent.

Relative sentences are the only adjectival sentences and their annotation is further described in section 9.4.

9.1.3 Adverbial sentences

Adverbial sentences are sentences which express information about time, intention, result, cause, concession, condition etc. Absolute constructions (9.7) belong here. Otherwise, they are always introduced by subjunctions and treated in section 9.2. Some subjunctions which introduce adverbial sentences in latin are: *cum, donec, dum, ne, nec, neque, nisi, postquam, prout, quando, quia, quoadusque, quod, quoniam, si, sicut, siquidem* In Greek, at least ἔαν, εἴ, ἐπάν, ἐπεί, ἐπειδή, ἕως, ἡνίκα, ἵνα, ὅταν, ὅτε, ὅτι, ὥστε introduce adverbial sentences.

9.2 Finite subordinate clauses with subjunctions

In subordinate clauses, except relative clauses, the finite verb is attached to the subjunction via the same relation PRED that we use in main clauses. The subjunction is related to the matrix clause via COMP if it is a complement clause:

(43)

```
                        Root
                         |
                        PRED
                       audistis
                         |
                        COMP
                        quia
                         |
                        PRED
                       dictum
              _____|_____
             |           |           |
            Aux         OBL         COMP
            est       antiquis     occides
                                      |
                                     Aux
                                     non
```

audistis quis dictum est antiquis non occides

(44)

```
                        Root
                         |
                        PRED
                       datum
           _____/  |  _____
          /              |              \
        Aux            OBL            COMP
        est            illis            ne
                                         |
                                       PRED
                                    occiderent
                                         |
                                        OBJ
                                        eos
```
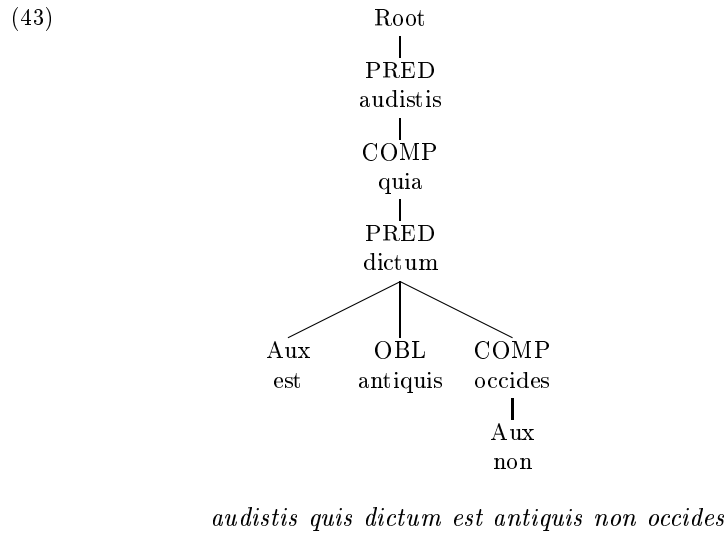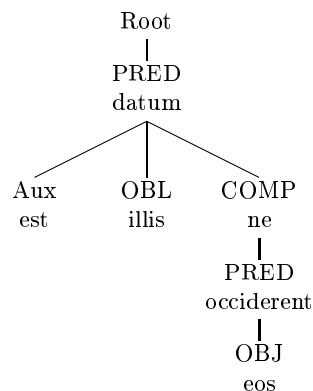
datum est illis ne occiderent eos

Only a restricted group of subjunctions introduce COMPs, see the discussion in in section 9.1.1. Many more subjunctions introduce adverbial sentences, consult section 9.1.3.

Notice that in most cases the subjunction will only have a single daughter, the verb, although sometimes a subjunction can be modified. For example, we can have εἰ καί or *et si* (= *etsi*) where καί/*et* modifies the subjunction:

Modification of a subjunction

(45)

```
                ADV
                 si
           ____/  \____
          /            \
        Aux          PRED
         et       scandalizati
                    __/  \__
                   /        \
                 SUB       Aux
                omnes     fuerint
```
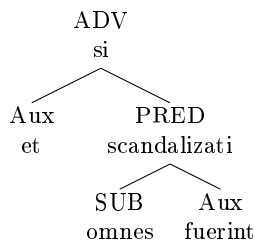
et si omnes fuerint scandalizati

This means 'even if everyone is scandalized'. In cases where *et si* means 'and if', *et* should be attached to the main verb:

26

(46)

```
                              Root
                               |
                             PRED
                           deficient
              _____/    |    _____
           ADV              Aux              ADV
            in               et               si
            |                                 |
           OBL                              PRED
           via                            dimisero
                                        __/      \__
                                     OBJ            OBL
                                     eos             in
                                                     |
                                                    OBL
                                                   domum
                                                     |
                                                    ATR
                                                   suam
```
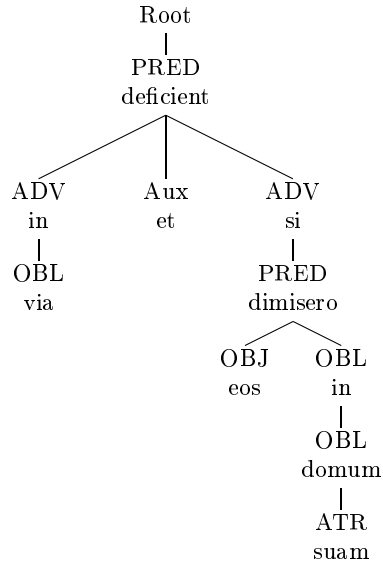
et si dimisero eos in domum suam deficient in via

Here the meaning is 'And if I send them home, they will faint on their way', ie. *et* modifies the whole sentence, and not the subjunction alone.

9.3   Finite subordinate clauses without subjunction

It can happen that a finite subordinate clause is not introduced by a subjunction, e.g. when *ut* is left out. In such cases, the function of the subordinate clause is annotated directly on the verb, and the function is almost always COMP:

(47)
```
          Root
           |
         PRED
          vide
           |
         COMP
        dixeris
           |
          OBL
        nemini
```

vide dixeris nemini

9.4   Relative clauses

Relative clauses differ from other finite subordinate clauses in that they do not have a subjunction. Instead, they are introduced by an element (the relative pronouns or adverbial) which also has a role in the sentence, such as subject, object, oblique or adverbial. Therefore these sentences should be headed by

27

the verb directly, and the relative or interrogative should be annotated with its function within the clause. In other words, it is **never** correct to let an adverbial or relative word head a sentece. This also goes for relative adverbs like *ubi* and similar words.

The verb of such subordinate sentences is therefore given the relation corresponding to the function of the sentence as a whole. There are several possible functions.

The verb of a relative clause with an antecedent is attached to the antecedent via the relation ATR (restrictive relative clauses) or APOS (non-restrictive relative clauses):

Adnominal relative clauses

(48)
```
                    Root
                     |
                   PRED
                 illudebant
         ┌───────────┼───────────┐
       OBL          Aux         SUB
        ei           et         viri
                                 |
                                ATR
                              tenebant
                              ┌────┴────┐
                            SUB       OBJ
                            qui       illum
```
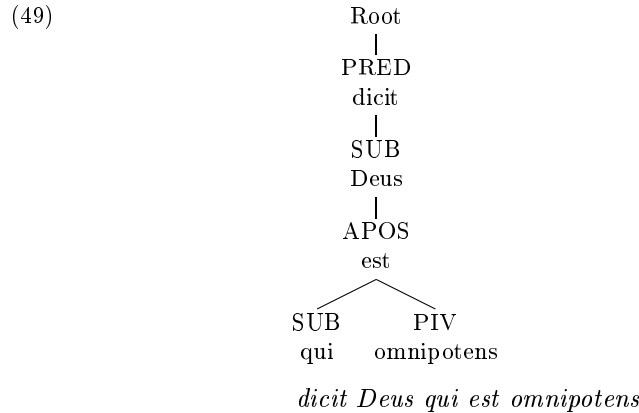
Et viri qui tenebant illum, illudebant ei

(49)
```
            Root
             |
           PRED
           dicit
             |
           SUB
           Deus
             |
          APOS
           est
        ┌────┴────┐
      SUB        PIV
      qui     omnipotens
```

dicit Deus qui est omnipotens
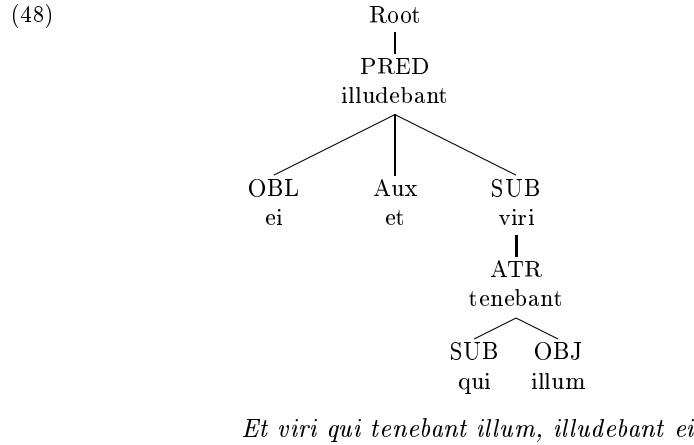
If the verb of the relative clause was instead attached via the relation ATR, this would correspond to the semantic interpretation "the god who is omnipotent" (in contrast to some other god). If it is not possible to decide whether a relative clause is restrictive or not, use the supertag REL.

It is important that not only relative pronouns, but also relative adverbs should be annotated this way, since relative adverbs also have a function within their own clause. The same goes for interrogative adverbs. The following sentence illustrates *ubi* in both uses:

Relative adverbs

28

(50)

```
                      Root
                       |
                      PRED
                       est
              PIV              SUB
         ubi ·················➤ refectio
                            ATR        ATR
                         mea            manducem
                                  ADV   OBJ   ADV
                                 ubi   pascha    cum
                                                  |
                                                 OBL
                                                  |
                                              discipulis
                                                  |
                                                 ATR
                                                  |
                                                 meis
```
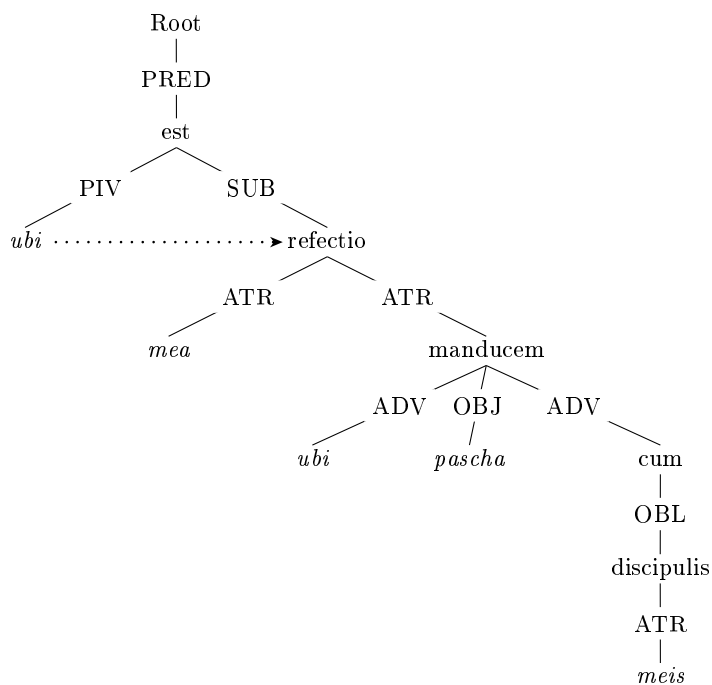
ubi est refectio mea ubi pascha cum discipulis meis manducem

If there is no antecedent for the relative pronoun, the verb of the relative clause will itself bear a sentence-level function within the matrix clause:

Relatives without antecedent

(51)

```
              Root
               |
              PRED
             audiat
               |
              SUB
             habet
         SUB     OBJ
         qui     aurem
```
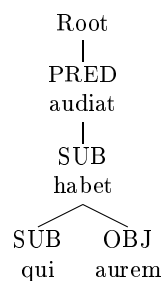
qui habet aurem, audiat

Notice that this method of annotation implies that the relation of the subordinate verb changes if the correlate is left out. Consider the following two sentences:

(52) (a)

```
            Root
             |
            PRED
           scribe
             |
            OBJ
             ea
             |
            ATR
           uides
             |
            OBJ
           quae
```

(b)

```
            Root
             |
            PRED
           scribe
             |
            OBJ
           uides
             |
            OBJ
           quae
```

scribe ea quae vides   *scribe quae vides*

Leaving out the correlate changes the function of the relative clause, which is annotated on its verb, from an attribute which restricts the reference of *ea* to a direct object of *scribe*.

Sometimes the correct position of the relative pronoun can be deep inside the clause it introduces, e.g. in an embedded accusative with infinitve:

(53)

```
              Root
               |
              PRED
           manducavit
               |
              OBJ
             panes
               |
              ATR
             licet
             /     \
          Aux       COMP
          non      manducare
                      |
                     OBJ
                    quos
```
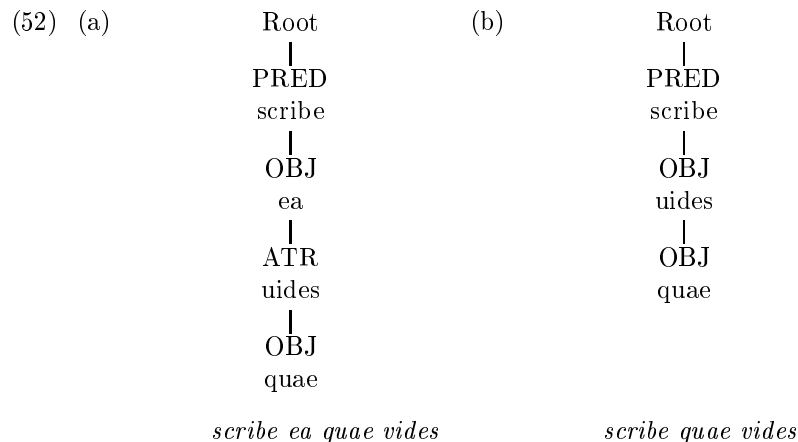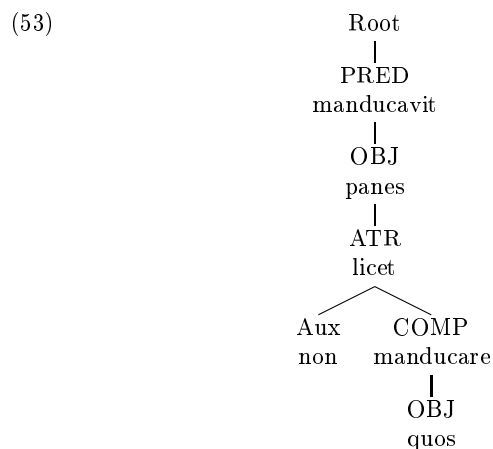
9.5   Indirect questions

Indirect questions are like relative sentences in that there is no element which introduces the sentence. The interrogative pronoun/adverbial has a function inside the sentence and must be annotated accordingly. The verb of the indirect question is given the function of the whole subordniate sentence, which in the case of indirect questions is always COMP.

(54)
```
                    Root
                     |
                    PRED
                  quaesivit
                     |
                    COMP
                  exivisset
                     |
                    ADV
                   quare
```
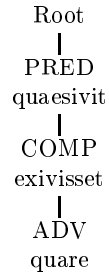
quaesivit quare exivisset

9.6 Infinite predication: Accusative with infinitive (AcI)

Again we let the infinitive verb stand in for the whole construction. In the normal case this construction consists of a subject in the accusative, a predicate which is a verb in the infinitive and possibly further arguments and adjuncts. The infinitive is given the relation COMP:

(55)
```
                    Root
                     |
                    PRED
                    vidi
                     |
                    COMP
                  cecidisse
                 /    |    \
              SUB    OBL    OBL
            stellam   de     in
                      |      |
                     OBL    OBL
                    caelo   terram
```
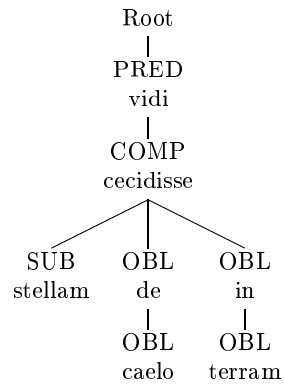
vidi stellam de caelo in terram cecidisse

However, it can happen that the predicate infinitive is lacking. Most often the elided infinitive is *esse* or a similar verb, and we introduce an empty node: **Elided infinitive**

31

(56)

```
                              Root
                               |
                             PRED
                            vidimus
                 _____/  |  _____
                /              |              \
              Aux            ADV            COMP
              aut           quando            0
                                        ____/ \____
                                       /           \
                                     SUB           PIV
                                      te           aut
                                               ___/ \___
                                              /         \
                                            PIV         PIV
                                         infirmum        in
                                                         |
                                                        OBL
                                                      carcere
```
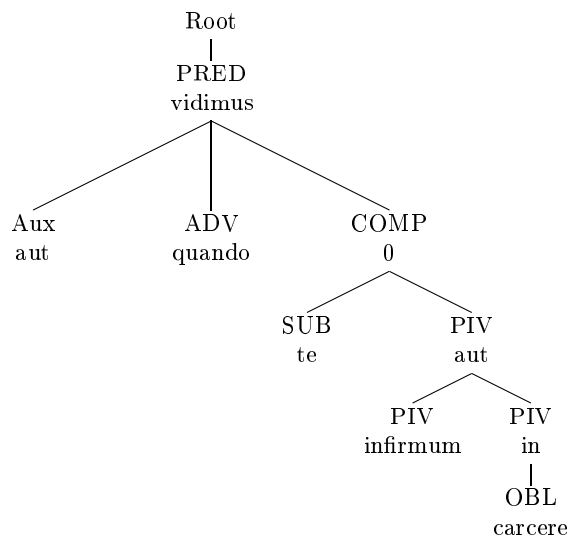
quando te vidimus infirmum aut in carcere

Accusative with infinitive structures should be kept apart from pure infinitives
which cannot take a subject, as with the complement infintives of auxiliary verbs
like *posse, velle*. For the annotation of the latter structures, consult section 9.9.

However, since the subject is not always present in an accusative with in-**AcI without**
finitive structure, it is sometimes hard to tell whether a given infinitive is part **subject**
of an AcI with an unexpressed subject or is an open complement. In addition,
some verbs allow both constructions. For example, both *uolo id facere* and *uolo
me id facere* are possible constructions in Latin. In examples like *uolo id facere*,
facere should be treated as an open complement (XOBJ) and not part of an AcI
with a deleted subject. An elliptical AcI should be assumed only if the matrix
verb does not allow an open complement construction.

There are structures where one could be in doubt whether an accusative
noun is the object of the main verb or the subject of the subordinate verb.
Consider f.ex. the causative construction with *facere* + accusative noun +
infinitive, as in *fecit omnes accumbere*. *omnes* could be analysed as the subjet
of *accumbere* or as the object of *fecit*. Both analyses would in principle be
possible, but annotators should always use the AcI analysis with the accusative
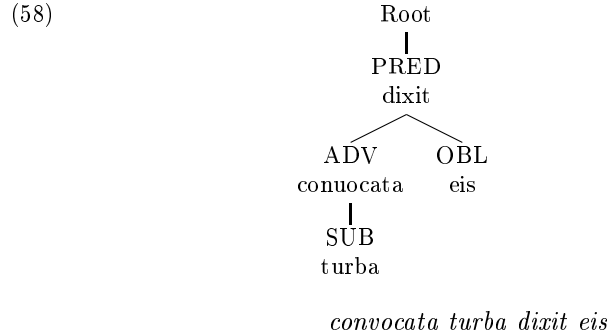noun dependent on the infinitive:

(57)

```
        Root
         |
       PRED
       fecit
         |
       COMP
     accumbere
         |
        SUB
       omnes
```
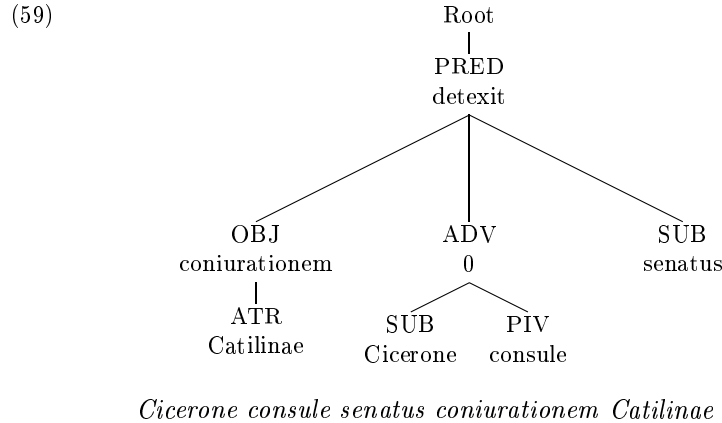
32
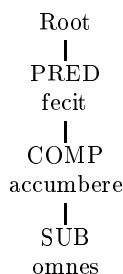
This is a purely conventional choice and applies only to accusative nouns. In structures with a dative noun and an infinitive, f.ex, the noun is made dependent on the matrix verb, as in *licet mihi exire*, see section 14.4.

9.7 Infinite predication: absolute constructions

Absolute constructions are embedded predications with an adverbial relation to the rest of the sentence. We consider the participial verb to be the head of the construction. It is therefore related to the matrix clause via the relation ADV:

(58)
```
                    Root
                     |
                    PRED
                    dixit
                   /     \
               ADV        OBL
            conuocata      eis
               |
              SUB
             turba
```

convocata turba dixit eis

The predicate in an absolute construction need not be a verb: it can be a noun or an adjective. In such cases, we assume an empty verb:

(59)
```
                         Root
                          |
                         PRED
                        detexit
                       /    |    \
                   OBJ     ADV     SUB
            coniurationem   0     senatus
                  |        /  \
                 ATR     SUB   PIV
              Catilinae Cicerone console
```

Cicerone consule senatus coniurationem Catilinae detexit
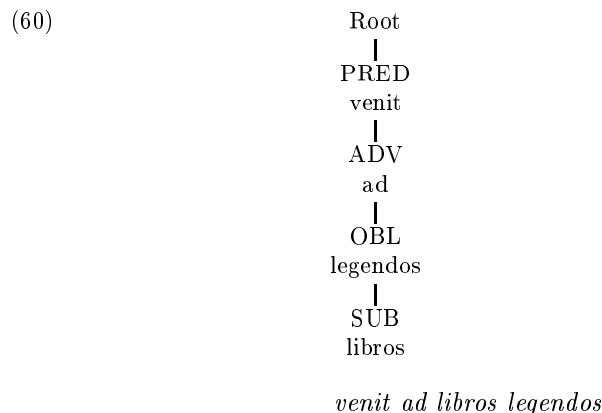
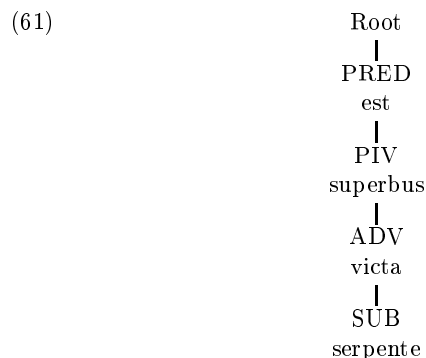## 9.8 Infinite predication: dominant participles and gerundives

Latin has a special type of an embedded predication which looks like a normal noun phrase: sometimes noun + agreeing participle/gerundive corresponds to an English translation with a verbal noun translating the participle (or gerundive) + a dependent genitive. Thus *ab urbe condita* means 'from the founding of the

city', and not 'from the founded city'; *Caesar occisus* can mean 'the murder of Caesar' (ie. 'that Caesar was murdered') and not 'the murdered Caesar'. In such cases, we consider the participle/gerundive to be the head of the construction and the noun is attached via the SUB-relation, whereas the participle/gerundive is annotated with the function of the whole predication.

Probably the single most frequent case of such a construction, is the *ad* + gerundive + noun construction. In this locution, the noun is almost always dependent on the gerundive:

ad + **noun** + **gerundive**

(60)
```
           Root
            |
          PRED
          venit
            |
           ADV
            ad
            |
           OBL
         legendos
            |
           SUB
          libros
```

venit ad libros legendos

But the *ab urbe condita*-construction is found in other contexts as well:

(61)
```
           Root
            |
          PRED
           est
            |
           PIV
         superbus
            |
           ADV
          victa
            |
           SUB
         serpente
```

superbus victa serpente est '(Apollo) is proud that the serpent was defeated'

9.9   Open predications

Open predications are predications that do not supply their own subject, but get a subject via coreference relations[6] within the sentence. Finite verb forms never take part in open predication, only infinite forms. The infinite verb form heads the whole construction and is related to the matrix verb via the relation corresponding to the function of the embedded predication + a prefix X.

---

[6]These relations are normally analysed in terms of *raising* and *control*

We distinguish two kinds of open predications according to whether they are arguments which *complement* a verb or adverbials which *modify* a verb.

In some cases, infinite verb like infinitives and gerunds can depend on nouns. In these cases, they are never given the relations XOBJ or ADV, but are most often NARGs. Consult section 8.5, as well as 14.6 on gerunds and 14.7 on infinitives.

9.9.1 XOBJ

Infinitives can also be objects of verbs. This typically happens with auxiliary verbs like *uelle, posse* etc.:

(62)

non potest se ipsum facere salvum
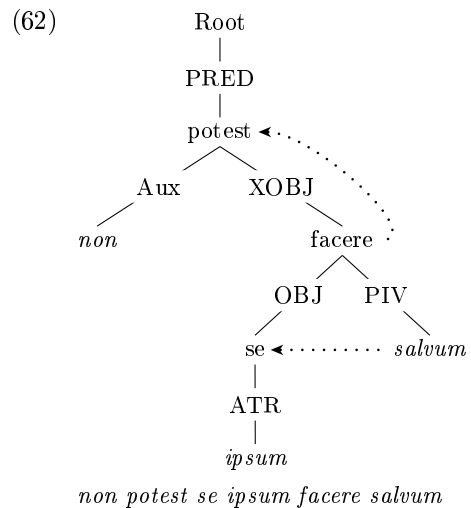
But it is also found with some other verbs, such as *dare*:

(63)
```
            Root
             |
            PRED
             |
            dabo
            /\
       OBL  XOBJ
        /      \
      ei ◂┄┄┄┄ edere
               |
              OBJ
               |
               de
               |
              OBL
               |
             ligno
               |
              ATR
               |
             vitae
```

dabo ei edere de ligno vitae
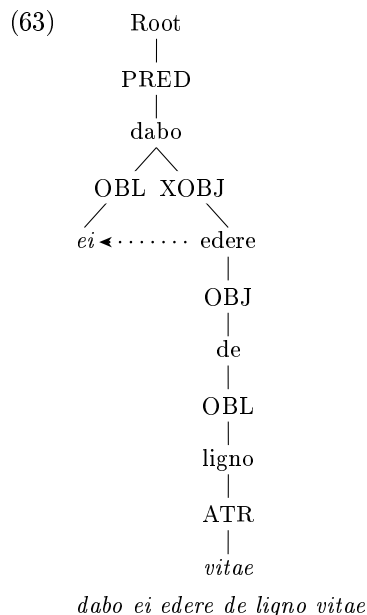
Such constructions are different from other embedded predications (AcI's etc.)
in that no subject can be added. Instead the subject is supplied by coreference
with an element which is either present in the matrix clause, such as *ei* in the
last example, or implied by the argument structure of the matrix verb, as the
implied subject of *potest*. This coreference should be marked by means of the
slash notation, see section 13.

The so-called nominative with infinitive construction also involves an XOBJ: **Nominative with infinitive**

(64)
```
                Root
                 |
                PRED
                 |
             putabantur
                /\
           SUB    XOBJ
           /        \
       fabellae ◂┄┄┄ scribi
          |            |
         ATR          AG
          |            |
       Terentii        a
                       |
                      OBL
                       |
                    Laelio
```

Terentii fabellae a Laelio scribi putabantur
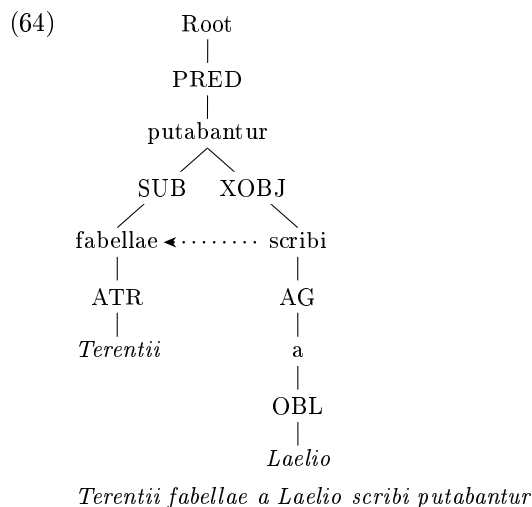
XOBJs are not always infinitives; some verbs, like λήγω govern a participle
which is then related to it via XOBJ. The coreference between the subject

36

of the participle and the subject of the matrix verb is again marked via the
slash notation. Also, perception words which take an accusative with participle
construction are analysed as taking the accusative as an object and the participle
as an XOBJ:

(65)

```
                    Root
                     |
                   PRED
                     |
                    vidi
                   /    \
              OBJ        XOBJ
             /              \
        puerum ◄ ······· currentem
```

Vidi puerum currentem
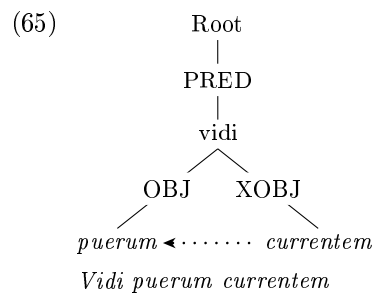
9.9.2 XADV

Conjunct (or predicative) participles are adverbials which modify the matrix
verb, to which they are attached via the relation XADV:

(66)

```
                    Root
                     |
                   PRED
                     |
            ···► exivit
           :        /    \
           :   XADV      OBL
           :   /            \
        exclamans           ab
           |                 |
          ADV               OBL
           |                 |
         voce                eo
           |
          ATR
           |
        magna
```
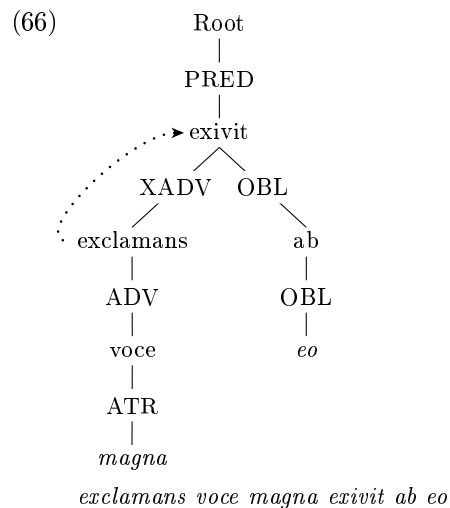
exclamans voce magna exivit ab eo

Like predicative participles, predicative adjectives are also given the tag XADV:

(67)

```
               Root
                |
               PRED
                |
              pergunt
             /    |    \
         SUB   XADV   OBL
        Galli   laeti   in
                         |
                        OBL
                         |
                       castra
```

Galli laeti in castra pergunt
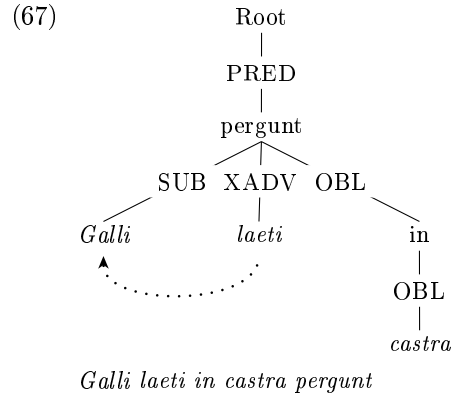
Participles and adjectives are given the tag ADV when they are predicative, ie. do not restrict the reference of a noun phrase but rather modify the main verb, ie. the above sentence means 'The Gauls proceeded happily into the camp.' whereas the meaning 'The happy Gauls proceeded into the camp.' would be represented as

(68)

```
          Root
           |
          PRED
         pergunt
         /    \
      SUB     OBL
      Galli    in
       |        |
      ATR      OBL
      laeti   castra
```

Galli laeti in castra pergunt
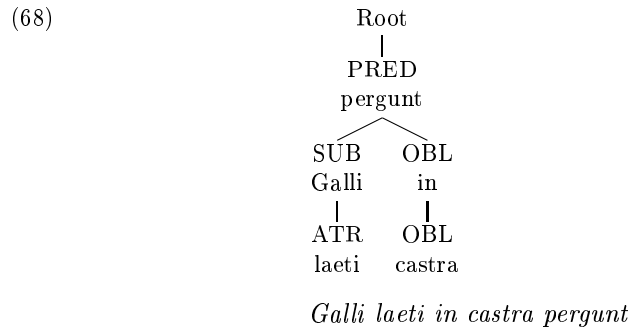
The infinitive of purpose is also an adverbial expression and should be assigned to the relation XADV :   **Infinitives of purpose**

(69)

```
    Root
     |
    PRED
     |
  παρέσμεν ◄
     |
   XADV
     |
  ἀκοῦσαι
παρέσμεν ἀκοῦσαι
```
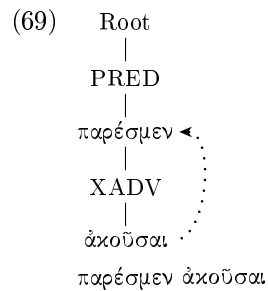
9.10 Supertags

One supertag is relevant for embedded predications: REL, which is used whenever it is not possible to determine whether a relative clause is restrictive or not.

10   Coordination

Notice first that we do not recognize monopartite coordination. Thus, in the numerous cases in the New Testament where a sentence is introduced by a conjuction (*et* and others), this should not be treated as coordination, but the *et* should be attached to the sentence predicate via the relation Aux.

The slash arrow notation, which is used extensively in this section, is further explained and discussed in section 13, often with the same examples being used.

In analysing coordination, the first step is to ascertain what kind of elements are being conjoined: the conjuncts can be either constituents, multi-rooted elements, or sentences. **Types of coordination**

A constituent, in the sense of a dependency grammar, is a node together with all the nodes it dominates: for example, a noun with all its attributes and appositions is a constituent. In *Cicero consul coniurationem Catilinae detexit* (see the tree on page 21), there are exactly five constituents: *consul, Cicero consul, Catilinae, coniurationem Catilinae* and *Cicero consul coniurationem Catilinae detexit*.[7] However, the latter constituent, which corresponds to a sentence, is treated differently from other sentences. By definition a constituent has a single root. **Constituent**

A multi-rooted element is a set if nodes which are not connected, ie. does not have a common mother. Consider *tradet frater fratrem in mortem* (example 102 = 79): *frater fratrem in mortem* has a common mother node, the verb, but this is not present in the string, so this set of nodes is as such multi-rooted. And still, it can be coordinated with another element, as in *tradet frater fratrem in mortem et pater filium*. **Multi-rooted elements**

A sentence is a constituent dominated by a finite verb, or by an empty node which stands in for a verb, or by the infinitive in an Accusative with infinitive construction. **Sentences**

10.1   Coordination of constituents/single rooted elements

Coordination of constituents is the most straightforward case, especially when the constituents are single words. Consider the example '*quid nobis et tibi Iesu Nazarene?*'. *nobis* and *tibi* are conjoined by *et*. They are both OBLique arguments of a (elliptical) *esse*, but so is the whole phrase *nobis et tibi*. We therefore want to have both *nobis, tibi* and *nobis et tibi* as constituents which bear the OBL relation and we achieve this by having the conjunction dominating both *nobis* and *tibi* via the relation these would have had to the main verb if there was no coordination. The conjunction then inherits this relation and is attached to its head via the same relation that it bears to its daughter(s):

---

[7] In a phrase structure grammar, on the other hand, all words would be constituents, as would the VP (verb + object) *coniurationem Catilinae detexit*.

(70)

```
                          Root
                  ┌─────────┴─────────┐
                 VOC               PRED
                 Iesu                0
                  │           ┌───────┴───────┐
                 ATR         SUB             OBL
               Nazarene      quid             et
                                      ┌────────┴────────┐
                                     OBL              OBL
                                    nobis             tibi
```
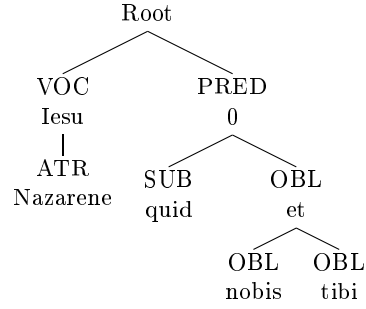
Quid tibi et nobis, Iesu Nazarene?
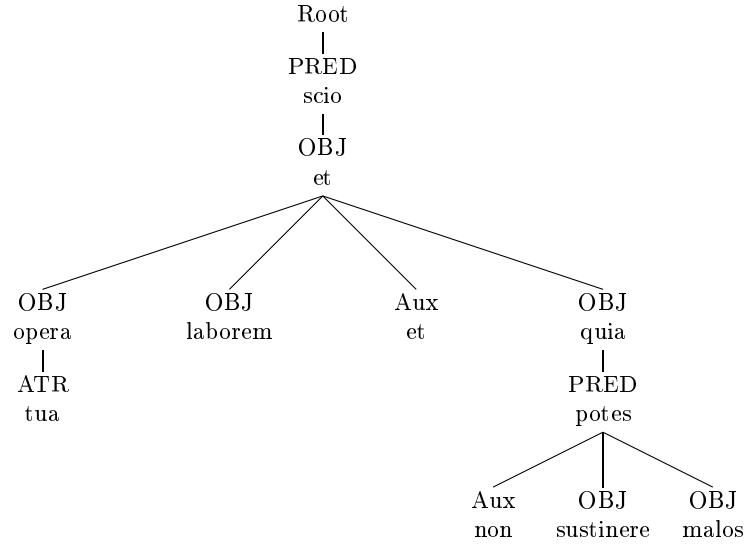
If there are more than than two elements, all conjuncts are attached to the conjunction in the same way. Often there will also be more than one conjunction. In such cases, the first conjunction should serve as a head of the coordinated phrase, and any further conjunctions should depend on the first one via the relation Aux

(71)

```
                          Root
                           │
                          PRED
                          scio
                           │
                          OBJ
                           et
          ┌──────────┬──────────┼──────────────┐
         OBJ        OBJ        Aux            OBJ
        opera      laborem      et            quia
         │                                     │
        ATR                                  PRED
        tua                                  potes
                                      ┌────────┼────────┐
                                     Aux      OBJ      OBJ
                                     non    sustinere  malos
```

scio opera tua et quia non potes sustinere malos

If there is no conjunction present we insert an empty node which behaves as a conjunction.

We use essentially the same analysis whenever the conjuncts are single rooted but share a subtree. Consider the string *boni viri et cives*. There are two possible analyses: the intended meaning can be 'good men and citizen (which are not necessarily good)' (tree (a) below)- in that case we have constituent coordination, since *viri* and its attribute *boni* is a constituent which is related to the constituent *cives*. But the meaning can also be 'good men and good citizens' (tree (b) below), in which case *boni* modifies both *viri* and *cives*. We represent the difference in the following way:

(72) (a)
```
            SUB
             et
            / |
       SUB    SUB
       uiri   ciues
        |
       ATR
       boni
```
(b)
```
            SUB
             et
          /  |  \
      ATR   SUB   SUB
      boni  uiri  ciues
```
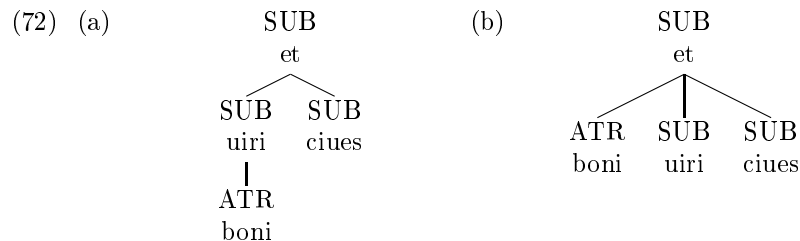
In this way, the adjective has correct scope, see section 14.3.

In analysis of single root conjuncts, it is important to ensure that both con-joined elements have the same function, ie. should bear the same grammatical relation. SUBs can only be coordinated with SUBs, OBJs with OBJs etc. Only in this way is it possible to give the conjunction a correct function. **Identity of function**
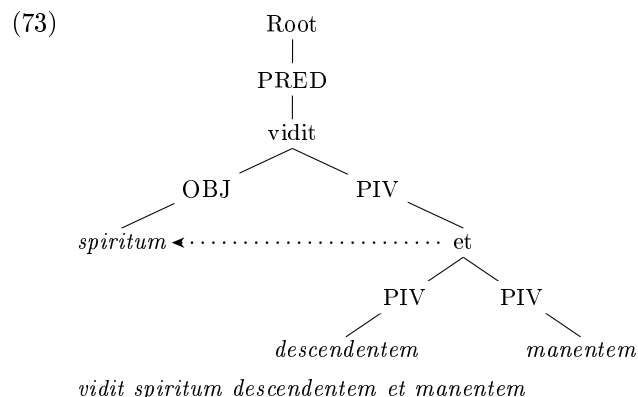
There is one exception to this, however. The XADV-relation, which can be coordinated with an ADV-element. In such cases the conjunction is given the relation ADV (and not XADV). This is possible because the only real function of the X prefix is to signal the presence of a slash arrow.[8] **Coordination of ADV and XADV**

If the relations of the two conjuncts are not identical, another form of con-junction must be used. Of course, beside the conjuncts themselves, the coordi-nation can have 'superfluous' conjunctions bearing the relation Aux, as well as items that are shared between the two conjuncts.

The principles described in this section are only applicable to **constituent** coordination. Whenever the two elements which each have more than one root are coordinated, the construction must be treated as described in section 10.3. One case which is not infrequent is the coordination of two object + object predicative structures. Even though we might like to conceive of an object + an object predicative as a single constituent, they have no common root except the governing verb in our model. We must therefore treat such coordinations as sentence coordinations, see example 78.

On the other hand, it *is* possible to coordinate two PIVs:

(73)
```
                    Root
                     |
                    PRED
                     |
                    vidit
                   /      \
             OBJ            PIV
              \              \
    spiritum ◄·················· et
                              /    \
                          PIV       PIV
                           \          \
                      descendentem    manentem

        vidit spiritum descendentem et manentem
```

---

[8]Note that the relation between OBJ and XOBJ is different, since verbs subcategorize differently for these functions.

In this case, there should be a slash from the conjunction *et* to *spiritum*, see section 13.

It is also possible to coordinate a nominal object with an accusative with infinitive, even if the object takes a predicative complement:

(74)

```
                          Root
                           |
                         PRED
                           |
                        invenit
                       /        \
                   OBJ            PIV
                    |                \
                    et            .· iacentem
                  /    \         ·       |
              OBJ      OBJ      ·       OBL
               |        |       ·        |
            exisse    puellam ◄·        supra
               |                         |
             SUB                        OBL
               |                         |
          daemonium                   lectum
```

invenit puellam iacentem supra lectum et daemonium exisse
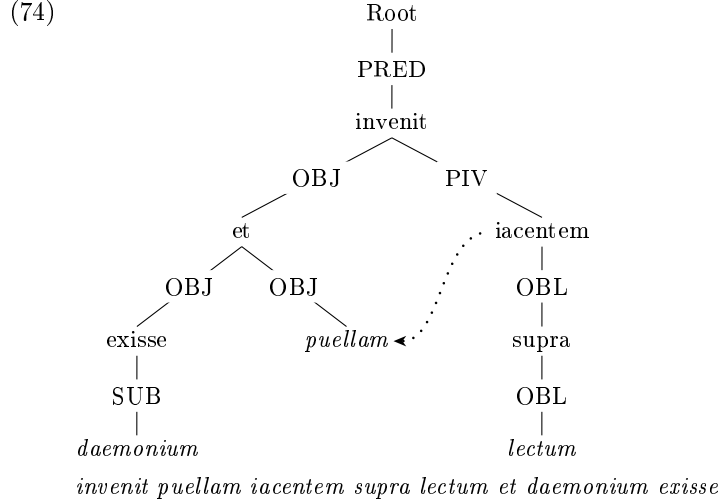
In this case there should be a slash from *iacentem* to *puellam*. The example illustrates how our analysis relates to the semantics of the sentence in such cases: the subject of *invenit* preceives both the girl (*puellam*) and some proposition about here (that she is lying down, *iacentem*). The subject also perceives a proposition about the demon (*daemonium exisse*), but he does not directly perceive the demon, and therefore *daemonium*, unlike *puellam*, is not a direct object of *invenit*.
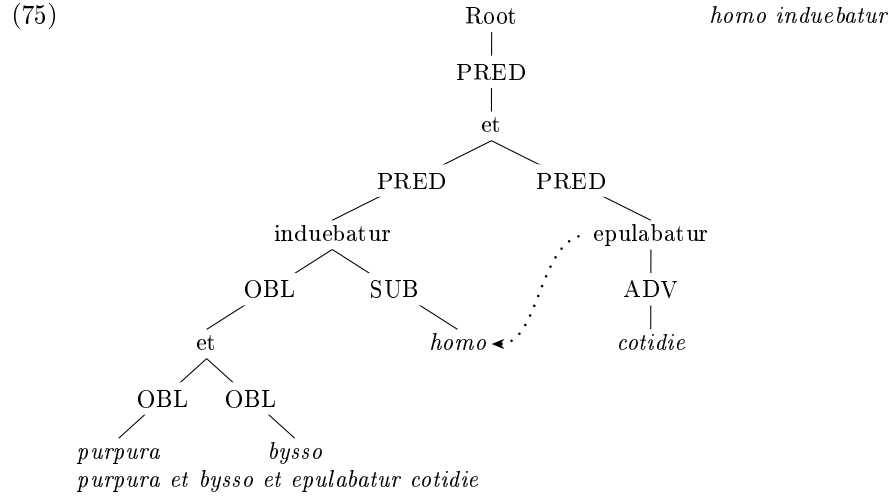
10.2   Sentence coordination

Although technically it would be possible to model VP coordination[9] in the same way as other coordinations of single rooted conjuncts which share a subtree, we do not pursue this option. Instead we follow the spirit of dependency grammar and assume that every finite verb, as well as infinitives in accusative with infinitives, forms a sentence. This also ensures consistency in the analysis, since - given the liberal use of pro-drop subjects in ancient IE languages - it is often not possible to determine whether we have sentence coordination or VP coordination.

Consider *homo induebatur purpura et bysso et epulabatur cotidie*. There is no way of knowing whether the two conjuncts are *induebatur purpura et bysso* and *epulabatur cotidie*, with the subject belonging to both conjuncts, or rather *homo induebatur purpura et bysso* and *epulabatur cotidie* with a zero subject in the second conjunct. To avoid making such decisions, we treat all such cases as

---

[9]That is, the coordination fo two verbs with their arguments, but without the subject.

sentence coordination and mark shared arguments via the 'slash notation', see
section 11. The representation is therefore:

(75)
                                    Root   *homo induebatur*
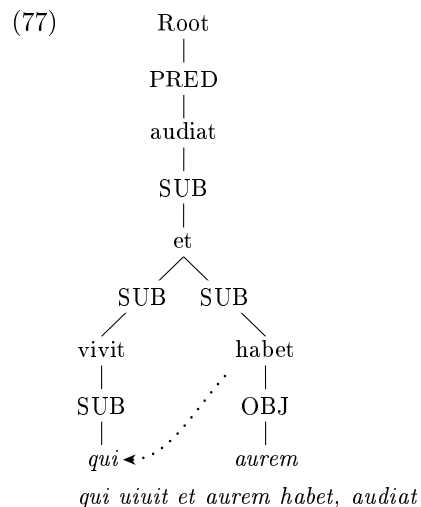 |
                                    PRED
                                     |
                                     et
                                   ⟋   ⟍
                              PRED   PRED
                            ⟋   ⟋   ⟍
                     induebatur   ⋰ epulabatur
                     ⟋   ⟍   ⋮ |
                  OBL   SUB   ⋮   ADV
                ⟋   ⟍ ⋮ |
               et   *homo* ◂⋰   *cotidie*
             ⟋ ⟍
          OBL   OBL
         ⟋   ⟍
     purpura   *bysso*
     purpura et bysso et epulabatur cotidie

If there is more than one conjunction present, the first will dominate the coordinated elements, whereas subsequent conjunctions will be attached to the first one via the relation Aux:

(76)
                              Root
                           ⟋ | ⟍
                    PRED   Aux   PRED
                  ⟋   ⟋   ⟍
                 et   *et*   et
                 | ⟋   ⟍
                PRD   PRED   PRED
                 | ⟋   ⟍
             dicebant   ceciderunt   *adoraverunt*
              ⟋   ⟍ | ⋮
           SUB   OBJ   SUB   ⋮
          ⟋   ⟍ | ⋮
      animalia   *amen*   *seniores* ◂⋯⋯⋯
         |
        ATR
         |
     quattuor

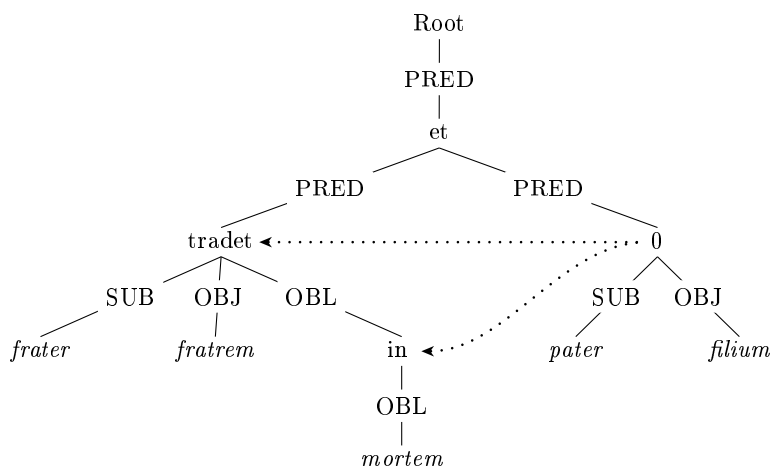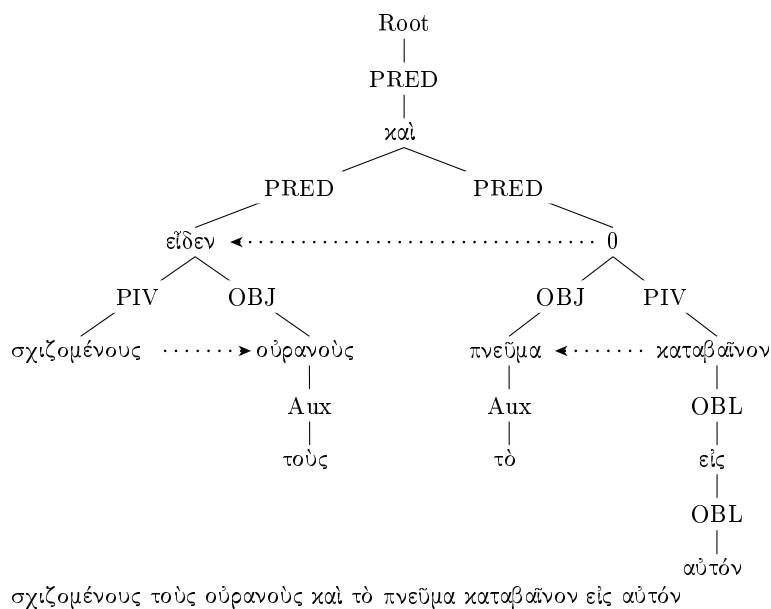   *et quattuor animalia dicebant amen et seniores ceciderunt et adoraverunt*
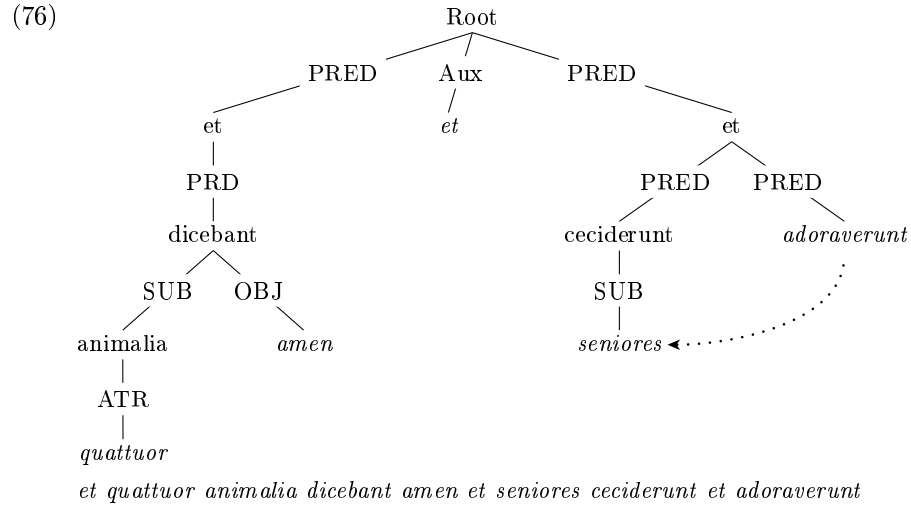
In subordinate clauses without a subjunction, the verbs do not bear the relation
PRED but corresponding to the funtion of the subordinate clause. Conjunct
verbs are analysed as sentence coordination here too:

43

(77)

```
              Root
               |
             PRED
               |
             audiat
               |
              SUB
               |
               et
              / \
          SUB    SUB
          /         \
       vivit        habet
         |            |
        SUB          OBJ
         |            |
        qui ◄········ aurem
```

qui uiuit et aurem habet, audiat

10.3 Conjunction of non-constituents/multi-rooted elements

The conjuncts do not always have a single root. Consider a sentence like 'John drank coffee and Peter beer.' The second conjunct here is 'Peter beer' which is not a constituent and does not have one root but two unconnected roots, 'Peter' bearing a SUB relation and 'beer' an OBJ relation. We must first create a common root for them. This will be an empty node. The empty node and the sentence are then conjoined in a way similar to sentence coordination. Both are given the relation PRED, but the second conjunct lacks the verb and is therefore marked with a slash arrow towards the overt verb, ie. it is a kind of predication which shares the central element, the predicate, with the first conjunct):

(78)   Root   εἶδεν
                                          |
                                        PRED
                                          |
                                         καὶ
                              PRED   PRED
                          εἶδεν ◀······························· 0
                        PIV   OBJ   OBJ   PIV
              σχιζομένους ·······▶οὐρανοὺς   πνεῦμα ◀······· καταβαῖνον
                                     | | |
                                    Aux   Aux   OBL
                                     | | |
                                    τοὺς   τὸ   εἰς
                                                                     |
                                                                    OBL
                                                                     |
                                                                   αὐτόν

σχιζομένους τοὺς οὐρανοὺς καὶ τὸ πνεῦμα καταβαῖνον εἰς αὐτόν

(79)   Root
                                          |
                                        PRED
                                          |
                                          et
                              PRED   PRED
                          tradet ◀·························· 0
                   SUB   OBJ   OBL   SUB   OBJ
                 frater fratrem in ◀·······   pater   filium
                                   |
                                  OBL
                                   |
                                 mortem

10.4   In which conjunct does an element belong?

It is sometimes not clear how the conjoined domains should be delimited and in which conjunct an element belongs. If the element is shared between the two conjuncts, the question is which dependency should be marked directly in the tree, and which one by a slash arrow. This does not affect the semantic interpretation of the sentence in any way, since the element is shared. For such questions, consult section 13.3.4.

It can happen that it is clear that an element belongs to only one conjunct, but it is unclear which one that is. In such cases, the choice will determine the interpretation. If in doubt, the annotator should consult standard translations. The principles in section 13.3.4 do not apply to such cases.

10.5   Other issues

Finally, it is important to distinguish the *conjunction et* 'and' from the *particle et* 'also'. This latter should be attached to the word it emphasises via the relation Aux. The same also holds for some other particles, as *neque* which can sometimes mean 'not even'.

11   Gapping and ellipsis

11.1   Elided copulas

Since we take the verb to be the head of the entire sentence in our model, we always need a verb in the analysis. However, copular verbs are often elided. In such cases we insert an empty copula:

(80)   Find example

Note that we have to assume an empty copula even in some cases where it is never overtly realised, as absolute ablatives with a predicative noun, see section 9.7

When the absent verb is not a copula, we will have to analyse this as gapping (see next section), ie. the structure should be attached to the sentence with which it shares a verb.

11.2   Gapping

Note that we do not mark ellipsis of nominal arguments as such, ie. we do not mark absent subjects in sentences like *currit* 'he runs'; nor do we mark absent objects in sentences like *interfecit* 'he killed him'. The only kind of ellipsis that we *do* mark is so-called gapping, ie. cases where shared material in a coordinated structure is left out in one or more of the conjuncts. Such conjuncts are treated as sentences, ie. we insert an empty verb which is given the relation PRED, and the shared elements are stored in a list, as explained in section 10.3. One further example will suffice:

(81)

```
                        0
               PRED            PRED
          incolunt ◀······················ 0
           OBJ  SUB              OBJ  SUB
          unam   Belgae         aliam   Aquitani
```
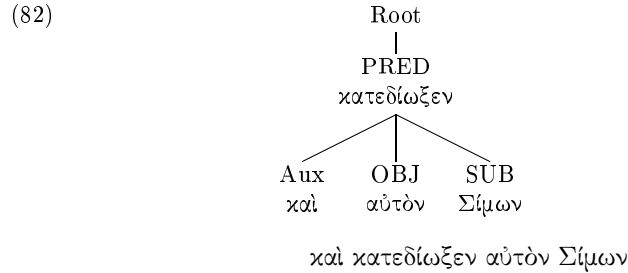
46
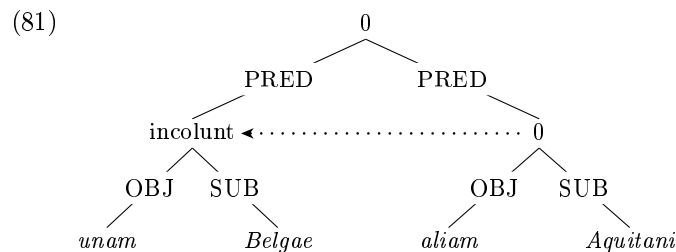
Notice that for the purposes of this rule, we treat XADVs as coordinated with the main verbs, ie. it is allowed to use a slash arrow from a main verb towards an argument of an XADV participle, see example 101.
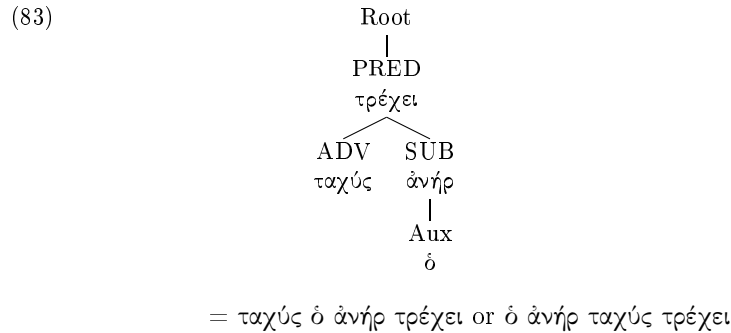
12   The Greek article

12.1   Noun phrases

When a Greek noun phrase does not contain any articles, it is treated like NPs in other languages:

(82)

```
              Root
               |
             PRED
           κατεδίωξεν
          /    |    \
       Aux    OBJ    SUB
       καὶ    αὐτὸν  Σίμων
```

κα κατεδίωξεν αὐτὸν Σίμων

However, many Greek noun phrases contain one or more definite articles which can appear in various configurations, DAN, DNDA, NDA, ADN and DNA:[10] ὁ ἀγαθὸς ἀνήρ, ὁ ἀνήρ ὁ ἀγαθός, ἀνήρ ὁ ἀγαθός, ἀγαθός ὁ ἀνήρ and ὁ ἀνήρ ἀγαθός. In the last two onfigurations the adjective is normally considered predicative and not attributive, so there is a functional difference as well as a difference in word order. For our purposes, this means that adjectives in configurations like ἀγαθός ὁ ἀνήρ and ὁ ἀνήρ ἀγαθός should not be related to the noun via ATR, but rather to the verb via XADV. The article, on the other hand, is related to the noun via Aux. Note that since our syntax is dependency-based and not configurational, there is no difference between ταχύς ὁ ἀνήρ τρέχει and ὁ ἀνήρ ταχύς τρέχει:
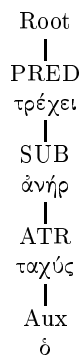
Possible configurations

(83)

```
              Root
               |
             PRED
            τρέχει
            /    \
        ADV      SUB
       ταχύς     ἀνήρ
                  |
                 Aux
                  ὁ
```

= ταχύς ὁ ἀνήρ τρέχει or ὁ ἀνήρ ταχύς τρέχει

In other cases, where the adjective is attributive, we attach the article to the first item to the right. This means that in the dependency structure, we do not distinguish between ὁ ταχὺς ἀνήρ and ἀνήρ ὁ ταχύς. Both turn up as
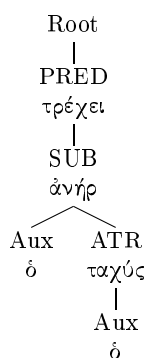
---

[10]D for the determiner/article, N for noun, A for adjective

(84)

```
                    Root
                     |
                   PRED
                   τρέχει
                     |
                    SUB
                    ἀνήρ
                     |
                    ATR
                    ταχύς
                     |
                    Aux
                     ὁ
```
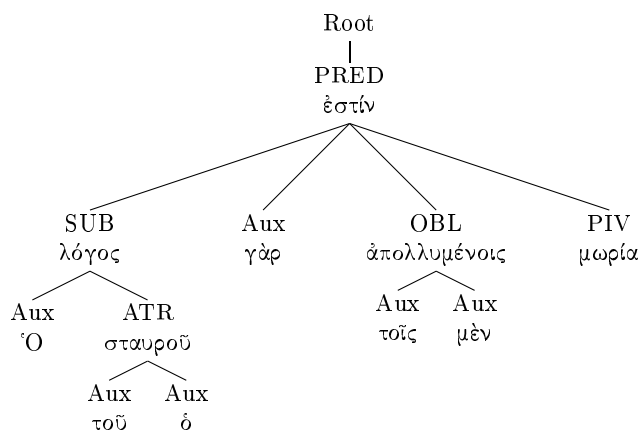
In the final case, there is an article preceding both the noun and the adjective and we attach each one to the element to their right. ὁ ἀνήρ ὁ ταχὺς τρέχει ends up as:

(85)

```
                    Root
                     |
                   PRED
                   τρέχει
                     |
                    SUB
                    ἀνήρ
                    /  \
                 Aux    ATR
                  ὁ     ταχύς
                          |
                         Aux
                          ὁ
```

However, the modifier in an NP need not be an adjective; it can be a genitive NP, an adverb etc. We attach the article to that element of the modifier which is related to the noun via ATR:

(86)

```
                              Root
                               |
                             PRED
                             ἐστίν
              /          /        \          \
            SUB        Aux        OBL         PIV
           λόγος       γὰρ    ἀπολλυμένοις    μωρία
           /  \                  /   \
         Aux  ATR             Aux    Aux
          Ὁ  σταυροῦ          τοῖς   μὲν
              /  \
           Aux   Aux
           τοῦ    ὁ
```

Ὁ λόγος γὰρ ὁ τοῦ σταυροῦ τοῖς μὲν ἀπολλυμένοις μωρία ἐστί Notice that in the structure of ὁ τοῦ σταυροῦ, both ὁ and τοῦ are Aux-daughters of σταυροῦ.
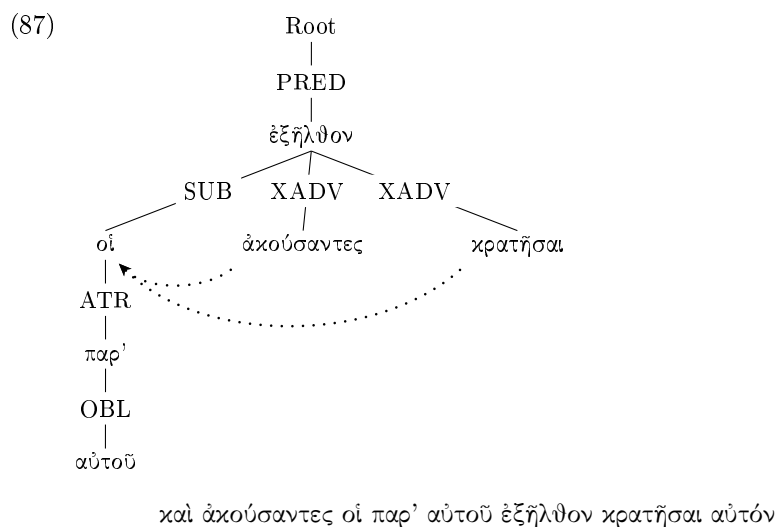
12.2 The article on its own

Whenever the article appears on its own, without belonging to a noun or to some other element, as in the ὁ μέν ... ὁ δέ construction, it is not an article at all, but should be marked as a pronoun in the morphological analysis and be analysed as a subject.

12.3 Articles without nouns

If an article appears with only an adjective or only a participle, it is considered to nominalize this adjective/participle (for syntactic purposes, not the morphology!). This means the adjective/participle will have a normal sentence-level function like SUB, OBJ or similar.

However, when the article appears with non-nominal categories like adverbs or preposition phrases, the article itself is considered the head of the construction and given the appropriate relation:

(87)

```
                        Root
                         |
                        PRED
                         |
                      ἐξῆλθον
                     /    |    \
               SUB     XADV    XADV
                |        |         \
               οἱ    ἀκούσαντες    κρατῆσαι
                |
               ATR
                |
               παρ᾿
                |
               OBL
                |
              αὐτοῦ
```

καὶ ἀκούσαντες οἱ παρ᾿ αὐτοῦ ἐξῆλθον κρατῆσαι αὐτόν

12.4 Articular infinitives

In articular infintive structures, the article should always depend on the infinitive via Aux, even if it is separated from its infinitive by other elements.

(88) Find example

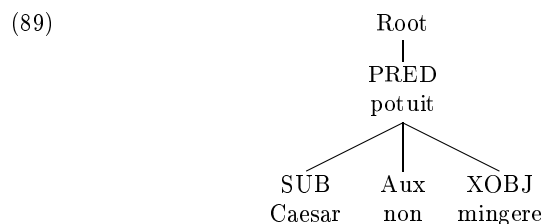# 13 Slash notation

13.1 Introduction

Slashes are used in our system to represent coreference relations within one dependency tree (which can of course contain several coordinated main clauses).

Informally, the general principle is that a whenever an item 'needs' to have a dependent, but this dependent is already 'used' (ie. is a dependent of something else).
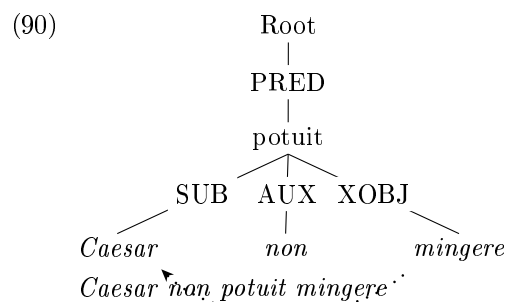
In other words, the meaning of a slash is *not* that the slasher node[11] is referentially identical to the slashee node. [12] Rather, the slash arrows should be conceived of as supplementary dependency relations: the slashee node is a dependent of the slasher. There is one exception to this principle, namely when the slasher is an empty node which bears the PRED-relation, see section 13.3.3.

To understand this general principle, consider the sentence *Caesar non potuit mingere*. The dependency tree is

(89)

```
                    Root
                     |
                    PRED
                   potuit
              /       |       \
           SUB       Aux      XOBJ
          Caesar     non     mingere
```

Caesar is correctly designated as the subject of *posse*. However, Caesar is also the subject of *mingere* and to represent this fact, we put a slash arrow from *mingere* to *Caesar*:

(90)

```
               Root
                |
               PRED
                |
              potuit
            /    |    \
         SUB    AUX   XOBJ
          |      |      \
       Caesar   non    mingere

     Caesar non potuit mingere
```

The interpretation of this notation is that the subject of *mingere* is coreferent with the subject of *posse*, which is *Caesar*.

We can distinguish two groups of uses of the slash notation, one associated with the 'open' functions XADV and XOBJ as well as PIV, and one associated with gapping and elliptical coordination.
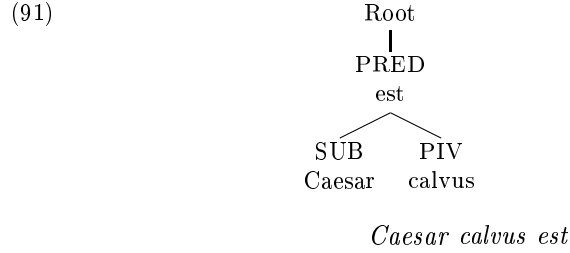
13.2   Open functions: XADV, XOBJ and PIV

The open functions XADV and XOBJ were introduced in section 9.9. By definition, they do not supply their own subject, but get a subject via coreference
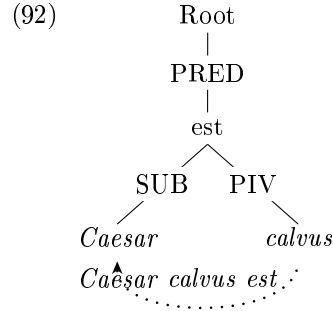
---

[11] Ie. the node where the slash is inserted; the origin of the slash arrow in the visual representation of the dependency tree.

[12] Ie. the node where the slash is inserted; the origin of the slash arrow in the visual representation of the dependency tree.

relations within the sentence. From the perspective of traditional grammar, it is perhaps not clear that PIV behaves in the same manner, but consider the example *Caesar calvus est*. *Caesar* is the subject of *est*, and *calvus* is the predicative complement of *est*:

(91)

```
                    Root
                     |
                   PRED
                    est
                   /‾‾\
             SUB       PIV
            Caesar    calvus
```
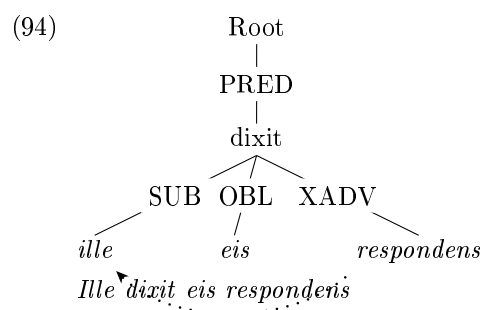
Caesar calvus est

However, we want to capture the fact that not only is *calvus* an argument of *est*, in the sense that *est* requires the presence of a predicative complement, *calvus* is also a predication about *Caesar*. In other words, *Caesar* is the subject of *calvus* and this is represented by a slash arrow from *calvus* to *Caesar*:

(92)

```
              Root
               |
             PRED
               |
              est
             /‾\
         SUB     PIV
        /           \
    Caesar          calvus
    Caesar calvus est
```
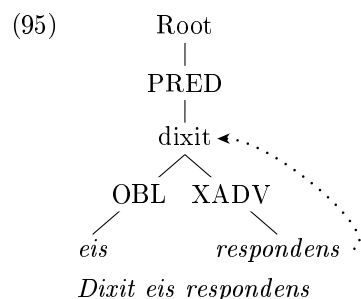
The same holds for a traditional 'object predicative', as in *Romani Ciceronem consulem creaverunt*: *creare* requires three arguments, a subject, an object and a predicative. So, *consulem* is a PIV-dependent of *creaverunt*, and *Ciceronem* is a OBJ-dependent of *creaverunt*, but at the same time, *Ciceronem* is the subject of *consulem* and we capture this fact by a slash arrow from *consulem* to *Ciceronem*:

(93)

```
                    Root
                     |
                   PRED
                     |
                 creaverunt
                  /  |  \
          SUB     OBJ     PIV
         /         |         \
     Romani    Ciceronem    consulem
     Romani Ciceronem consulem creaverunt
```

51
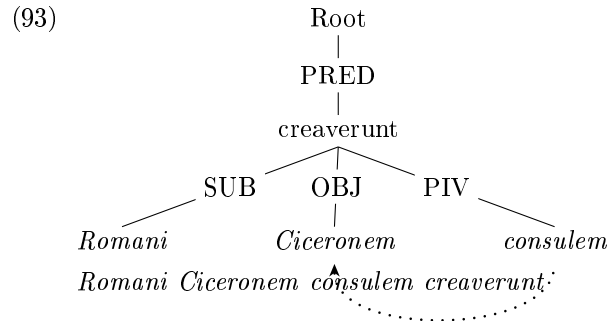
With the relation XADV, the facts are the same. Consider *ille respondens dixit eis*: *dixit* is the main verb, *ille* its subject and *eis* its oblique argument. *respondens* is an adverbial which modifies the main verb, contributing the extra information that the 'saying' was 'responding'. So *respondens* is an XADV-daughter of *dixit*, but we also want to express that *ille* is the subject of *respondens*:

(94)

```
                    Root
                     |
                    PRED
                     |
                    dixit
                    /\
            SUB  OBL  XADV
            /      /        \
         ille    eis      respondens
      Ille dixit eis respondens
```

Now what if there was no overt subject in the sentence, ie. if the subject of *dixit* was pro-dropped and the sentence read *respondens dixit eis*? In this case, the subject is supplied by the finite verb itself, and the slash arrow is therefore directed towards the verb:

(95)

```
              Root
               |
              PRED
               |
              dixit ◄·····
               /\          ·
           OBL  XADV        ·
           /        \        ·
         eis      respondens ·
      Dixit eis respondens
```

This means that **every node which is the daughter in an XOBJ, XADV or PIV-relation should have a slash!** The interpretation of the slash arrow is always uniform, since it is always a *subject* dependent that these nodes lack. In other words, the slashee is aways the subject of the slasher. Therefore there should **never be more than one** outgoing slash from the daughter in an XOBJ, XADV or PIV-relation, since this will create an ambiguity. In other words, it is not possible to mark that such an element shares an argument with another element of the sentence.
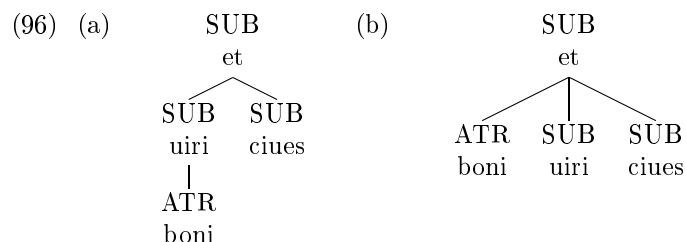
Number of outgoing slashes on XOBJs/XADVs

Notice finally, that the slash arrow from an XOBJ, XADV or PIV-node should always be local, ie. directed towards either the head verb or an element

dominated by the head verb. This restriction is enforced by the annotation interface.

13.3   Slashes in gapping and coordination

13.3.1   Motivation

Slashes in coordinate *sentences* denote much of the same scoping information that is expressed in other ways in constituent coordination. In section 10.1 we represented adjectives scoping over two coordinated nouns as in (b) below:

(96) (a)   SUB   (b)   SUB
                      et   et

            SUB   SUB   ATR   SUB   SUB
            uiri   ciues   boni   uiri   ciues
              |
            ATR
            boni

Theoretically, it would be possible to represent *Caesar edit et bibit* by coordinating the two verbs under the conjunction and then attach *Caesar* as a SUB-daughter of the conjunction. But consider *quod Caesar edit et bibit bonum erat*. *et* would be a subject daughter of *erat*, and would dominate one object daughter, *quod*, and *three* subject daughters, namely *edit*, *bibit* - and *Caesar*. Although this ambiguity could be resolved through the morphological annotation, we prefer to avoid it entirely and represent the sentence as:

(97)   Root
                               |
                             PRED
                               |
                             erat

                    PIV   SUB

              bonum   et

                                    SUB   SUB
                                    edit   *bibit*

                              OBJ   SUB
                            quod   *Caesar*

quod Caesar edit et bibit bonum erat
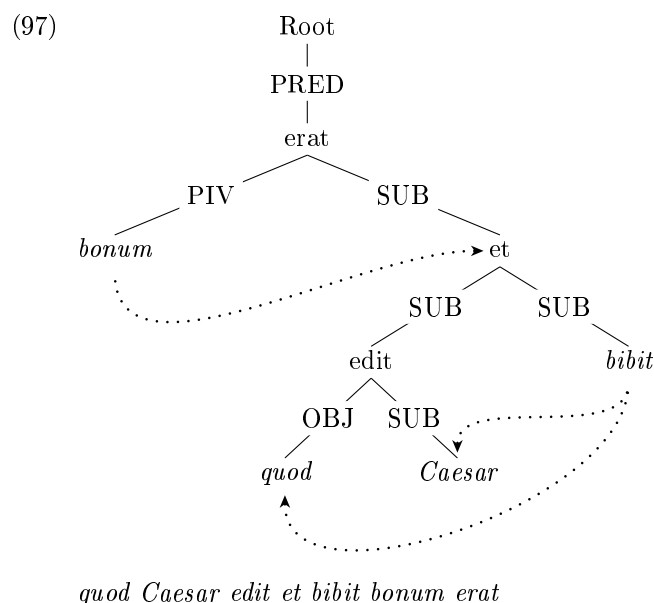
13.3.2 Slashes in sentence coordination

Whenever two coordinated sentences, or an XADV and its main verb, share an element, be it a SUB, OBJ, XOBJ, OBL, AG or ADV, and this element is overtly represented only once, the element should be attached to the verb to which it belongs in the surface string, and a slash arrow should be set from the other verb to the shared element.

Shared arguments

Notice in particular that for the purposes of slashing, XADVs are considered to be on par with their governing verbs. It is allowed to slash from a main verb to an argument of an XADV, but not to an argument of some dependent clause (XOBJ, accusative with infinitive or subordinate clause). But the opposite, a slash arrow from an XADV to an argument of the verb can only indicate the subject of the XADV, therefore XADVs can only have one outgoing slash arrow.
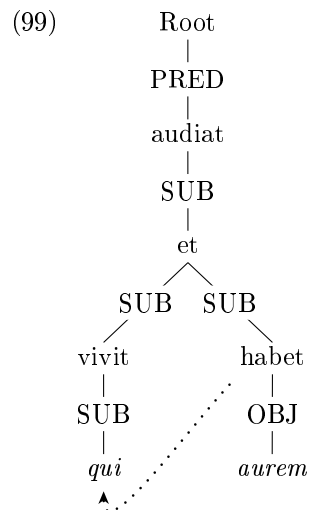
Treatment of XADVs

This kind of slashes should leave a verbal node and point towards the shared element. One should never use slashes between two verbs to indicate subject identity.

Consider again the first example from section 10.2:

(98)
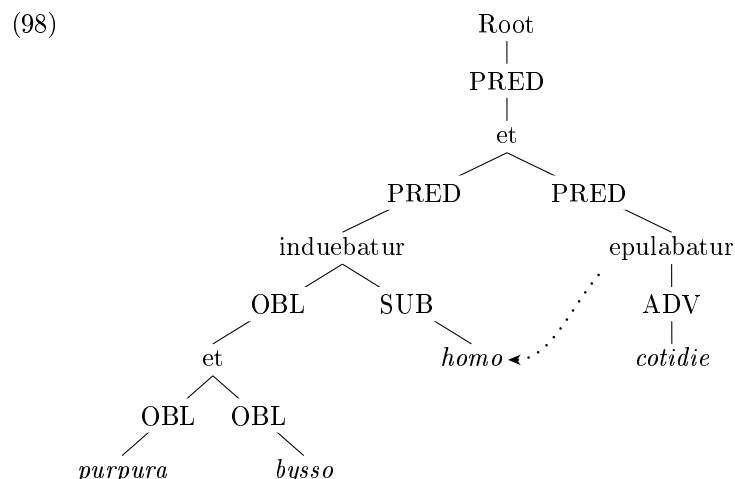
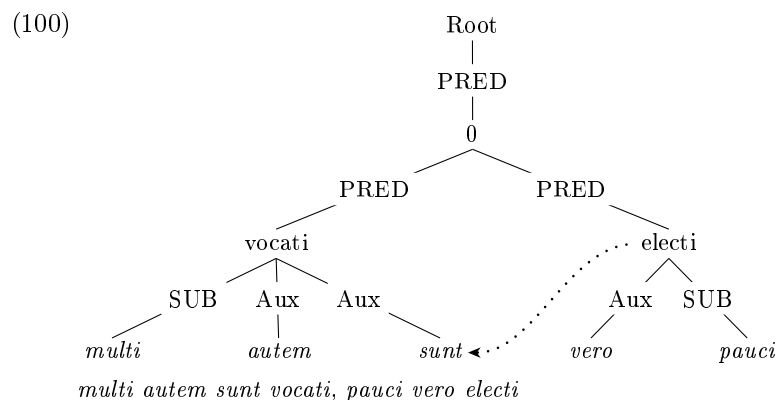*Homo indebatur purpura et bysso et epulabatur cotidie*

Now consider the example *qui uiuit et aurem habet, audiat*:

(99)
```
              Root
               |
              PRED
               |
             audiat
               |
              SUB
               |
               et
              /  \
           SUB    SUB
           /       \
        vivit      habet
          |          |
         SUB        OBJ
          |          |
         qui        aurem
```

qui vivit et aurem habet, audiat

The shared element can also be an auxiliary verb:

(100)
```
                              Root
                               |
                              PRED
                               |
                               0
                             /   \
                         PRED     PRED
                         /           \
                      vocati         electi
                      / | \          / \
                  SUB Aux Aux      Aux  SUB
                   |   |    \       |    \
                 multi autem sunt  vero  pauci
```

multi autem sunt vocati, pauci vero electi

When the slash notation is used in sentence coordination, it is important to assure that the grammatical relation between the slasher node and the slashee is identical to the relation of the slashee to its mother. In other words, if the slashee is a subject in its own clause, it should also be the subject of the slasher. If the unexpressed object of a coordinated verb is identical to the overt subject of another verb, we cannot express this coreference relation.This is so because, unlike the case of slash notation on open predications, where all slashees are subjects, there is no default relation type with which to interpret the slash relation. Instead, the slash relation 'inherits' the function of the slashee node. As long as this restriction is respected, there can be several slashes in a tree:
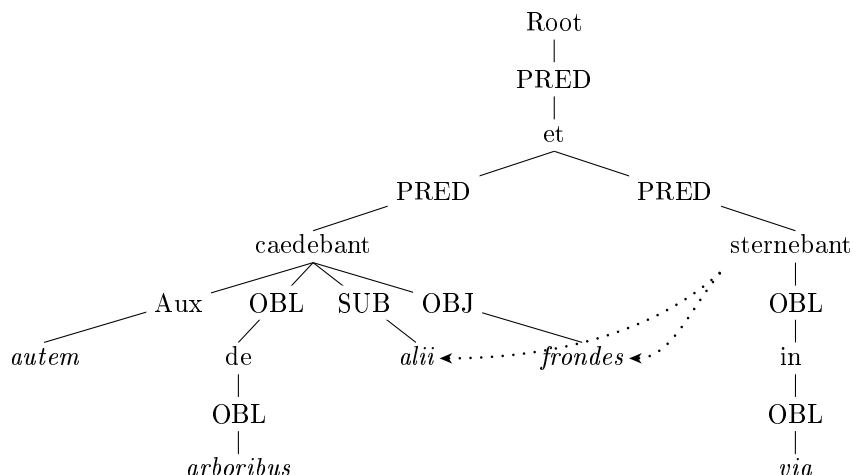
alii autem frondes de arboribus et sternebant in via

We can even have many more arrows:

(101)

χαὶ λαβόντες αὐτὸν ἔδειραν χαὶ ἀπέστειλαν χενόν
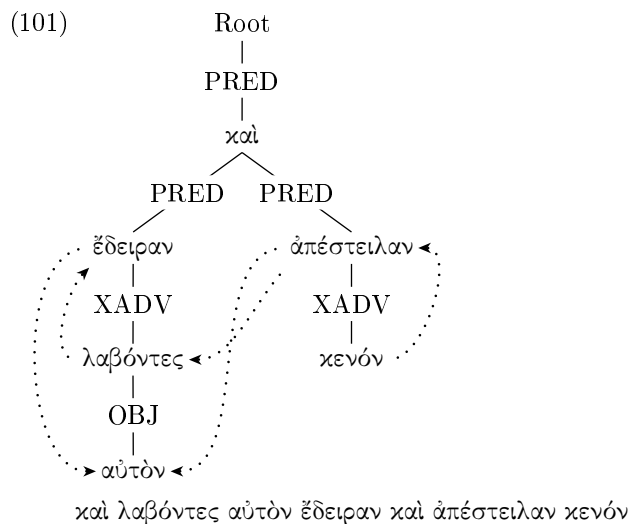
Here, αὐτὸν is taken to be the overt object of λαβόντες (for the general principle, see section 13.3.4). The arrows from ἔδειραν and ἀπέστειλαν indicate that these verbs also have αὐτὸν as their object. The arrows from λαβόντες and χενόν to their respective dominating verbs ἔδειραν and ἀπέστειλαν indicate that the subjects of these XADVs is an unexpressed element which is 'supplied by the verb'. In the case of λαβόντες, the subject of the participle is the unexpressed subject of the main verb; and in the case of χενόν, the subject of the adjective

56

is the object of the main verb. This object is expressed, but via a slash arrow: it is therefore not possible to slash directly from χενόν to its subject.

13.3.3 Slashes in gapping/multi-rooted conjuncts

Slashes in multi-rooted conjuncts behave exactly like slashes in sentence coordination, except that there is also a slash arrow from the empty node representing the verb, to the overt verb.[13] Consider *tradet frater fratrem in mortem et pater filium*:

(102)
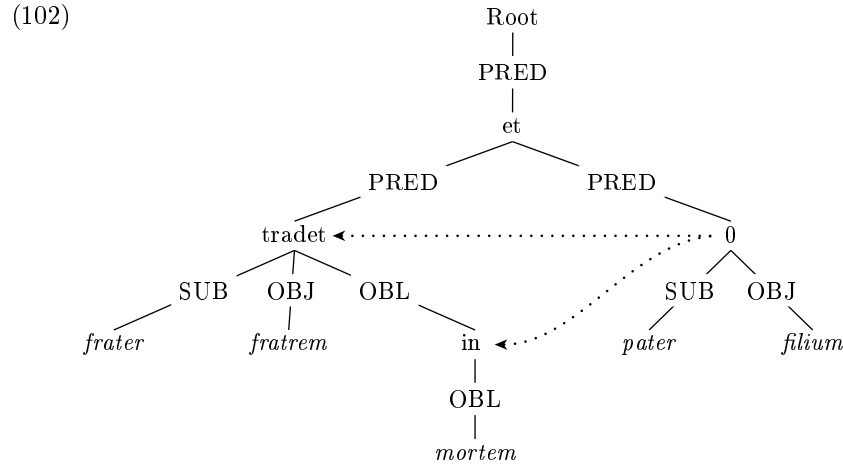
tradet frater fratrem in mortem et pater filium

As here, it is often the case that other elements than the predicate are shared between the conjuncts. The slash arrow from the empty node to *tradet* indicates predicate identity whereas the arrow from the empty node to *in* indicates a shared argument. As such it underlies the same restriction as other slashes in sentence coordination: the slashee must have the same grammatical function in both conjuncts.

13.3.4 In which conjunct does a shared element belong?

Our treatment of shared arguments raises the question where a shared argument belongs in the tree. Sometimes an element can belong in several places. Why do we put *in mortem* in the first conjunct in example 102? Or, in a more difficult case, why does αὐτὸν belong to λαβόντες in example 101? The following section provides some guidelines for making such decisions.

For argument sharing between coordinated elements we need to establish the domains of both conjuncts. If there is an overt conjunction, this will indicate **Delimitation of conjunct domains**

---

[13]This slash arrow therefore has a different interpretation, meaning that the slasher node has the same meaning as the slashee node.

the boundary between the two domains. Elements should therefore be made to depend on the verb in their domain. In *tradet frater fratrem in mortem et pater filium* we have the domains *tradet frater fratrem in morten* and *pater filium*, so *in mortem* clearly depends on *tradet* and not on the empty node. If there is no overt conjunction, we appeal to the principle of domain continuity: both domains should, if possible, be continuous. If there are several possibilities, ambiguous elements should belong to the first conjunct. For example, if there was no *et* in example 102, both *tradet frater fratrem in mortem // pater filium* and *tradet frater fratrem // in mortem pater filium* would yield continuous domains, so we choose the first option, which attaches *in mortem* to the first conjunct.

In practice, then, the principles mean that the first element which belongs only to the second conjunct marks the start of the second conjunct domain.

When there is argument sharing between a clause and an XADV, the principles remain the same, but the application is slightly different. The subtree dominated by the subordinate verb or the subjunction should correspond to a continuous string in the sentence. In example 101, this means that αὐτὸν can be attached to λαβόντες; if αὐτὸν appeared to the right of ἔδειραν, such an attachment would not be possible. When several attachments are possible, we again choose to attach elements as early as possible in the surface string: this means that we prefer to attach αὐτὸν to λαβόντες. However, if the subject of ἔδειραν intervened between λαβόντες and αὐτὸν, such an attachment would *not* be possible, since λαβόντες αὐτὸν would no longer be a continuous domain.

Notice, finally, that the principles described in this section are only applicable whenever the sentence is ambiguous. Very often, case morphology will make it entirely clear where an element belongs, and in such cases, the morphology should not be overridden by considerations of domain continuity etc.

14 Other constructions

14.1 Comparison

Ablatives of comparison are dependent on the comparative adjective via OBL:

(103)

```
                        Root
                         |
                        PRED
                        sunt


        ADV           PIV            SUB
        nobis         clariora       consilia

                        |          /    \
                       OBL      ATR      ATR
                       luce     luce    omnia
```
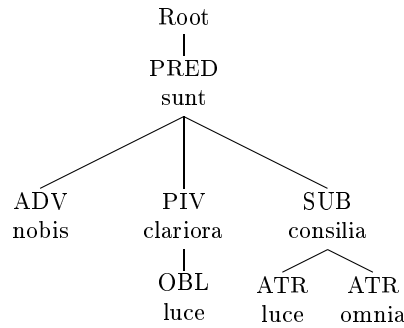
luce sunt clariora nobis tua consilia omnia

When *quam* is used it should depend on the comparative adjective via OBL, and the second member should depend on *quam* via the same relation as the other item compared:

(104)
```
                        Root
                         |
                        PRED
                         est
                        /    \
                    PIV       SUB
                   laetior   puella
                      |
                    OBL
                   quam
                      |
                   SUB
                   puer
```
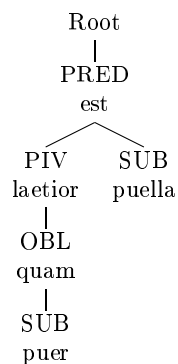
puella est laetior quam puer

Other expressions of comparison are analysed in the same way: *nihil aliud nisi, idem qui, similis ac* etc. Here is an example:

(105)
```
                        Root
                         |
                        PRED
                        scio
                         |
                       OBJ
                     sensisse
                     /        \
                 SUBJ          OBJ
              Caesarem        eadem
                              /    \
                          AUX       OBL
                          non      quae
                                     |
                                   SUBJ
                                    me
```
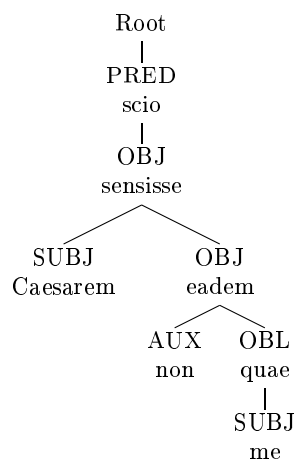
Caesarem non eadem quae me sensisse scio

We use the same principle for comparative adverbs.

(106)

```
                        Root
                         |
                        PRED
                        amat
                 _____|_____
                /        |        \
              SUB       OBJ       ADV
            Brutus    Caesarem    plus
                                   |
                                  OBL
                                  quam
                                   |
                                  OBJ
                                Augustum
```

Brutus amat Caesarem plus quam Augustum

(107)

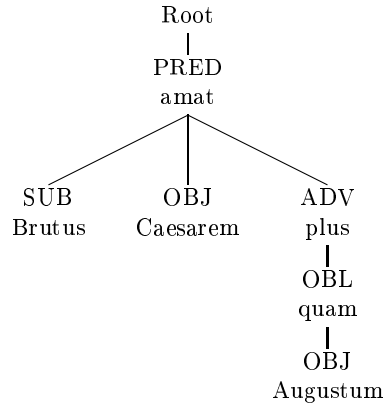```
                        Root
                         |
                        PRED
                        amat
                 _____|_____
                / | \
              SUB   OBJ   ADV
            Brutus   Caesarem   plus
                                   |
                                  OBL
                                  quam
                                   |
                                  SUB
                                Augustus
```
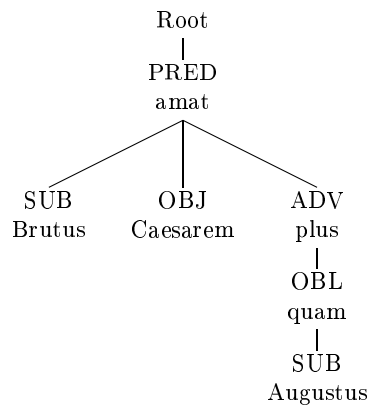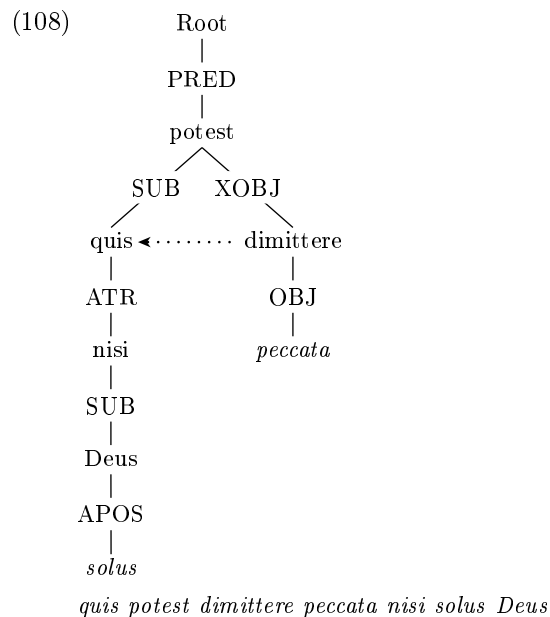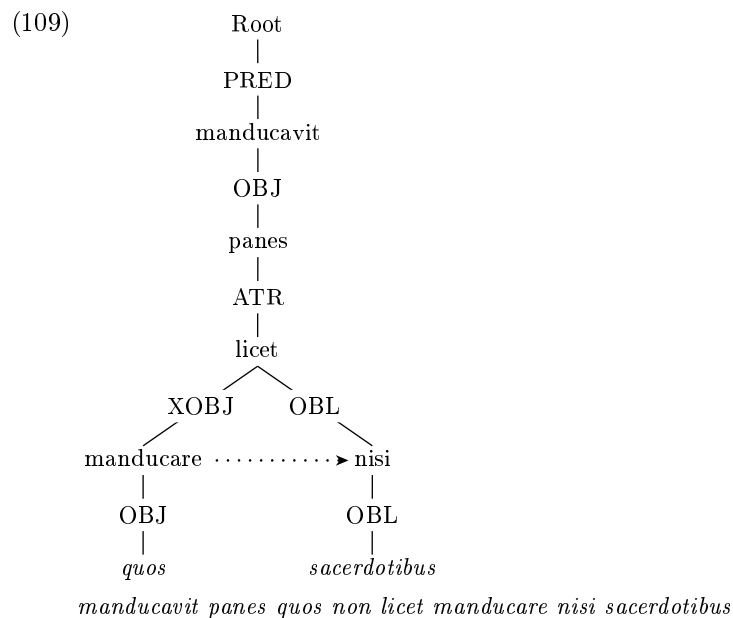
*Brutus amat Caesarem plus quam Augustus*

This approach is tantamount to treating *quam* (as well as *nisi* in *nihil aliud nisi*, *qui* in *idem qui*, *ac* in *similis ac* as introducing a sentence.

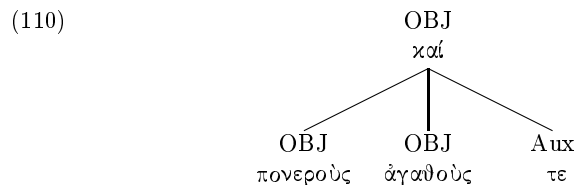Here is another example where *nisi* modifies an interrogative pronoun:

(108)

```
                    Root
                     |
                    PRED
                     |
                   potest
                   /      \
              SUB        XOBJ
              /             \
          quis ◂········· dimittere
            |                 |
           ATR               OBJ
            |                 |
          nisi             peccata
            |
           SUB
            |
          Deus
            |
          APOS
            |
         solus
```

quis potest dimittere peccata nisi solus Deus

If there is no 'antecedent' to *nisi*, it will bear a sentence-level function:

(109)

```
              Root
               |
              PRED
               |
           manducavit
               |
              OBJ
               |
             panes
               |
              ATR
               |
             licet
             /     \
         XOBJ      OBL
         /            \
    manducare ··········▸ nisi
        |                  |
       OBJ                OBL
        |                  |
      quos            sacerdotibus
```

manducavit panes quos non licet manducare nisi sacerdotibus

14.2 Coordination through particles in Greek

Coordinating particles are treated as conjunctions. Note however that in a sequence τε ... καί we treat καί as the head and τε as an auxiliary particle:

(110)
```
                          OBJ
                          καί
                     ┌─────┼─────┐
                   OBJ    OBJ    Aux
                 πονεροὺς ἀγαθοὺς  τε
```

In a sequence of μὲν ... δὲ ..., we treat δὲ as the head and μὲν as an auxiliary particle, since it does not have to be present.

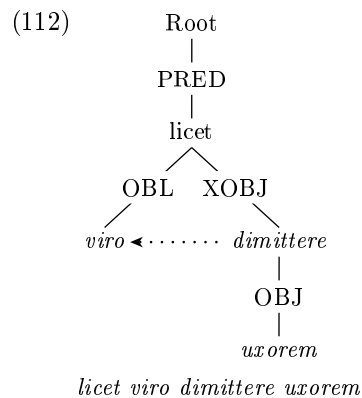(111) Find example

14.3   Scope

Scope is relevant to many constructions. An adjective can modify one or more nouns, and is then said to have scope over these nouns. A genitive can be dependent upon (and thereby for example modify) one or more nouns. The negation can negate one particular element in a sentence, or several, or the whole sentence - these elements are said to be in the scope of the negation. Emphasizing particles can take scope of one or more words.

   We represent scope via the attachment site of scoping items. Scoping items should be placed so as to be dependent on the item in their scope. By default, they also take scope over all elements dominated by their mother node; so a negation dependent on the verb negates the whole sentence. This means that if we want an item to take scope over two coordinated elements, it should be made to depend on the conjunction.

   Note however that scope over coordinated verbs/sentences is treated in a fundamentally different way. An item which is the subject of two coordinated verbs can *not* be made dependent on the conjunction. Instead, it should depend on the verb in the sentence where it appears (see section 13.3.4 for delimitation of the domains) and have an incoming slash arrow from the verb in the second conjunct.

14.4   Impersonal verbs

Impersonal verbs are defined by their inability to take a subject. Therefore, verbs like *licet, pudet* ἔξεστιν etc. should never take a subject dependent. Infinitives with such verbs should be considered OBJs or XOBJs, depending on whether an accusative subject would be possible or not. For example *licet* takes a dative and an infinitive. This becomes:

(112)

```
                Root
                 |
               PRED
                 |
               licet
                /\
           OBL    XOBJ
            /        \
      viro ◄········ dimittere
                        |
                      OBJ
                        |
                     uxorem
```

licet viro dimittere uxorem

This means that whenever no dative is present, there should be a slash to the main verb:

(113)

```
    Root
     |
   PRED
     |
  oportet ◄.
     |      ⋮
   XOBJ     ⋮
     |      ⋮
   fieri ··
```

oportet fieri
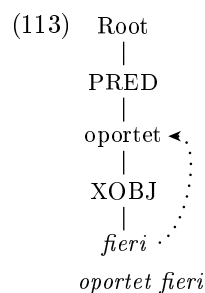
On the other hand, such verbs can often also be constructed with an Accusative with infinitive, and in such cases, they must be OBJs:

(114)

```
                      Root
                       |
                     PRED
                    oportet
                       |
                     COMP
                   praedicari
                    /     \
                 SUB      ADV
             evangelium    in
                           |
                          OBL
                         gentes
                           |
                          ATR
                         omnes
```
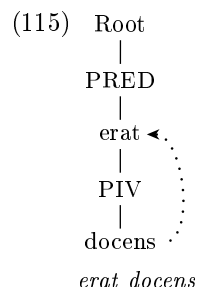
in omnes gentes oportet praedicari evangelium
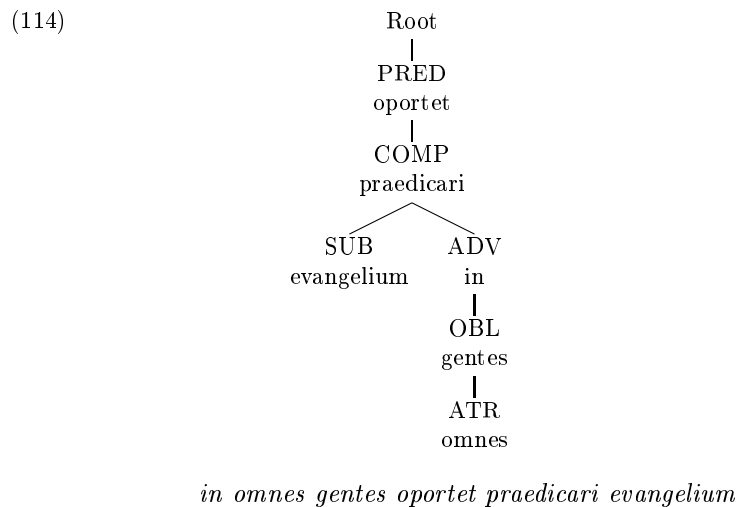
Verbs which are sometimes constructed with an AcI and sometimes with a pure infintive are ambiguous whenever there is no subject accusative to the infinitive

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and no argument of the main verb which can supply a subject to the infinitive. In such cases, annotators should choose the XOBJ relation, as in example 113. But first it must be made sure that the verb in question can take a pure infinitive.
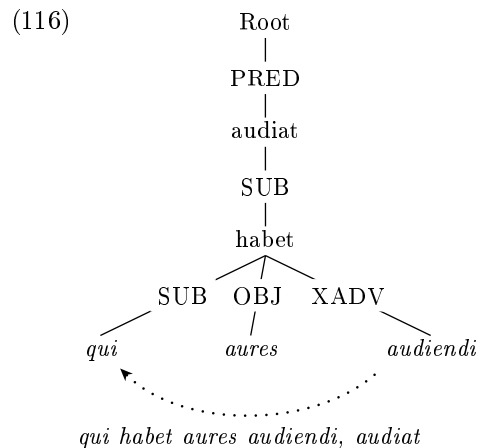
14.5   esse + participle

In the New Testament, we fairly often find a construction where the copula combines with a participle to form something which could almost be described as a periphrastic form. However, despite the regularity of the construction, we have chosen to treat it as if the copula had its full force:

(115)   Root
           |
         PRED
           |
         erat ◄.
           | ⋮
         PIV   ⋮
           | ⋮
         docens ⋅
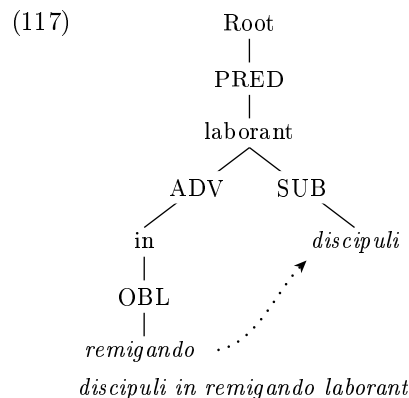
         erat docens

14.6   Gerunds

Gerunds on verbal nouns which cannot take a subject. As such, they should have an outgoing slash arrow. Gerunds on their own will very often be XADVs, fulfilling an adverbial role in the sentence. This goes both for instrumental ablative gerunds and final genitive gerunds:

(116)   Root
                            |
                          PRED
                            |
                          audiat
                            |
                          SUB
                            |
                          habet
                         ╱ | ╲
                   SUB   OBJ   XADV
                    | | |
                  qui *aures* *audiendi*
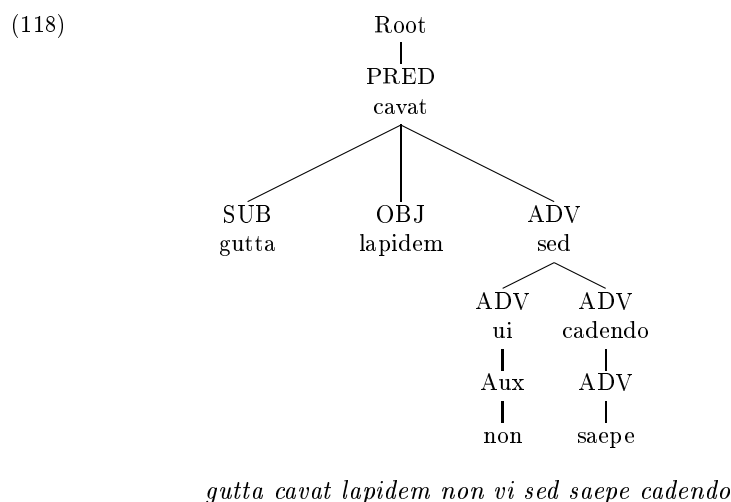
         qui habet aures audiendi, audiat

However, gerunds are also very often embedded in a preposition phrase. In such cases, the preposition serves as an ADV, while the gerund is an OBL of the preposition with a slash to its subject:

(117)

```
                    Root
                     |
                    PRED
                     |
                  laborant
                  /      \
              ADV          SUB
             /               \
           in              discipuli
            |                  ↗
           OBL              ·
            |            ·
        remigando  ·····
```

discipuli in remigando laborant

Another common use of gerunds is as arguments of certain verbal nouns, as in e.g. *spes vincendi*. In this function, they are NARGs, but with a slash to the subject if one is present. This slash should be directed towards the nearest possible subject - the number of nodes one must go upwards from the NARG/OBL slasher node before one descends towards the slashee node should be as small as possible.
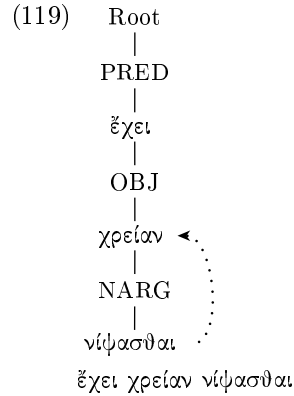
Ablative gerunds are also typically ADVs:

(118)

```
                        Root
                         |
                        PRED
                        cavat
              /           |           \
            SUB          OBJ           ADV
           gutta        lapidem        sed
                                      /    \
                                   ADV      ADV
                                    ui     cadendo
                                    |        |
                                   Aux      ADV
                                    |        |
                                   non      saepe
```

gutta cavat lapidem non vi sed saepe cadendo
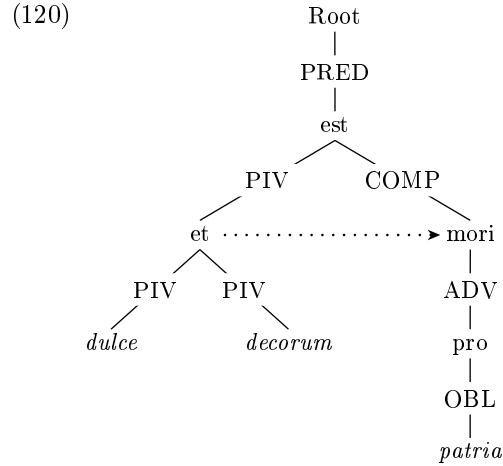
14.7 Infinitives

The two most common functions of infinitives are head of AcI (which is a COMP) and complement of auxiliary verb (XOBJ). But infinitives can have other functions, often corresponding to that of the gerund in Latin. For example, a bare infinitive can express purpose, in which case it is an XADV. It can also be an argument of a noun, in which case it is a NARG. The articular infinitive can be the object of a preposition, in which case it is an OBL. XADVs and XOBJs underlie some restriction on their slashes, which should always be 'local', ie.

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point toward the mother node or a node which the mother node dominates. Slashes from NARGs and OBLs are freer, but should still be as local as possible - the number of nodes one must go upwards from the NARG/OBL slasher node before one descends towards the slashee node should be as small as possible.

(119)   Root
             |
           PRED
             |
           ἔχει
             |
            OBJ
             |
          χρείαν ◄·⋯
             | ⋮
           NARG   ⋮
             | ⋮
         νίψασθαι ·⋯⋯

         ἔχει χρείαν νίψασθαι

The subject of νίψασθαι is not represented directly, but is coreferent with the subject of ἔχει. If this subject was present in the sentence, the coreference would again be noted by means of the slash notation.

Furthermore, infinitives are often found in positions where it could be analysed as a subject. However, we have chosen to treat it as a COMP 'across the board', in order to avoid complicated choices:

(120)   Root
                                |
                              PRED
                                |
                               est
                              ╱   ╲
                           PIV   COMP
                            | ╲
                           et ⋯⋯⋯⋯⋯⋯► mori
                          ╱ ╲ |
                       PIV   PIV   ADV
                        ╱   ╲ |
                     dulce   decorum   pro
                                         |
                                        OBL
                                         |
                                       patria

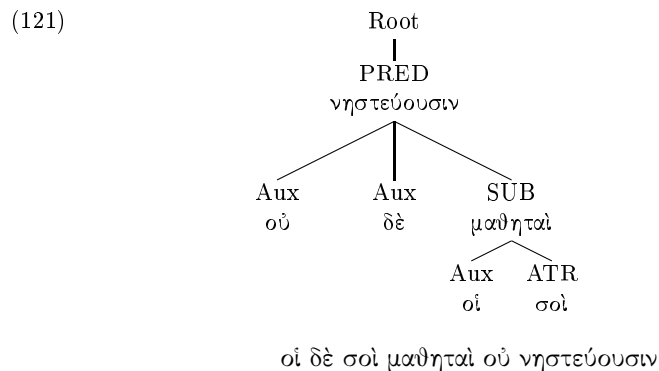   *dulce et decorum est pro patria mori*

14.8   Datives

The dative has a variety of meanings within the languages in our corpus. In Greek and Gothic, for example, the instrumental and the dative have syncretized. Therefore the dative has a variety of instrumental meanings which

are almost always ADVs, except with some verbs like χράομαι 'use' which takes a dative OBL.

In this section, we focus particularly on the 'dative proper', excluding meanings that have arisen by syncretism. The proper dative has as its central meaning the expression of 'the more remotely concerned person'. This will most often be an OBL. However, there are some other possibilities:

The dative is sometimes used adnominally to express possession, in which case it will be an ATR

(121)

```
                    Root
                     |
                   PRED
                 νηστεύουσιν
              /      |       \
           Aux      Aux       SUB
            οὐ       δὲ      μαθηταὶ
                              /    \
                           Aux     ATR
                            οἱ      σοὶ
```

οἱ δὲ σοὶ μαθηταὶ οὐ νηστεύουσιν

In other adnominal uses, the dative can be a NARG, whereas the so-called ethical dative should be ADV

15 General issues

15.1 ADV or OBL? adjunct or argument?

It can often be hard to decide whether a given element should be an ADV or an OBL, or - in more traditional terms - whether an element is an adjunct or an argument. Therefore we provide a super-tag which should be used whenever the annotator cannot decide, but the following section offers some advice to guide the choice.

Arguments are traditionally defined as 'elements seen as required by the verb'. In old Indo-European languages, nothing is really 'required by the verb', because all elements, even subjects and objects, can be dropped if they are easily inferable from the context. The test is therefore not whether an element can be left out or not, but rather whether it is possible to conceptualize the event expressed by the verb while abstracting from some element in the sentence. If that is possible, the element is an adjunct. Adjuncts (ADVs) are elements which elaborate upon an event desription and gives extra information about the event.

There are some kinds of adverbials which are almost always adjuncts. These are

- Adverbials of manner

- Adverbials of instrument

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- Adverbials of time

- Adverbials of place

- Adverbials of purpose

But even here there are exceptions: in *bene tractare*, for example, *bene* is an argument, since it is not possible to conceptualize the idea of 'treating someone' while abstracting away from the way of treating him. *utor* + ablative in Latin, and χράομαι + dative in Greek are cases where an adverbial of instrument has been grammaticalized so as to become a ablative/dative "object" - which we treat as an OBL. Place adverbials are typically OBLs and not ADVs when they appear with 'positional verbs', such as *stare, sedere* etc. However, even these can sometimes take a position ADV. Consider the following interesting example:

(122)
```
                        Root
                         |
                       PRED
                      sedebant
                    /          \
                 ADV            OBL
                  in             in
                  |              |
                 OBL            OBL
              synagogis       cathedris
                                |
                               ATR
                              primis
```

in synagogis sedebant in cathedris primis

The *cathedris*, seats, are inextricably linked to the sitting event, but the synagogues are not.

Elements of an idiom will also often be OBLs, e.g. *cum* in *pacem facere cum aliquo.* some more

There is also another way of thinking about arguments: they are elements that can appear in a sentence because of the main verb. Specifications on manner, instruments, times and places can appear with almost any verb. Specifications of goal and source, on the other hand, can only appear with a subset of verbs - mostly motion verbs - therefore they are arguments of their verbs. Sometimes both a source and a goal appears in a sentence, and both are OBLs:

(123)
```
                     Root
                      |
                    PRED
                   ἤρχοντο
                  /        \
              OBL          OBL
              πρὸς        πάντοθεν
               |
              OBL
             αὐτὸν
```

The two ways of thinking about arguments do not always give the same pre-
dictions. Here for example, one could argue that it is possible to conceptualize
motion without a goal and a source; but goal and source are 'selected' by the
verb and cannot appear with any verb.

If the two tests give the same result, we have a rather clear case of an
argument. But most elements which test positively for argumenthood in either
one should be considered arguments.

15.2   ATR or APOS? attribute or apposition?

. . .

15.3   ATR or XADV?

It can sometimes be hard to know whether a participle or an adjective is an
ATR or an XADV, ie. whether it helps determine the reference of the noun
(ATR) or is predicated of the noun (XADV).

With definite noun phrases, the decision is easier to make than with indefi-
nite nouns. In Greek there is overt marking: participles/adjectives in attributive
position (directly after the article) are ATRs and participles/adjectives in pred-
icative position are XADVs. But note that not all adnominal elements follow
the standard rules; for example πᾶς regularly appears in predicative position
even when it is attributive.

Even in languages with no overt marking of the attributive/predicative op-
position or of the definite/indefinite opposition, it is generally easier to deter-
mine whether an item is an ATR or an XADV if the NP is semantically definite.
This is so because the NP in such cases has a definite referent, and we can easily
determine whether the adjective/participle helps picking out this referent.

With indefinites, this is more difficult to determine. Annotators can try
whether it is possible to paraphrase a participle or adjective by a non-restrictive
relative clause - if so, the participle/adjective is likely an XADV. Another test
is whether it is possible to set up a contrasting referent - if so, the partici-
ple/adjective is likely an ATR.

15.4   XADV or SUB?

A similar question arises whenever a participle is dependent on a verb without
there being an overt subject present, as in *venientes dicunt ei*. If *venientes* is
taken as the subject, the sentence means 'those who are coming say to him'. If
venientes is taken as an XADV, it means 'Coming (to him), they said to him'.
There are no clear tests to be used. Annotators should base their analysis on a
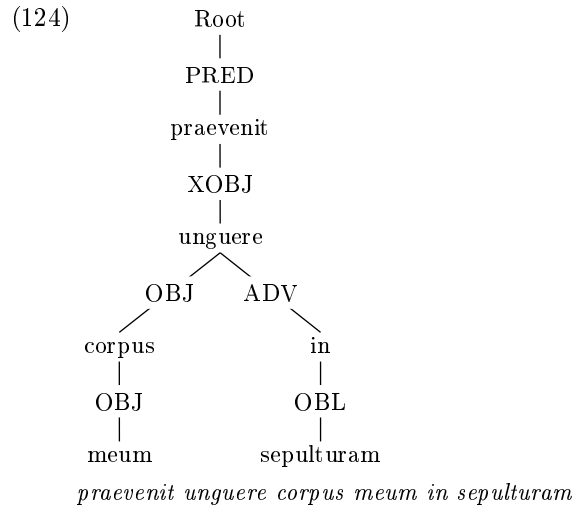semantic interpretation of the sentence.

15.5 More on the XOBJ relation and PIVs

The XADV and XOBJ relations are unfamiliar from traditional school grammar. XADV corresponds quite closely to the concept of predicative/conjunct participle or adjective, so it should not be too hard to grasp. The XOBJ relation, on the other hand, does not correspond closely to one particular category of traditional grammar, so it needs further explanation.

The crucial facts to grasp about the XOBJ relation is that it is used for predications which have external subjects (whence the X-) and which are governed by another verb. This means that nothing which can itself have a subject daughter, is an XOBJ: all finite verbs are excluded.
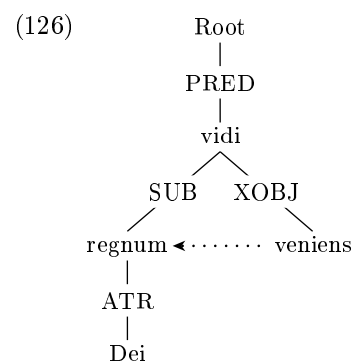
The prototypical XOBJ is therefore an infinite verbal form, but other word classes can also be predicative: most notably nouns, adjectives and prepositions.

XOBJ is a governed relation, an element which is selected and demanded by the matrix verb. A prototypical case are auxiliary verbs, like *posse, coepi, velle* and others, which demand a complement infinitive (and this infinitive cannot take its own subject). However, other verbs can also take an infinitive argument:

(124)

Root
|
PRED
|
praevenit
|
XOBJ
|
unguere
/   \
OBJ   ADV
| |
corpus   in
| |
OBJ   OBL
| |
meum   sepulturam

praevenit unguere corpus meum in sepulturam

(125)

Root
|
PRED
|
potest
/   \
SUB   XOBJ
/   \
Deus ◄······· iudicare

deus potest iudicare

Root
|
PRED
|
est
/   \
SUB   PIV
/   \
Deus ◄······· omnipotens

deus est omnipotens

The facts are the same in both constructions: both *iudicare* and *omnipotens* are selected by the main verb and cannot be deleted; and they both have external

subjects (they do not themselves govern their subject). For this reason, we treat traditional predicative complements as XOBJs. A notable case which often appears is the accusative with participle construction:

(126)
```
                    Root
                     |
                   PRED
                     |
                   vidi
                   ╱  ╲
              SUB      XOBJ
             ╱             ╲
        regnum ◄······· veniens
             |
           ATR
             |
           Dei
```

15.6   Empty nodes

In our model, we only use empty nodes to stand in for missing conjunctions in asyndetic coordination and missing verbs in elliptical constructions. Empty nodes should never be used for any other purpose