Coptic Universal Dependency Guidelines

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1. Preamble

These guidelines describe the application of the Stanford Universal Dependency scheme (de Marneffe et al. 2014) to Sahidic Coptic sentences. Where cases are left unspecified, the principles governing the Universal Dependency guidelines for languages other than Coptic may be consulted (see http://universaldependencies.org/).

In general, the attempt has been made to remain 'lexico-centric' in preferring lexical items as the heads of sub-trees, i.e. Coptic prepositions are analyzed as 'case markers', and the lexical infinitive is seen as the verbal root, with conjugation bases forming auxiliaries.

Some functions from the Universal Dependencies are not used, most notably labels for passives. Although Coptic has some form of passive constructions, they are not easily distinguishable and often ambiguous (actional passive identical with third person active sentence in the absence of a singular agent phrase; stative passive depending on transitivity of the verb for interpretation; see the *nsubj* label below). In these, and other cases, the realistic demands that accurate automatic parsing must satisfy have played a role in the decision in favor of a simpler analysis.

The dependency guidelines assume part of speech tagging based on the Coptic Scriptorium Guidelines (Zeldes & Schroeder 2016). Please consult the tagging guidelines for background on tagging, as well as tokenization decisions (e.g. portmanteau tokens and tags, such as fused ⲉⲣⲉ for 2nd person feminine singular, etc.; see Section 3). In general, these guidelines have been formed to complement the POS tag's expressivity, e.g. favoring distinctions that cannot be easily obtained from the POS tags (for example the label *amod* for the archaic attributive adjectives, which have no distinct POS tag).

2. List of dependency labels

acl – adjunct clause	ⲡⲣⲱⲙⲉ ⲉⲧⲥⲱⲧⲙ
advcl – adverbial clause	ⲉⲩⲭⲱ, ⲭⲉⲕⲁⲁⲥ ⲩⲟⲩⲱⲱⲩ
advmod – adverbial modifier	ⲟⲛ, ⲕⲁⲗⲱⲥ
amod – adjective modifier	ⲱⲛⲣⲉ ⲱⲛⲙ
appos – appositions	ⲡⲉⲕⲉⲓⲱⲧ ⲙⲁⲙⲙⲱⲛⲁⲥ
aux – auxiliary	ⲁ, ⲙⲡⲁⲧ, ⲱⲁⲣⲉ
case – case marking/preposition	ⲥⲱⲧⲡ ⲙⲡⲣⲱⲙⲉ, ⲙⲙⲟⲩ, ⲣⲙⲡⲛⲓ
cc – coordination	ⲁⲩⲱ, ⲙⲛ, ⲣⲓ, ⲏ
ccomp – complement clause	ⲡⲉⲭⲁ ⲩ ⲭⲉ ⲁ ⲓ ⲥⲱⲧⲙ
compound – nominal or verbal	ⲱⲃⲣ ⲣⲣⲱⲃ
conj – conjunct in coordination	ⲱⲛⲣⲉ ⲙⲛⲱⲫⲉⲉⲣⲉ, ⲁⲩⲛⲁⲩ ⲁⲩⲱ ⲁⲩⲥⲱⲧⲙ
cop – the copula	ⲡⲉ, ⲧⲉ, ⲛⲉ
csubj – clausal subject (fin./inf.)	ⲡ ⲉⲧ ⲱⲱⲉ ⲉ ⲁⲛⲉⲭⲉ ⲙⲙⲟ ⲕ
det – article or other determiner	ⲡⲣⲱⲙⲉ, ⲕⲉⲥⲟⲡ, ⲥⲟⲛ ⲛⲓⲙ
discourse – interjections etc.	ⲉⲣⲉ, ⲟⲩⲟⲉⲓ!
dislocated – extraposed argument	ⲩ ... ⲛⲥⲓⲡⲣⲗⲗⲟ, ⲡⲣⲱⲙⲉ ⲁⲩⲥⲱⲧⲙ
dobj – direct object	ⲥⲱⲧⲡ ⲙⲡⲣⲱⲙⲉ, ⲧⲛⲁⲣⲟⲧⲃⲉⲕ
iobj – indirect object (possessor)	ⲟⲩⲛⲧⲁⲩ ⲁⲡⲟⲧ
mark – clause marker or converter	ⲡⲉⲭⲁ ⲩ ⲭⲉ ⲉⲧⲃⲉ ⲟⲩ, ⲉ ⲓ ⲥⲱⲧⲙ ⲉⲣⲟ ⲕ
mwe – multiword expression	ⲉⲃⲟⲗ ⲣⲛ
name – multi-word name	ⲁⲡⲁ ⲡⲁⲡⲛⲟⲩⲧⲉ
neg – negation	ⲧⲙ ⲥⲱⲧⲙ, ⲟⲩ ⲣⲱⲙⲉ ⲁⲛ
nmod – nominal modifier	ⲟⲩ ⲣⲱⲙⲉ ⲛ ⲁⲡⲓⲥⲧⲟⲥ
nummod – number modifier	ⲣⲙⲉ ⲛ ⲣⲟⲟⲩ
nsubj – nominal subject	ⲡⲣⲱⲙⲉ ⲥⲱⲧⲙ, ⲁⲓⲣⲛⲟⲃⲉ
parataxis – loose clausal joint	ⲛⲁ ⲉⲡⲓⲥⲧⲟⲗⲏ ⲛⲉ ⲏ † ⲥⲟⲟⲩⲛ ⲁⲛ ⲭⲉ ⲕ ⲛⲁ ⲡⲁⲣ ⲟⲩ
punct – punctuation	· . ,
remnant – 2nd, conflicting argument	ⲙⲡⲓⲥⲱⲧⲙ, ⲁⲗⲗⲁ ⲛⲧⲟⲩ
root – root/predicate of utterance	ⲥⲱⲧⲙ, ⲛⲁⲛⲟⲩ ⲩ, ⲡ ⲣⲣⲟ ⲡⲉ
vocative – appellation	ⲡ ⲡⲟⲛⲏⲣⲟⲥ!
xcomp – subjectless clause	ⲙⲡ ⲩ ⲟⲩⲱⲩ ⲉ ⲱⲛⲣ

dep – undefined dependency – used when no other definition applies

3. Dealing with portmanteau tags

There are two modes of annotation: using portmanteau dependency tags, and pure universal dependencies.

Portmanteau functions
For portmanteau tags, tokens which carry a fused portmanteau POS tag receive both functions associated with those components, separated by an underscore. For example, the form ⲉⲕⲱⲁⲛ, which is tokenized as one fused token with the POS tag ACOND_PPERS, is both an auxiliary and a subject pronoun. Therefore, its associated verb dominates it as ***aux_nsubj***, by analogy to the POS tag.

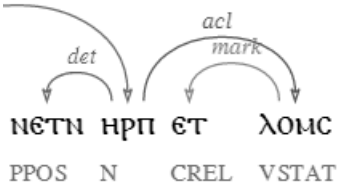
Pure universal dependencies
When using pure dependencies, more 'lexical' functions trump more 'grammatical' ones, so that examples like ACOND_PPERS are still labeled ***nsubj***, omitting the ***aux*** label entirely. This preserves the pure universal dependency tag set.

Alternatively, if the intended application of the annotation project supports sub-tokenization, the CoNLL-U format can be used as follows, specifying subtokens/supertokens for fused units:

```
1-2   ⲉⲕⲱⲁⲛ     _     _       _     _     _     _       _
1     ⲉⲣⲱⲁⲛ     _     ACOND   _     _     3     aux     _
2     ⲕ          _     PPERS   _     _     3     nsubj   _
3     ⲥⲱⲧⲙ      _     V       _     _     0     root    _
```

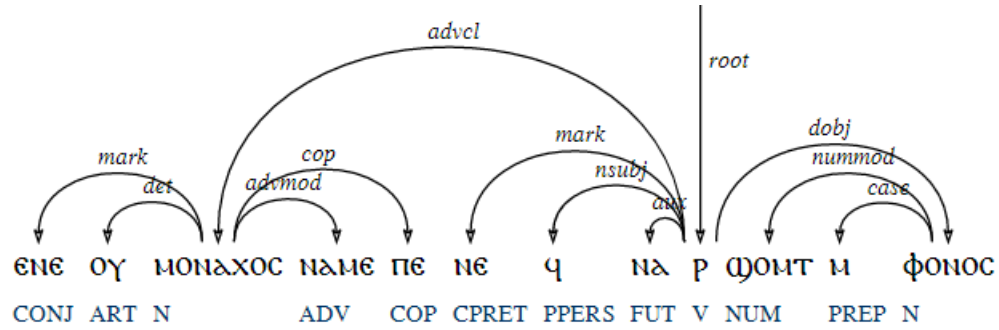
4. Function labels in detail

acl
Head of an 'adjectival' or relative clause, usually the verb or nominal predicate, when the clause is marked by a relative converter (the POS tag CREL, which is given the function **mark**, regardless of which form is used, such as ϵт, ϵтϵ, ϵтϵρϵ or ϵ; for circumstantial conversion see **advcl**). The arrow points from the modified element (usually a noun) to the predicate of the relative clause:



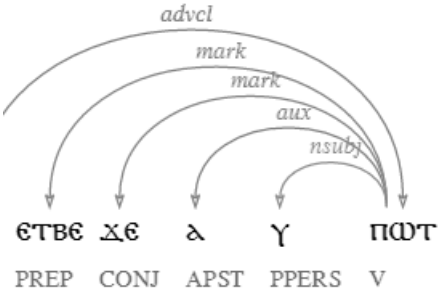
Your wine which is foul

advcl
An adverbial subordinate clause (e.g. a clause answering the question why? How? Where? When? or a conditional, etc.), usually introduced by a subordinating conjunction or auxiliary (ϵⲡϵⲓⲇⲏ, ϵⲣⲱⲛ), or a circumstantial converter (ϵ/ϵⲣϵ).



if he were really a monk, would he have committed three murders?

Rarely, we may also see a subordinate clause governed by a preposition, in which case the preposition is governed by the head of the clause and labeled **mark**, not **case**, even if there is also a second conjunction with a **mark** label.

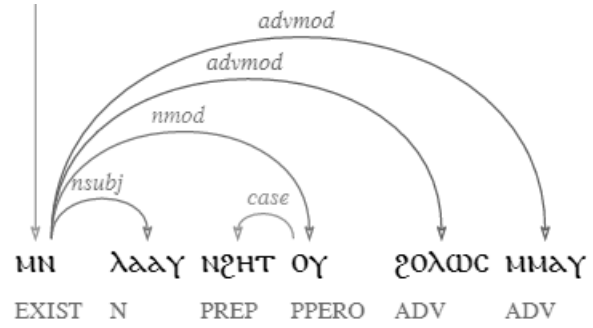


because they have fled (lit. *for that they fled* – both 'for' and 'that' are labeled **mark**)

This analysis keeps a parallel structure with a similar clause without the preposition (e.g. only with ϫϵ to mean 'because').

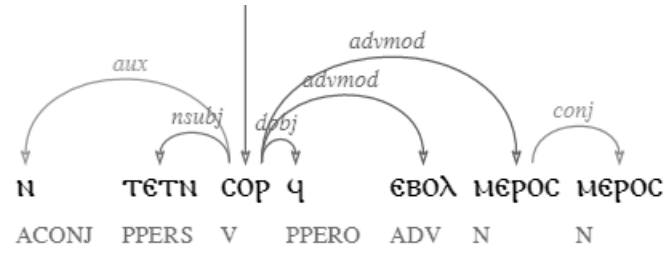
advmod

An adverbial modification, usually modifying a verb or a noun. This can be an adverb like ϵⲙⲁⲧϵ 'very much', ⲙⲛⲁⲩ 'there', a sentence particle (modifying the main predicate) like ⲅⲁⲣ 'after all', or a directional adverbial such as ϵⲃⲟⲗ 'out', as well as Greek adverbs in -ⲱⲥ.



There isn't a thing inside them <u>at all</u> <u>there</u>

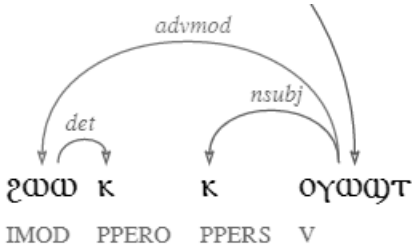
Occasionally nouns will be used as adverbial modifiers depicting manner or time, as in the following:



As you divide it <u>out</u>, <u>limb</u> for limb (lit. *limb-limb*, i.e. *limb-wise*)

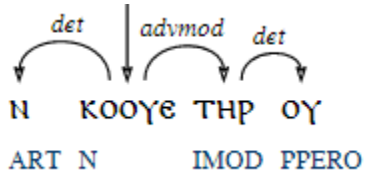
Inflected modifiers (Scriptorium tag IMOD, cf. Layton 2011: 118-123) are also seen as adverbial. For example, ϩⲱⲱ⸗ is used together with an object pronoun to mean 'also X' or 'X for X's part. Because of its basic modifier semantics, meaning 'also', the combination is seen as

adverbial, so that the function of the phrase is again **advmod**. Note that ϩωω is not a preposition, and the analysis treats it similarly to a possessed noun, so that the pronoun is seen as a determiner **det**:



You also worship / for your part you worship

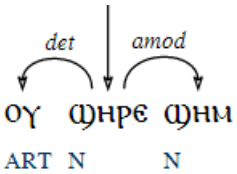
The same applies to other IMODs: the inflected modifier ⲧⲏⲣ≠ 'all of X' is also seen as **advmod**, i.e. as syntactically more similar to 'completely' than a determiner 'all'. Like all inflected modifiers, the pronoun is seen as a determiner in this case, similar to a possessive. In the following example, we can think of the meaning as 'their entirety(-wise)', or 'by way of their entirety'.



all the others (lit. 'the others, [in] their entirety)

amod

This function is reserved to the small closed class of Egyptian adjectives which may follow a noun without mediating ⲛ. The label is only given if the construction is actually noun+adjective: if an ⲛ appears, then the label should be **nmod**.

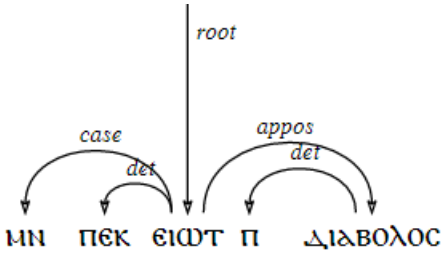


A <u>little</u> boy

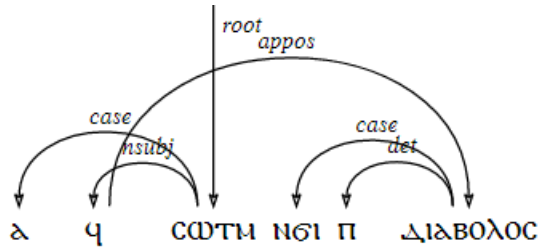
Note that such adjectives are still tagged with the POS tag N, following the Scriptorium POS tagging guidelines.

appos

Marks appositions in all free apposition constructions, as well as the special construction with ⲛⲥⲓ ‘namely’. Appositions are preferred to be marked from left to right, including in sentences with nominal subject after the verb (apposition from pronoun to noun). In cases where both a nominal and pronominal realization are given to the same argument with the same function, the tightly bound argument of the verb takes precedence in receiving subject or object marking, with subsequent realizations connected as appositions. Typical cases include normal apposition (two consecutive nominal expressions with same reference and grammatical function) and the ⲛⲥⲓ construction.



With your father, the devil



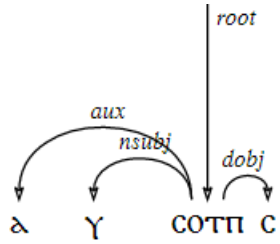
He heard, namely the devil

In the first example, *your father* and *the devil*, refer to the same thing, and have the same function (both relate to *with*: *with your father*, i.e. *with the devil*). In the second example, an apposition to the pronoun ⲩ ‘he’ is mediated by ⲛⲥⲓ ‘namely, that is’, which is considered to be a case marker, like a preposition (but with nominative case). As usual, the apposition goes from left to right, to the lexical head ‘devil’ (he = devil).

Unusually, if a nominal subject or object is mentioned **before** an auxiliary and is then referred to by a pronoun in the verbal complex (e.g. ⲡⲣⲱⲙⲉ ⲁⲩⲥⲱⲧⲙ ‘the man, he heard’), the pronoun is treated as the subject or object, and the preceding noun is labeled **dislocated**.

aux

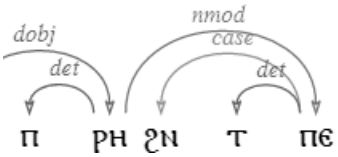
The relation between a lexical verb and a conjugation base marks the base as **aux** to the verb, as shown below. This applies to all tripartite conjugation bases, but NOT to converters, which receive the **mark** label.



They chose her (or: *she was chosen*)

Some other elements that are marked as aux include the future auxiliary ⲛⲁ (tagged FUT) and the potential verb ⲱ ‘be able to’, which is marked as an auxiliary to the lexical verb that follows it. This should not be confused with the impersonal verb ⲱⲱⲉ ‘it is appropriate’, which is treated as a main verb governing an infinitive.

case
Used for all prepositions, including the marker of accusative case ⲛ and all other prepositions, which are understood as ‘oblique’ cases. Nouns govern their prepositions as in all other Universal Dependency guidelines, and not the other way around.

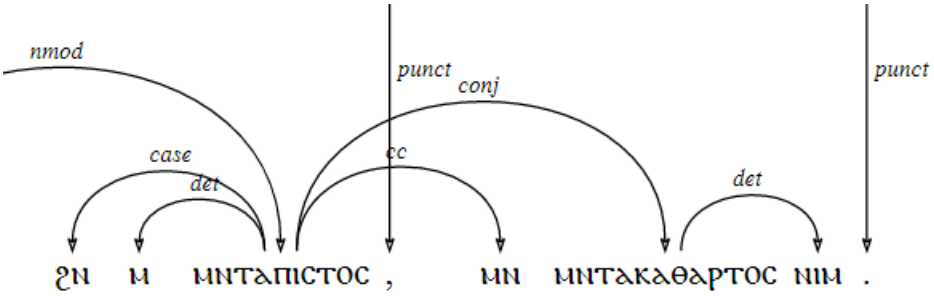


the sun <u>in</u> the sky

The hermeneutic particle ⲛⲟⲓ, roughly ‘namely’, is also considered a case marker, assigning nominative case (it is only compatible with subject appositions, never objects or obliques, cf. Grossman 2014); see **dislocated** for more guidelines on ⲛⲟⲓ.

cc
The label for coordinating conjunctions. These are usually ⲁⲩⲱ ‘and’ between clauses and ⲙⲛ ‘and, with’ between phrases, but could also be ⲫⲓ in the sense ‘X upon Y’ or ⲏ ‘or’. If the sense is not coordinating (e.g. ⲙⲛ to mean ‘with’), cc should not be used, but nmod as with a regular preposition.

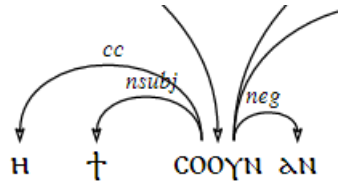
Coordination is marked left to right, with the first coordinate dominating all subsequent coordinations and receiving the incoming grammatical relations. The reasoning is that to retrieve the function of any coordinate, we can check its parent’s function, even without knowing how many coordinates there are (*X and Y and Z and …*). For example:



In faithlessness <u>and</u> every impurity

Note that the function of ⲙⲛⲧⲁⲡⲓⲥⲧⲟⲥ ‘faithlessness’ is nmod. To recover the function of ⲙⲛⲧⲁⲕⲁⲑⲁⲣⲧⲟⲥ ‘impurity’, we can look at ‘faithlessness’, its immediate parent and establish that ‘impurity’ is also nmod. Also note that the word ⲙⲛ ‘and’ is ambiguous with the meaning of comitative ‘with’ (e.g. go somewhere **with someone**). When used in the latter way, it is not labeled **cc** + **conj** but rather **nmod + case**, as with all other prepositions.

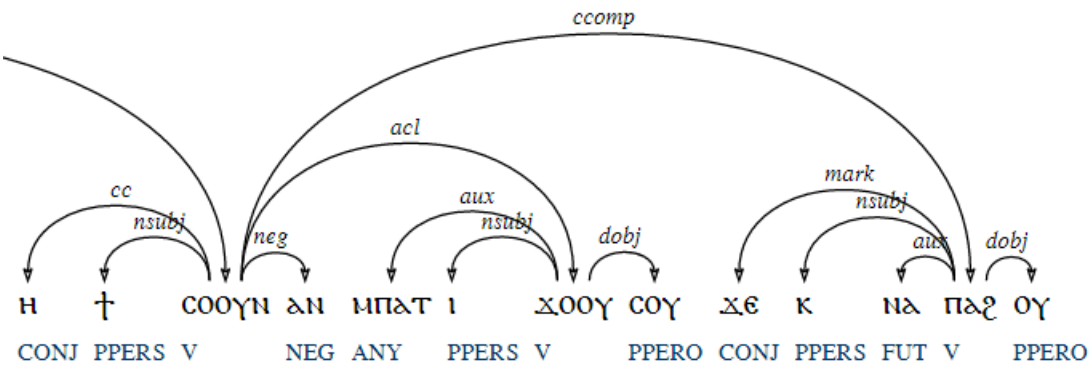
Exceptionally, clause initial ‘and’ or ‘but’ is connected to the root of the clause, pointing **backwards**, as in this example:



<u>Or</u> don’t I know?

In this case, the word ⲏ ‘or’ cannot be attached to a preceding word, so it is pointed to from the following conjunct ‘know’ with the usual function, **cc**.

ccomp
Marks a complement clause, e.g. an object clause to a verb of saying (said that: …., saw that: …). The dependency goes from the main clause predicate to the subordinate clause predicate. Markers like ⲭⲉ are governed by the **mark** function (see **mark**).

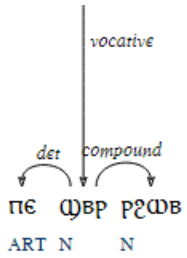


Don't I know, before I have sent them, that you will tear them up?

Note how the verb *know* is the source of **ccomp**, and the subordinate clause main verb, *tear*, is the target: [I] know [that you] tear – X knows about tearing – know -> tear.

compound

Used to connect compound noun heads to their modifier. For example the compound 'accomplice' is comprised of 'friend' and 'doing' (a 'doing-friend'), which is a type of 'friend' (not a type of 'doing'). Therefore 'friend' is the head, and 'doing' is attached to it via the function **compound**:

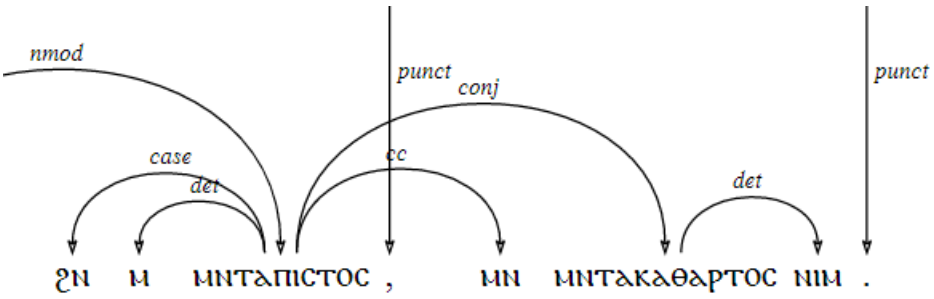


accomplice! (lit. 'the friend-doing', or 'doing-friend')

Note: This label is only used for cases in which tokenization has left parts of a compound as separate units. Generally speaking, Scriptorium guidelines specify that compound constituents are only annotated at the morpheme level, and do not constitute independent normalized units which are assigned a part of speech. As a result, this label should almost never be needed in corpora following Scriptorium segmentation practices; but for exceptional cases or corpora not following these practices, the **compound** label is the alternative.

conj

This function marks the coordinate (not the coordinating word 'and' etc.) and attaches it to the first member of the chain of coordinates. To retrieve the function of the daughter of *conj*, only its parent needs to be examined, cf. the guidelines for cc. The same example applies:

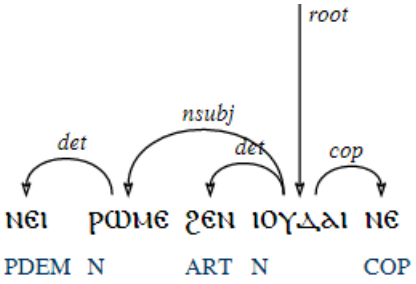


In faithlessness and every impurity

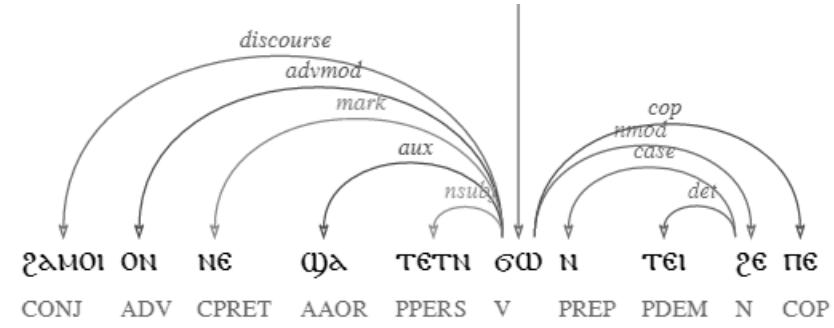
The first coordinate points right to the second.

cop

This label marks the copula forms ⲡⲉ, ⲧⲉ, ⲛⲉ. Note that the copula is not the root of a copula predication, but rather a dependent of the lexical predicate, usually a noun preceding the copula, but sometimes a verb (especially with preterit conversion, followed by the 'optional' copula). Both cases are illustrated below.

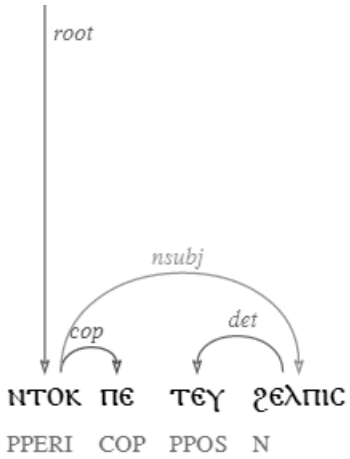


These men <u>are</u> Jews.



Oh, would that you would stop in this way!

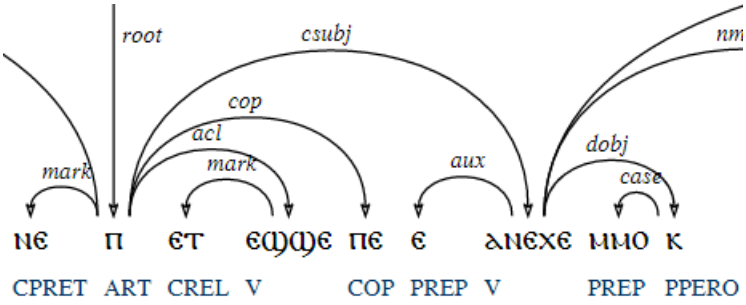
Also note that in nominal sentences, the subject is **nsubj** to the predicate, not to the copula. This is also true when the subject follows the copula, as shown below.



Their hope <u>is</u> you (lit. '[it]'s you, their hope')

csubj

Used to mark the head of a clausal subject. The dependency goes from the predicate that governs the subject, to the local root (i.e. the predicate) of the subject clause. This construction is fairly rare, and the subject clause is often an infinitive clause, as shown below.

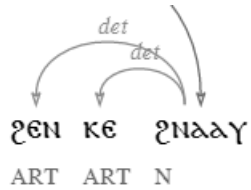


it would be fitting to tolerate you

Note that this is just like a nominal subject (**nsubj**): *what would be fitting? To tolerate you. To tolerate you is fitting.*

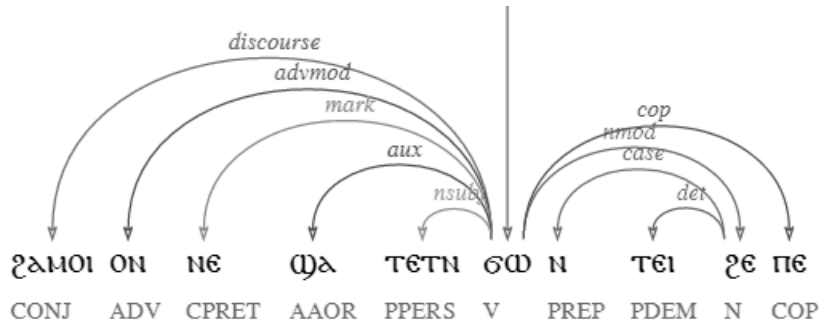
det

Function label for determiners, including definite and indefinite articles governed by their noun, but also the postposed ⲛⲓⲙ 'any' and the determiner ⲕⲉ 'other', which is unique in being allowed to stand for an article. If a noun has both a normal article and ⲕⲉ, both are marked as **det**:



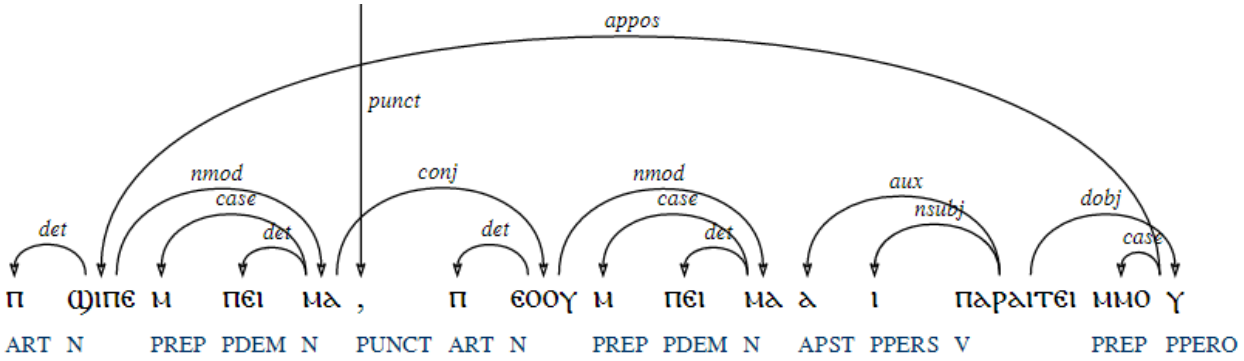
some other matters

discourse
Function label for discourse particles, such as negative/affirmative answers (yes, …) or interjections (oh! Hah! etc.). The discourse particle is connected to the root of its clause using the **discourse** function.



Oh, would that you would stop in this way!

dislocated
This label is used for arguments or 'hanging topics' that are preposed before the verbal complex, and which are referred to again as pronouns governed by the verbal complex.



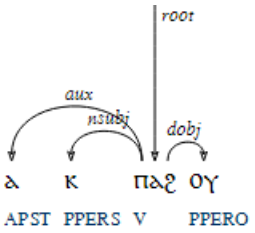
The shame of this place, the glory of this place, I have forsaken them

Note how the lexical arguments 'the shame … the glory' act as *dislocated* and are pre-posed, to be referred to again as pronouns by the pronoun object 'them', which acts as *dobj* (*forsaken* what? *them.* What is *them*? *shame + glory*). The dislocation is linked to the word governing the 'duplicate pronoun', usually the verb (here ⲡⲁⲣⲁⲓⲧⲉⲓ 'forsake', which also governs the object pronoun).

dobj
Designates the direct object of the verb. This can be one of the following:

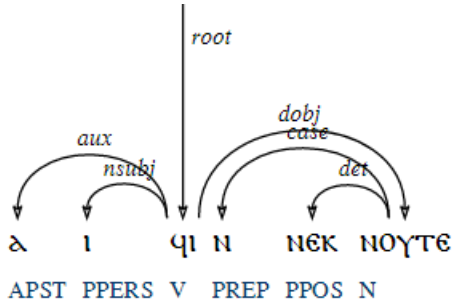
- A nominal object standing directly after a verb

- A pronominal object directly after a verb



You have torn them.

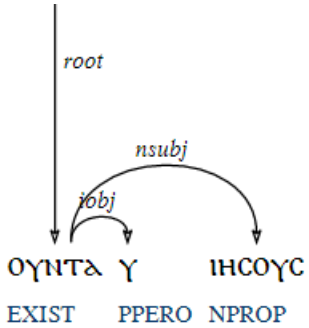
- A nominal or pronominal object mediated by the accusative marker (ⲛ/ⲙ/ⲙⲙⲟ), usually in the durative patterns according to Jernstedt's Law. The marker itself is linked to the noun with the **case** function.



I have carried your gods

iobj

Only used to mark the possessor in the possessive existential construction:



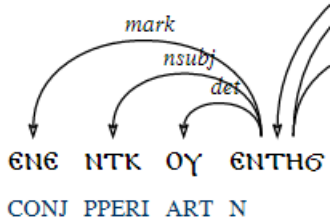
They have Jesus

(can be interpreted as 'exists to-them Jesus', etymologically ⲟⲩⲛⲧⲁ-ⲩ < 'exists in their hand')

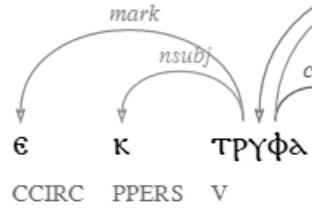
mark

Marker indicating clause status. For subordinate clauses, this is the subordinating conjunction or particle, such as ϫⲉ introducing the object clause of direct or indirect speech, a relative pronoun such as ⲉⲧ, or an adverbial subordination, such as the circumstantial converter ⲉ/ⲉⲣⲉ. In Coptic, some main clauses also have marker elements determining clause status, which are morphologically and paradigmatically comparable to subordinators: the focalizing and preterit

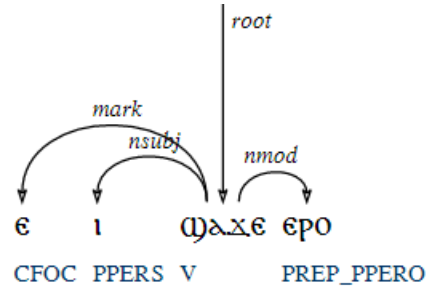
converters. As a result, all converters (POS tags CCIRC, CREL, CPRET and CFOC) are treated as **mark**, modifying their clause's predicate, but also non-converter conjunctions with similar functions (e.g. ⲉⲛⲉ 'if') as shown in the examples below.



If you were a weed



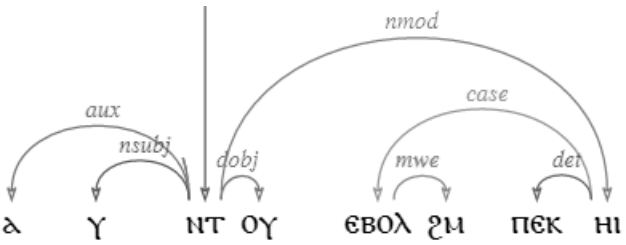
While you live luxuriously



It's YOU I'm talking to!

mwe

Multi-word expressions are sequences of tokens which form a fixed expression, for which internal grammatical relations are not represented. For Coptic, this often corresponds to multi-token complex prepositions, often with a frozen adverbial modifier such as ⲉⲃⲟⲗ 'out'. For example in the following example, the complex sequence ⲉⲃⲟⲗ ϩⲛ 'out of', has individual tokens which literally mean 'out in'.



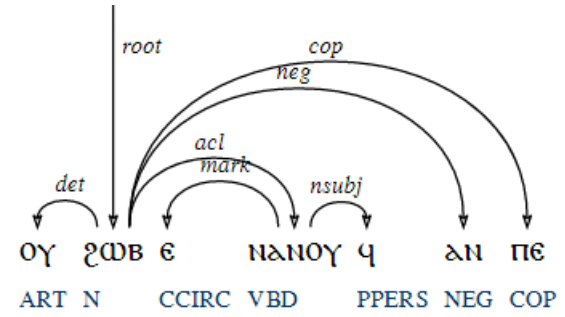
they took them out of your house

While an interpretation connecting ⲉⲃⲟⲗ to the verb to mean 'take out' is possible, that would leave the sense of 'in' to mean 'of' unexplained. Rather, the combination ⲉⲃⲟⲗ ϩⲛ 'out of' is lexicalized as a multiword expression, or **mwe**. By convention, mwe's point in a chain from left to right, whereas the first token in the chain carries the external function of the expression – in this case a preposition (the label **case**).

name
This label is used to connect parts of multi-word names, pointing from left to right in a chain. The most typical case is titles such as ⲁⲡⲁ, but the guideline applies to all complex names.

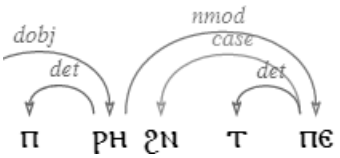
Apa Papnoute

neg
The label for negations such as ⲁⲛ, ⲛ, ⲧⲙ etc. which receive the POS tag NEG. The attachment is to the negated element, often the predicate or verb. Copula sentence negation is attached to the predicate, not to the copula. In circum-negation (ⲛ...ⲁⲛ), both elements are attached to the same element with the **neg** label.



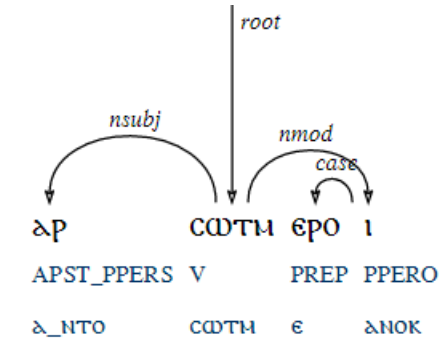
it is not a good deed.

nmod
A nominal modifier. This is the label given to prepositional objects and other types of nominal dependents which are non-core arguments (i.e. neither subject nor object). Note that in keeping with Universal Dependencies for other languages, the **nmod** noun attaches directly to the lexeme it modifies (usually a noun or verb), while the preposition is seen as a **case** dependent of the modifying noun.



the sun in the sky

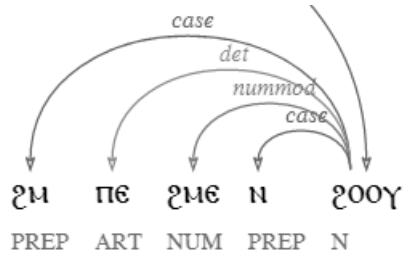
Note also that prepositional arguments of verbs are also marked as **nmod**, including prepositional objects of verbs of perception:



You have heard me

nummod

This label is used for number modifiers, counting the modified nouns. Note that for numbers taking a preposition ⲛ, the preposition is attached via the case label to the counted noun, but the article (and any further prepositions preceding the article) are attached to the nominal head as well, as shown below.



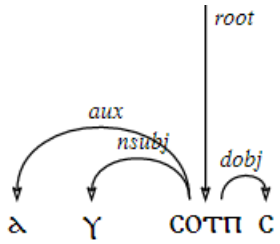
in the forty days

For the number ⲥⲛⲁⲩ ‘two’, which follows the counted noun, the noun is still the head, i.e. the dependency arrow points forward from the noun to the number.

nsubj

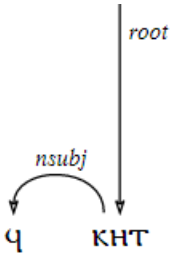
Designates the subject of a verb. The relation is from the lexical verb to the subject pronoun or noun, not from the auxiliary, as shown below. The annotation guidelines do not distinguish passive subjects, since the two forms of passive-like expressions in Coptic may be seen as syntactically indistinct from active:

- Actional passive – formed by a third person plural with non-plural reference, but if there is no singular ‘by’ phrase, it is formally indistinguishable from the active equivalent:

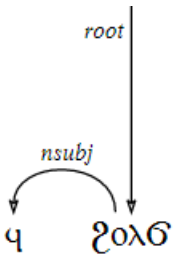


She was chosen (or: *they chose her*)

- Stative passive: formed by the morphological stative form (pos=VSTAT) with a transitive verb, however syntactically same as statal reading with intransitive verb:

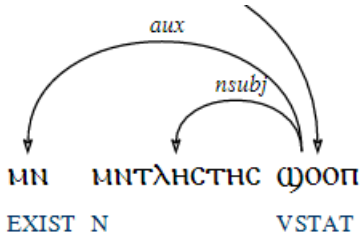


It is built (transitive ⲕⲱⲧ ‘build’)



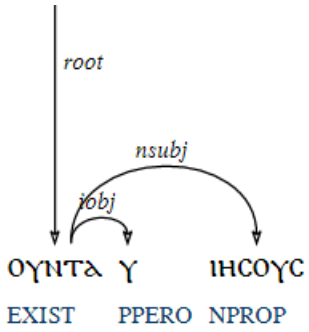
It is sweet (intransitive ⲭⲗⲟⲍ ‘become sweet’)

Note also that the existential predicates (pos=EXIST) take **nsubj** for the existing entity, even when they are used in the possessive construction:



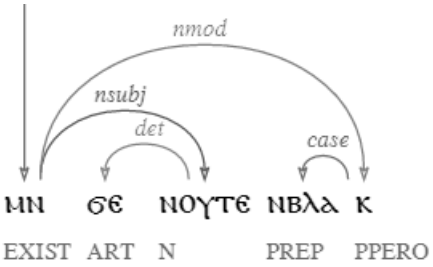
there is no robbery

If the possessor is indicated in the EXIST construction, the possessed is still annotated as nsubj, and the possessor is annotated as the indirect object, see **iobj** (i.e. the construction is interpreted as ‘there exists X to Y’).



They have Jesus (‘exists to them Jesus’)

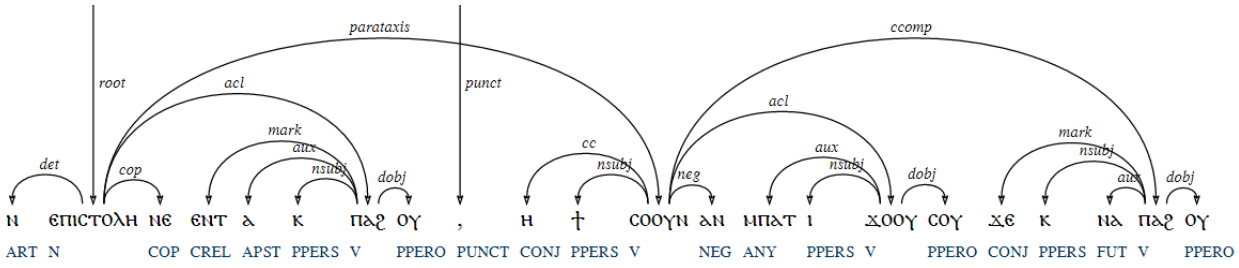
In pure existence predication, the existing entity is the subject, and the EXIST predicate is the local root:



There is no God but you (‘not existing’ is the main predicate, ‘God’ is the subject)

parataxis

This label is used to link two main clauses that are listed together as one sentence (either by accident, or because they are not quite independent sentences). It is also used for parenthetical clauses in the middle of other clauses. The dependency goes from the root of the first clause, or in parenthetical cases, the non-parenthetical clause, to the other one:

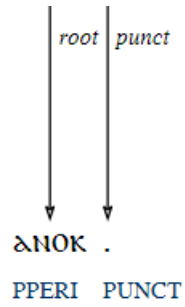


It’s the letters you tore, don’t I know before I sent them that you’ll tear them?

If both of these clauses are seen as one sentence, there is no other relation to call the connection between the first clause and the second one. Note that this is distinct from two coordinated clauses, e.g. with ⲁⲩⲱ ‘and’, for which **cc** and **conj** should be used.

punct

The function for punctuation. It is seen as a root function, i.e. punctuation does not depend on any other word in the sentence. If a single tree form is desired, it is also possible to attach punctuation to the local root of the graph.



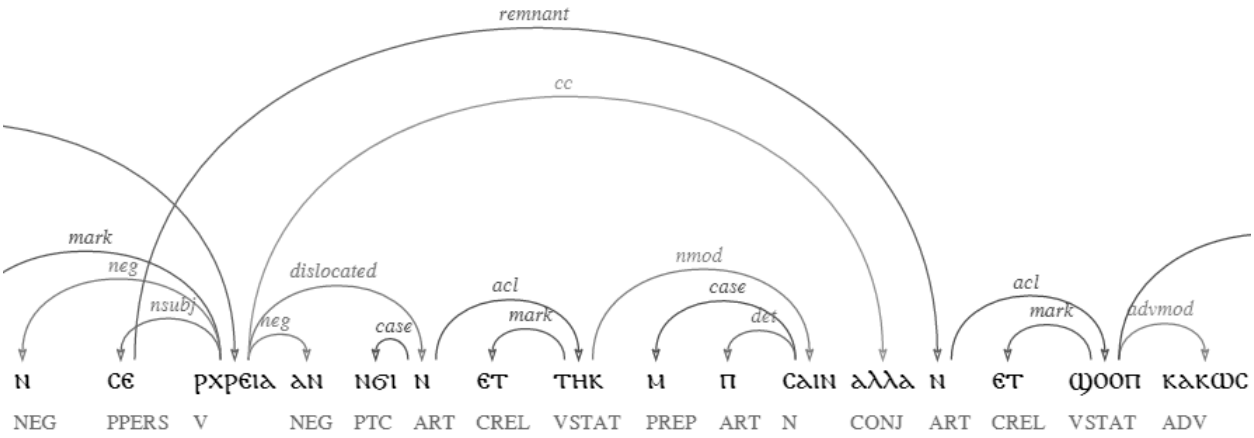
I.

remnant

This (relatively rarely used) function is required when ellipsis of a head word results in two words which do not refer to the same thing in the world (cf. dislocated) to be realized as double dependents of the same head. English examples for this relations are sentences such as:

Mary ate the cake, but John the cookies.

In this case, the absence of a second 'ate' forces us to consider two conflicting subjects and objects for the first 'ate'. The solution is to connect the second member in each set to the first one, using the **remnant** relation. Coptic examples work using the same logic:



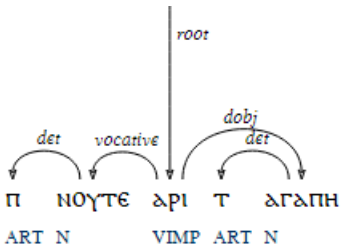
The healthy do not need the doctor, but those who are unwell (need the doctor)

While both subjects are related to *need*, only the first instance of the subject may be realized on the overt verb *need*. The second subject is thought of as belonging to an omitted coordinated verb. For this reason, the conjunction *but* is seen as having the function **cc** to the first verb.

root
The root of the utterance, that word, which depends on no other word. Usually this is the predicate, a verb if available, otherwise the nominal predicate of a nominal sentence. In fragments, such as a plain nominal phrase or a single interjection, the local root (i.e. the noun head, or the interjection) is the root.

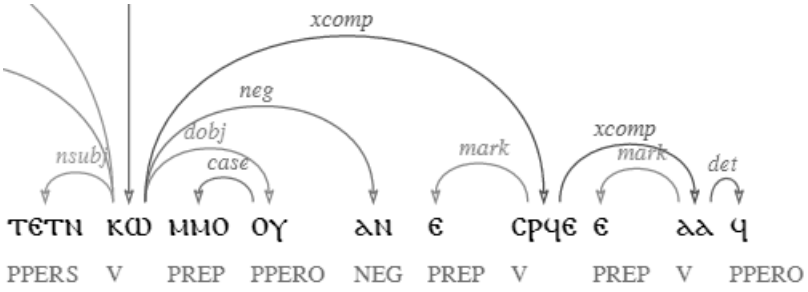
vocative

Used to mark direct forms of address, usually introduced by a definite article: ⲡⲉⲱⲃⲣⲣⲍⲱⲃ! ‘oh you accomplice!’. If the vocative forms the entire utterance, it is labeled vocative and functions as the root of the utterance. If there is a further proposition in the sentence (usually an impreative), then the vocative is attached to the root of the predication:



Oh God, have mercy!

xcomp
This label is used to mark dependent clauses that do not contain their own subject, most often infinitive object clauses.

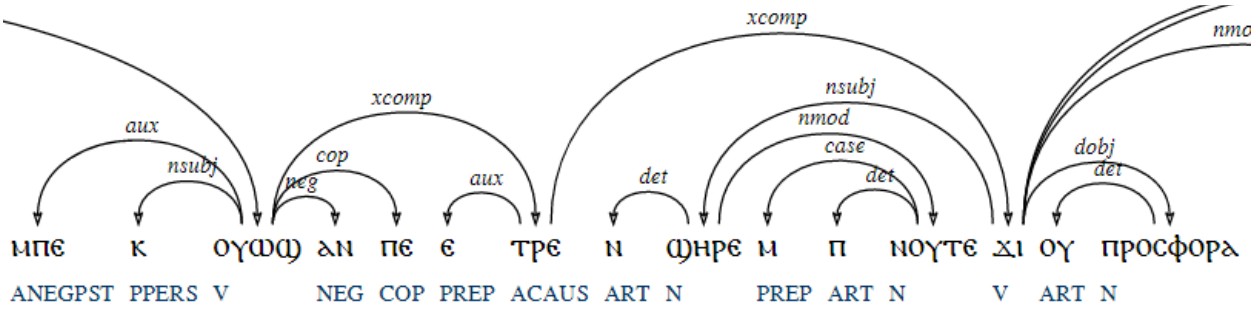


you do not let them engage in making it

Note how in the example above, the subject of both infinitives marked by ⲉ is the object of the main verb ⲕⲱ, which is external to the infinitive clauses. The infinitive clauses marked by **xcomp** are inheriting their subject argument from the main clause argument.

Additionally, the subordinate infinitive of the causative construction with ⲧⲣⲉ is also analyzed as **xcomp**, although the etymological subject of the auxiliary ⲧⲣⲉ is attached to the lexical infinitive

as a subject. This facilitates syntactic recognition of the construction next to semantic argument structure extraction:



you did not wish to make the sons of God carry an offering

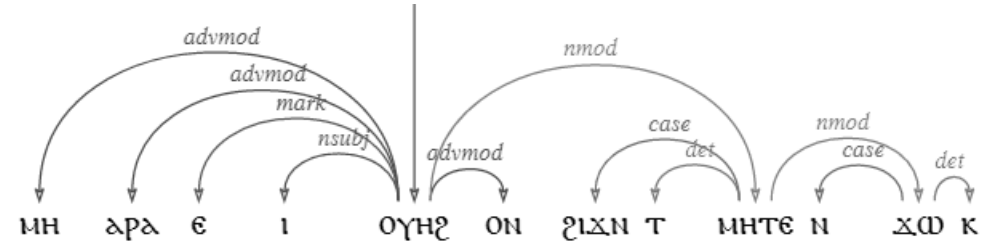
Note that in the example above, the first **xcomp** is the normal infinitive case, with no explicit subject, but the second **xcomp** illustrates the causative construction: ‘sons’ are both the object of ‘making’ and subject of ‘carrying’.

dep

For all cases not covered by these guidelines, the label **dep** may be used to denote the unusual dependency. Ideally, these cases should be re-examined and integrated into the guidelines at a later date.

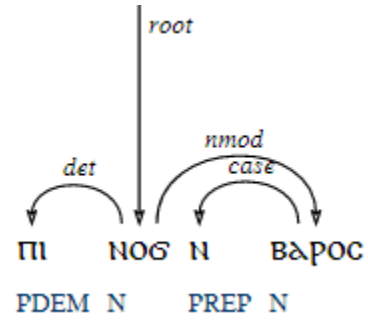
5. Special and Confusing Cases

Non-coordinating Greek conjunctions and particles
Greek conjunctions and particles that are non-coordinating (i.e. not meaning 'and/or') are labeled as **advmod** to their associated predicate, as in the following example:



After all do I still sit upon the middle of your head?

Inverted modifying construction - ⲛⲟϭ ⲛϭⲟⲙ
Inverted modifiers of the type ⲛⲟϭ ⲛϭⲟⲙ 'great power' (lit. a 'great of a power'), are analyzed in purely syntactic terms, such that the semantic modifier (ⲛⲟϭ, ⲕⲟⲩⲓ etc.) is the head, as shown below. The initial article also attaches to the syntactic head. The reason for this is primarily to allow for better parser performance, since making the second noun the head would be a very unusual exception. To find this construction we can look for the set of lexemes appearing in this configuration, most often ⲛⲟϭ and ⲕⲟⲩⲓ.



this great burden

Independent possessive pronoun construction – ⲡⲁ/ⲧⲁ/ⲛⲁ + noun phrase
The independent possessive pronoun 'that, which is of X, belongs to X' is analyzed as the head of the phrase, and the possessor is attached as **nmod** to this:

That, which is Christ's

6. Universal Part of Speech Tags

In keeping with other Universal Dependency treebanks, the Coptic dependency treebank also offers a mapping to the Universal Part of Speech tag set proposed in Petrov et al. (2012) and developed further into the version currently adopted by the UD project. However, unlike the syntactic annotation scheme, which we offer as the primary annotation guidelines for Coptic syntax, universal POS tags are very limited in their coarseness, and in many cases do not map well onto Coptic grammar. We therefore recommend the use of the Coptic specific Scriptorium tag set whenever possible. Below we list the mapping from Coptic Scriptorium to Universal POS tags, with some additional notes at the end.

Coptic Scriptorium	Universal Tags
AAOR	AUX
ACAUS	AUX
ACOND	SCONJ
ACONJ	AUX
ADV	ADV
AFUTCONJ	AUX
AJUS	AUX
ALIM	SCONJ
ANEGAOR	AUX
ANEGJUS	AUX
ANEGOPT	AUX
ANEGPST	AUX
ANY	AUX
AOPT	AUX
APREC	SCONJ
APST	AUX
ART	DET
CCIRC	SCONJ
CCOND	SCONJ
CFOC	PART
CONJ	CONJ
COP	PART
CPRET	AUX
CREL	SCONJ
EXIST	VERB
FM	X
FUT	AUX
IMOD	ADV
N	NOUN
NEG	ADV

NOUN	NOUN
NPROP	PROPN
NUM	NUM
PDEM	DET
PINT	PRON
PPERI	PRON
PPERO	PRON
PPERS	PRON
PPOS	DET
PREP	ADP
PTC	PART
PUNCT	PUNCT
UNKNOWN	X
V	VERB
VBD	VERB
VIMP	VERB
VSTAT	VERB

Notes

The Universal POS tags do not map well onto Coptic tags in several cases; in all instances, the attempt has been made to choose the nearest category, especially with syntactic function in mind. The objective is to create dependency trees that connect similar categories to those of other languages.

Most tripartite conjugation bases have been mapped to either auxiliaries (AUX), if they are main clause conjugations (past auxiliary APST, aorist AAOR, etc.) or not the main conjugation morpheme (e.g. future marker FUT, which may join a durative conjugation or irrealis preterit). For the subordinate conjugations (APREC, ALIM), the universal tag SCONJ (subordinating conjunction) is used.

The category IMOD is cast as a form of ADV. While the alternatives of ADP (adposition) or PART (particle) are semantically appealing, the mapping to ADV best represents their sentential function and parallels the dependency label advmod. Note that this results in some adverbs carrying determiners, which is rather odd in terms of underlying categories for the syntax trees. It is perhaps similar to some extent to situations with the Stanford Typed label npadvmod, with the distinction that Coptic IMODs only attach to pronouns, never nouns.

The existential predicates (EXIST) have been mapped as VERB, whereas the copula (COP) is mapped to PTC, since unlike in the case of existence, it does not contain the actual predicate, and is also absent in the interlocutive patterns.

Finally the converters have been treated similarly to conjugation bases, although they co-occur with the bases. Subordinate converters (CCIRC, CREL) are treated as SCONJ, while (potentially) main clause converters (CFOC, CPRET) are tagged as AUX. In all cases, we stress that these are not ideal tag assignments, but ones that aim to stay closest to the limited universal

tag set's behavior. For all new projects we recommend using Scriptorium tags and converting automatically to universal tags if necessary.

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