

Categorial Dependency Grammar of French. Nomenclature of Surface Syntactic Dependencies

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1 Short Introduction

This Document presents the nomenclature of surface syntactic dependencies of French used in the Categorical Dependency Grammar of French (CDGFr, version 3.3-devel) developed in the NLP group (TALN) of LINA. CDGFr is destined for the linguists developing their own Dependency Tree Banks (DTB) of French or experimenting with the existing CDG and DTB of French.

To read this Document, it is highly recommended to become familiar with the basic ideas of dependency syntax (we recommend the book [5] which presents the fundamentals of the linguistic theory of dependencies). The main notions, terms and facts concerning the Categorical Dependency Grammars (CDG) may be found in the recent paper [3]. In this paper one will also find a detailed description of CDGFr and of the method used for its construction. In the paper [1] is described the integrated environment CDG Lab, the advanced instrument of development of CDG and of French corpora. A mathematical introduction to CDG may be found in [2].

In this nomenclature, the dependencies are distributed over about 30 **groups** originating from the main (language non-specific) semantic dependencies. The groups are subdivided into **kinds** of (language specific) kindred dependencies. Then in every kind are presented all **projective** dependencies of this kind and all **non-projective** dependencies of the kind, if any. CDGFr numbers about 50 dependency kinds. 13 of them include non-projective dependencies. In this Document, all dependency kinds are illustrated by dependency structures (DS) generated by CDGFr.

As a rule, the non-projective dependencies correspond to the analogous projective dependencies, and for the most part, they also have an **anchor** (in this case, the **host word** *H* is also indicated). For instance, $\nearrow Agent$ and $\swarrow Agent$ are respectively the positive and the negative non-projective dependencies corresponding to the projective dependency *Agent*. $\#(\swarrow Agent)$ is the anchor of the negative dependency $\swarrow Agent$. Its host word *H* is the main (possibly auxiliary) verb; $\#(\swarrow Agent)$ is anchored immediately on its left. The non-projective dependencies, as well as the corresponding anchor dependencies, are never iterated. In the surface DS below, the projective dependencies are represented by continuous arcs, the non-projective dependencies are represented by dashed arcs and the anchor dependencies are

displayed below the sentence. All these DS are constructed by the Parser of the CDG Lab.

All dependency definitions have the following standard format: they include the **dependency name**, the prototypical **governor** G and the prototypical **dependent** (subordinate) D . The definitions of non-projective dependencies also include the prototypical **host word** H .

In papers [4] and [6] one may find different nomenclatures of surface syntactic dependencies of French.

2 Notation

In the descriptions of dependencies below we use the following notation:

G denotes the *governor*, D denotes the *subordinate* (i.e. immediately *dependent*) and H denotes the *host word* for an *anchor* of a non-projective dependency.

General remark: In French, the pronouns found in verb argument positions may have one of the cases: a (accusative), d (dative), g (genitive), l (locative) and o (oblique)¹. Below we say that a verb complement is in the case C if it may be replaced by a pronoun in this case.

When a verb v (in a finite or infinite form) has a dependency of the form *dep-C* or *dep-C1-C2*, this means that one or, respectively, two its complements in the corresponding cases is pronominalized and fronted (converted into a clitic in the same case), or topicalized and not pronominalized. Rather often this dependency is non-projective. In such cases v is subordinate to a verb v_0 separating it from the displaced complements, and v_0 serves as the host word for the anchor of this non-projective dependency.

3 Verbal Dependencies

3.1 Group *PRED*

3.1.1 Projective PREDICATIVE dependency *pred*

G is a verb and D is its (surface syntactic) subject (a noun, a pronoun, a verb in infinitive, etc.).

In French, the neutral position of the subject D is on the left of G (i.e. in *pre-position*) because the pre-position is **topicalized** in French. De-topicalized subjects in post-position are represented by pronouns, often attached to the verb (see below). On the other hand, a topicalized and focused subject may be found in post-position with respect to the main verb. In this case, it is expressed by a noun (see **Figure 1**). In **Figure 2** is shown a typical example of a subject in pre-position. As a rule, the

¹We don't consider the partitive case. At that, the partitive is marked for with a special determiner dependency *det-p* (see below).

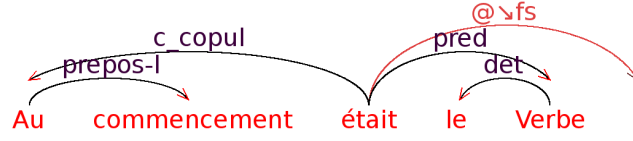


Figure 1: *pred*: $G = \text{était}$, $D = \text{Verbe}$

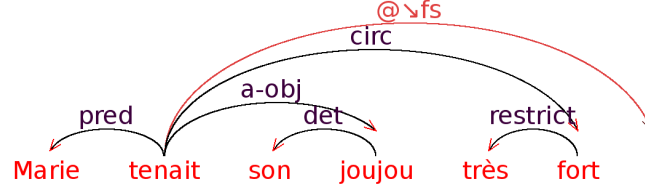


Figure 2: *pred*: $G = \text{tenait}$, $D = \text{Marie}$

syntactic subject subordinate to the main verb through dependency *pred* coincides with the semantic subject of the sentence (see **Figure 2**). But syntactic subjects may also be different from the semantic one. (cf. the impersonal subject *il* shown in **Figure 3**). In interrogative sentences the subject (expressed by a pronoun) may be attached to the main verb from the right (see **Figure 4**). Cf. this case with that of a focused subject in post-position as in **Figure 1**. This order inversion is also possible in the indicative, especially in the exclamatory sentences (see **Figure 5**). A verb in infinitive may also be the subject (see **Figure 6**).

When the subject is an aggregate of names, it is the first of them which is dependent through *pred* (see **Figure 7**).

3.2 Group *AGENT*

3.2.1 Projective *AGENTIVE* dependency *agent*

Case 1: G is a past participle and D is one of the prepositions *de* (d' , *des*, *du*) or *par* (*de* is used in the case where the subject doesn't undergo the action expressed by the participle). The case of $D = \text{par}$ is illustrated by the **Figure 8**). The case of $D = \text{de}$ may be seen below in **Figure 146** ($G = \text{suivi}$, $D = \text{de}$).

Case 2: G is a verb in infinitive subordinate to the past participle of a light verb and $D = \text{par}$ (see **Figure 9**).

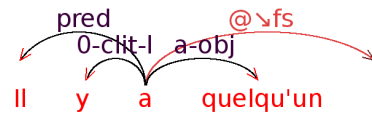


Figure 3: *pred*: $G = \text{a}$, $D = \text{il}$

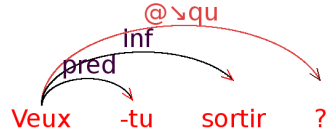


Figure 4: $pred: G = veux, D = -tu$

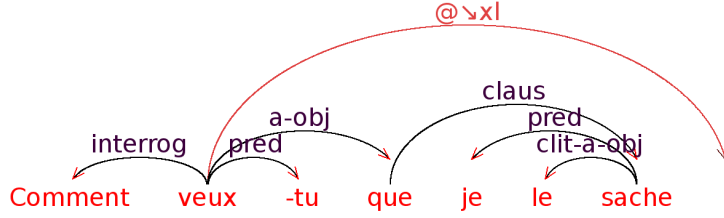


Figure 5: $pred: G = veux, D = -tu$

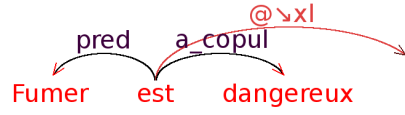


Figure 6: $pred: G = est, D = fumer$

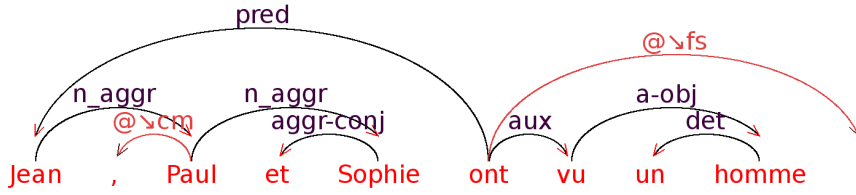


Figure 7: $pred: G = ont, D = Jean$

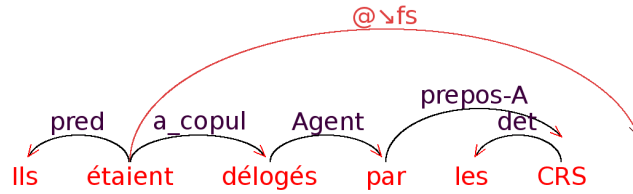


Figure 8: $agent: G = délogées, D = par$

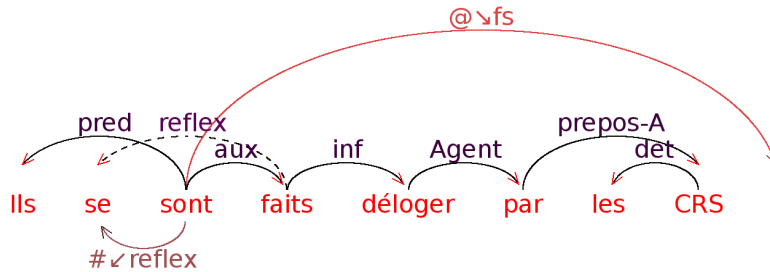


Figure 9: $agent: G = déloger, D = par$

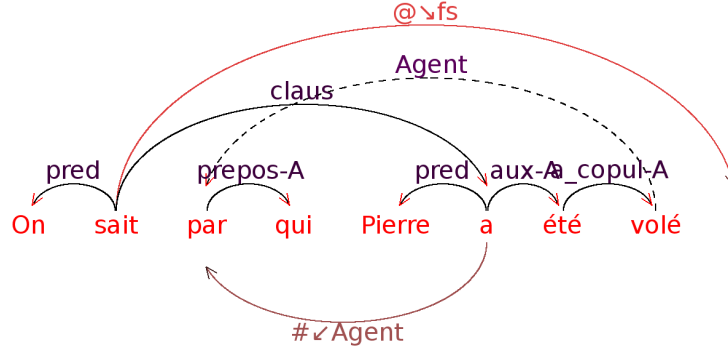


Figure 10: Non-projective *agent*: $G = volé$, $D = par$, $H = a$

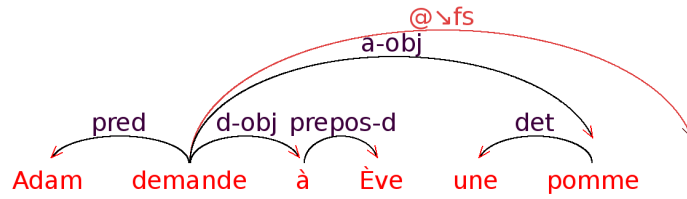


Figure 11: *a-obj*: $G = demande$, $D = pomme$; *d-obj*: $G = demande$, $D = à$

3.2.2 Non-projective AGENTIVE dependency *agent*

G is a past participle, D is one of the prepositions *de* (*d'*, *des*, *du*) or *par* in pre-position with respect to the main auxiliary verb, which also serves as the host word H . An example of this dependency is shown in **Figure 10**. See also **Figure 34** ($G = privé$, $D = par$, $H = a$).

3.3 Group *OBJ* of objective dependencies

3.3.1 Projective OBJECTIVE dependencies *C-obj*

In these dependencies *C-obj*, C is one of the cases: *a*, *d*, *g*, *l* and *o*. G is a verb, but sometimes also a noun, an adjective or an adverb, and D is a preposition in the case C introducing a complement of G or the complement itself. See **Figure 2** (*a-obj*: $G = tenait$, $D = joujou$).

Another example is shown in **Figure 11**, where a di-transitive verb has a direct object in accusative case (*a-obj*) and an indirect object in dative case (*d-obj*). In **Figure 12** is shown a verb with an indirect object in dative case (*d-obj*). **Figure 13** shows a transitive verb subordinating through *a-obj* its direct object with partitive semantics (marked with the partitive article *de la*). In **Figure 14** is shown a verb with an object in genitive case (*g-obj*). **Figure 15** shows a verb with a direct object in accusative case and its complement, which is a noun with an argument in genitive case (*g-obj*). **Figure 16** shows a verb with an object in locative case (*l-obj*).

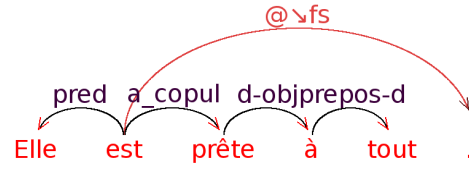


Figure 12: *d-obj*: $G = prête$, $D = à$

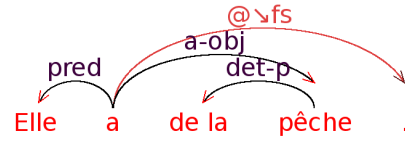


Figure 13: *a-obj*: $G = a$, $D = pêche$

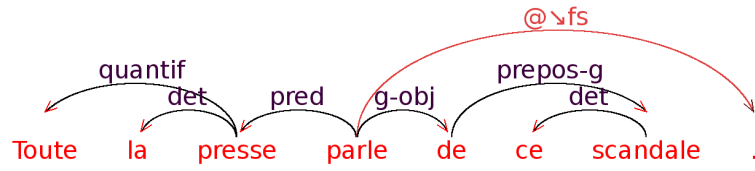


Figure 14: *g-obj*: $G = parle$, $D = de$

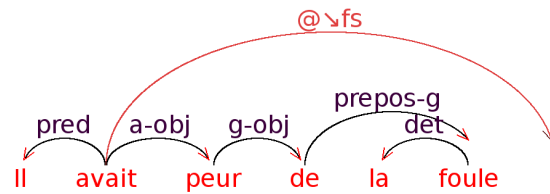


Figure 15: *g-obj*: $G = peur$, $D = de$

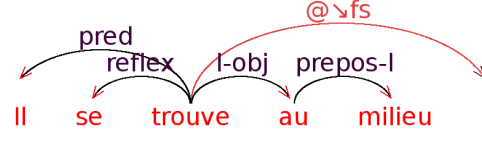


Figure 16: *l-obj*: $G = trouve$, $D = au$

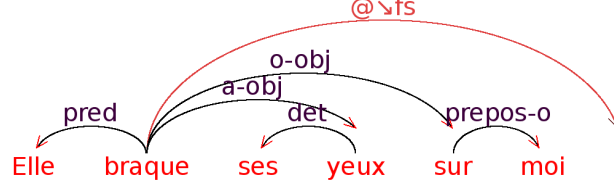


Figure 17: *o-obj*: $G = braque$, $D = sur$

A di-transitive verb with a direct object in accusative case and an indirect object in oblique case (*o-obj*) may be seen in **Figure 17**. One more example of oblique object dependency is shown in **Figure 18**.

3.3.2 Projective OBJECTIVE dependency *a-obj-g*

Case 1: G is a verb (e.g. *avoir*), D is its nominal complement (e.g. *besoin*) whose genitive case complement is pronominalized/topicalized and fronted. This case is shown in **Figure 19**. Case 2: G is a past participle dependent on the auxiliary verb (*avoir*) through dependency *aux-g*, D is its nominal complement (e.g. *besoin*) whose genitive case complement is pronominalized/topicalized and fronted. This case is shown in **Figure 20**.

3.3.3 Projective \forall -OBJECTIVE dependency *qa-obj*

G is a verb in an infinite form (e.g. past participle, infinitive), D is one of the universal quantification pronouns (*tout*, *rien*, *nul*) in pre-position with respect to G . An example of this dependency is given in **Figure 21**.

3.3.4 Non-projective OBJECTIVE dependencies *C-obj*

G is a verb, a noun, an adjective or an adverb with a C -case argument, and D is the topicalized complement of D in pre-position to the main verb.

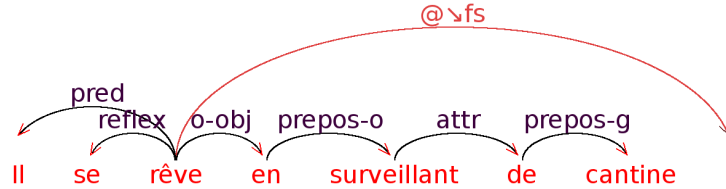


Figure 18: *o-obj*: $G = rêve$, $D = en$

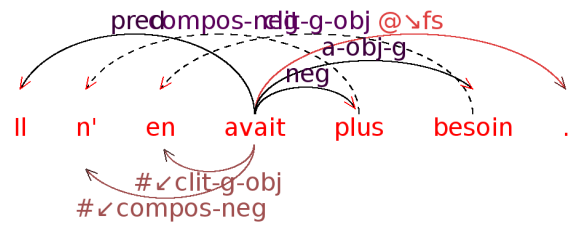


Figure 19: $a\text{-obj-g}$: $G = \text{avait}$, $D = \text{besoin}$

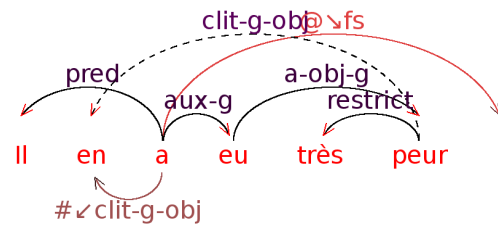


Figure 20: $a\text{-obj-g}$: $G = \text{eu}$, $D = \text{peur}$

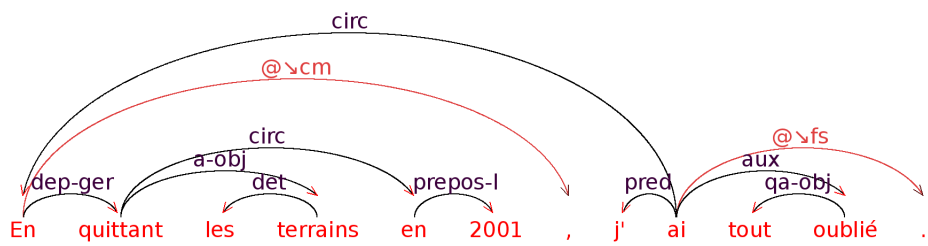


Figure 21: $qa\text{-obj}$: $G = \text{oublié}$, $D = \text{tout}$

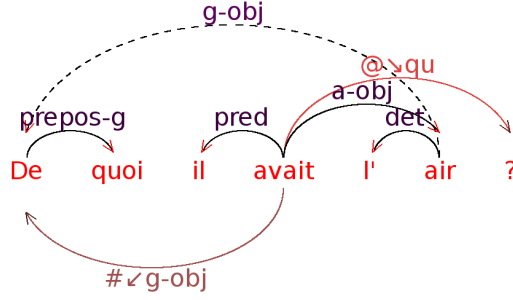


Figure 22: Non-projective *g-obj*: $G = \text{air}$, $D = \text{de}$, $H = \text{avait}$

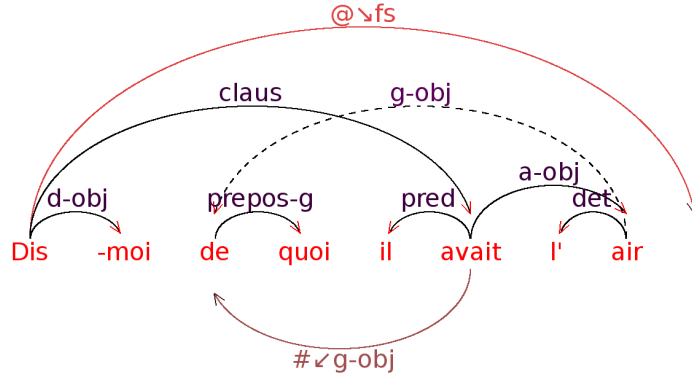


Figure 23: Non-projective *g-obj*: $G = \text{air}$, $D = \text{de}$, $H = \text{avait}$

A typical example of such non-projective dependency in an interrogative sentence is shown in **Figure 22**. In **Figure 23** is shown a non-projective objective dependency in a clause.

3.4 Group *CLIT* of clitic dependencies

3.4.1 Projective *CLITIC* dependencies *clit-C-obj*

In these dependencies, C is one of the cases a , d , g , l . G is a verb or a noun with an argument in the case C and D is its pronominalized fronted complement (a *clitic*) in the case C . For the dative clitics there are two variants: *clit-3d-obj* (for the 3d person), and *clit-d-obj* (for the 1st and the 2d person). One may see a dative case clitic and also an accusative case clitic in **Figure 24**. **Figure 25** shows a genitive case clitic. A locative case

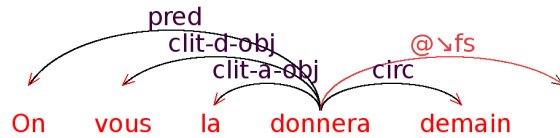


Figure 24: *clit-a-obj*: $G = \text{donnera}$, $D = \text{la}$; *clit-d-obj*: $G = \text{donnera}$, $D = \text{vous}$

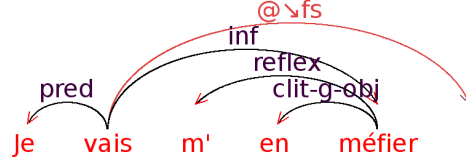


Figure 25: *clit-g-obj*: $G = \text{méfier}$, $D = \text{en}$

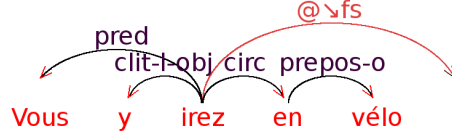


Figure 26: *clit-l-obj*: $G = \text{irez}$, $D = y$

clitic is shown in **Figure 26**.

3.4.2 Projective NULL CLITIC dependency *0-clit-g*

G is a verb, D is the null clitic *en* in the genitive case. An example of this dependency is given in **Figure 27**.

3.4.3 Non-projective NULL CLITIC dependency *0-clit-g*

G is one of the verbs used only with a reflexive pronoun and with the null clitic *en* (e.g. *s'en vouloir*, *s'en faire*, etc.), D is the null clitic *en* in the genitive case. An example of this dependency is shown in **Figure 28**.

3.4.4 Non-projective CLITIC dependencies *clit-C-obj*

G is a verb/noun/adjective, D is a *clitic*: a pronominalized fronted complement of G in pre-position to the main verb which serves as the host word H . There are many examples of structures with these dependencies: **Figure 31** (*clit-a-obj*, $G = \text{lavées}$, $D = \text{les}$, $H = \text{est}$), **Figure 32** (*clit-g-obj*, $G = \text{débarassé}$, $D = \text{en}$, $H = \text{être}$), **Figure 33** (*clit-a-obj*, *clit-3d-obj*, $G = \text{refusée}$, $D1 = \text{la}$, $D2 = \text{lui}$, $H = \text{a}$), **Figure 34** (*clit-a-obj*, $G = \text{privé}$, $D = \text{en}$, $H = \text{a}$), **Figure 35** (*clit-g-obj*, $G = \text{parlé}$, $D = \text{en}$, $H = \text{a}$), **Figure 37** (*clit-g-obj*, $G = \text{fier}$, $D = \text{en}$, $H = \text{est}$), **Figure 47** (*clit-a-obj*, $G = \text{acheté}$, $D = \text{l'}$, $H = \text{a}$), **Figure 74** (*clit-g-obj*, $G = \text{sûr}$, $D = \text{en}$, $H = \text{être}$), **Figure 132** (*clit-a-obj*, $G = \text{rencontrée}$, $D = \text{l'}$, $H = \text{a}$), **Figure 99** (*clit-a-obj*, $G = \text{beaucoup}$, $D = \text{en}$, $H = \text{avait}$).



Figure 27: *0-clit-g*: $G = \text{sommes}$, $D = \text{en}$

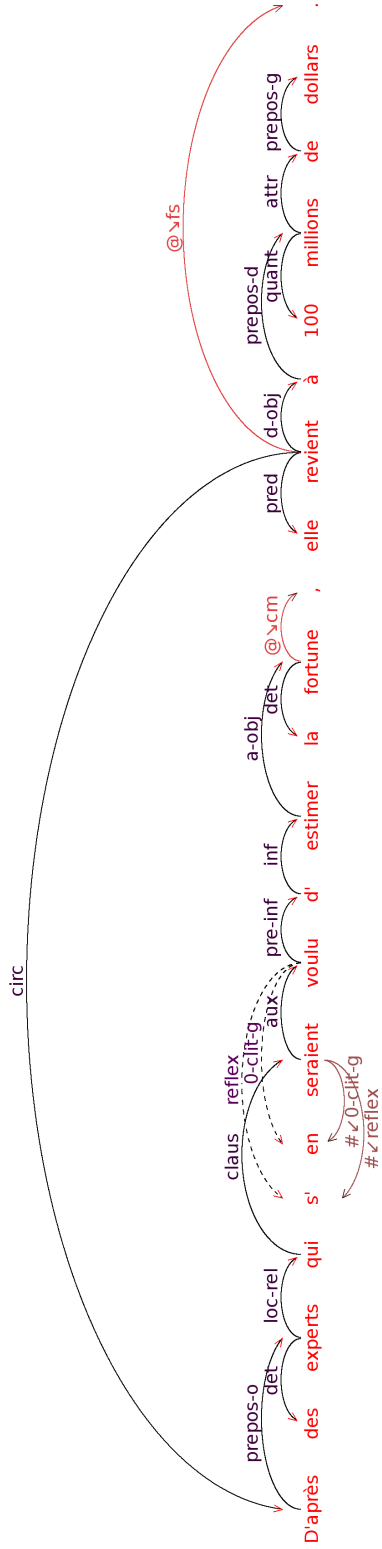


Figure 28: *0-clit-g*: $G = voulu$, $D = en$

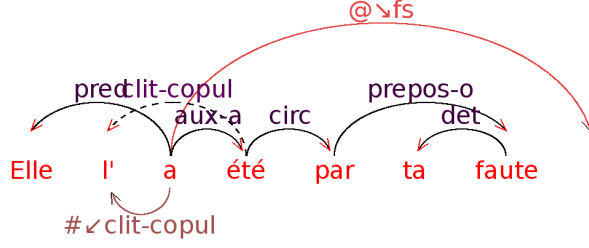


Figure 29: *clit-copul*: $G = \text{été}$, $D = l'$, $H = a$

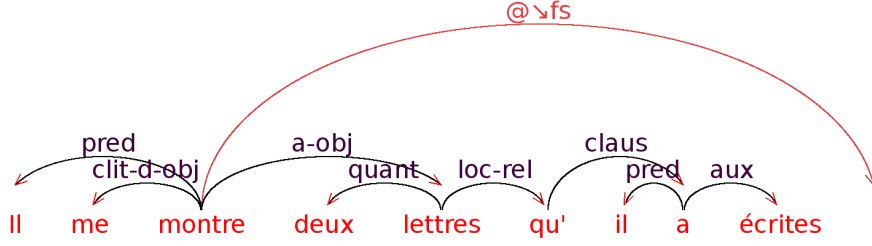


Figure 30: *aux* $G = a$, $D = \text{écrites}$

One more example may be seen in **Figure 29**.

3.5 Group *AUX* of auxiliary dependencies

3.5.1 Projective *AUXILIARY* dependency *aux*

G is an auxiliary verb (*avoir* or *être*) and D is a past participle. In **Figure 30** is shown the auxiliary verb *avoir* governing a past participle and in **Figure 9** the auxiliary verb *être*: (*aux*: $G = \text{sont}$, $D = \text{fait}$).

3.5.2 Projective *AUXILIARY* dependencies *aux-C*, *aux-C1-C2*, *aux-C-A*

These dependencies are parametrized by the cases $C1$, $C2$ of pre-verbal clitics (one case marker per clitic), or by fronted complements in the corresponding cases, or by an agent.

Case 1: G is an auxiliary verb (*avoir* or *être*) and D is a past participle with a pronominalized/topicalized complement in case C or with two pronominalized/topicalized complements in cases $C1$, $C2$. In this case, $G = H$, i.e. the auxiliary verb serves as the host word for the fronted complements/agents (see the examples in Subsections 3.3.4, 3.4.4). In **Figure 31** one may see dependency *aux-a* which is due to the accusative case clitic *les* anchored on the auxiliary verb, and in **Figure 32** it is the genitive case clitic *en* which determines the parameter g in the auxiliary dependency *aux-g*. **Figure 33** shows dependency *aux-a-d* due to the combination of accusative and dative case clitics. The dependency *aux-g-A* in **Figure 34** is caused by the com-

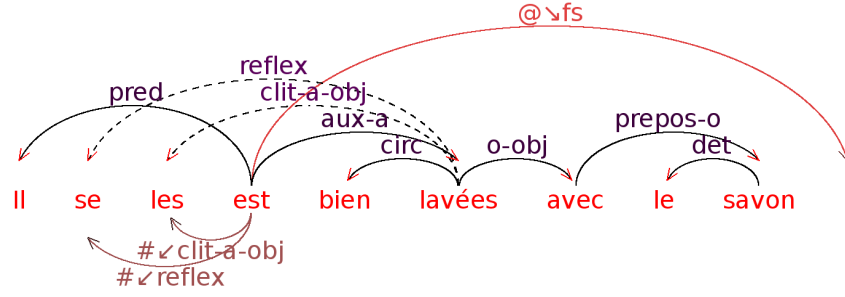


Figure 31: *aux-a*: $G = est$, $D = lavées$

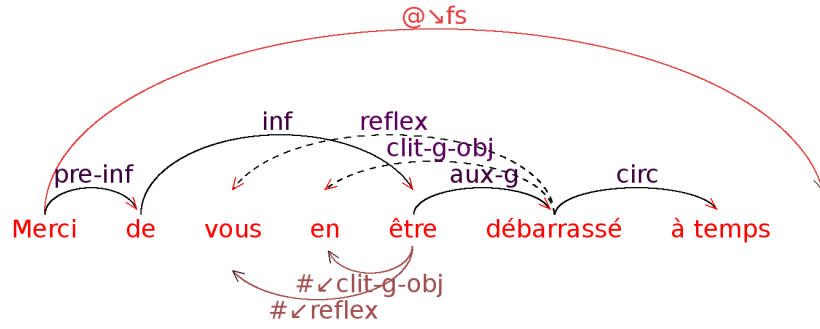


Figure 32: *aux-g*: $G = H = être$, $D = débarrassé$

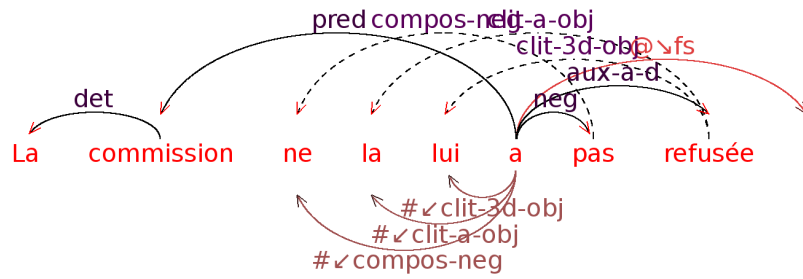


Figure 33: *aux-a-d*: $G = H = a$, $D = refusée$

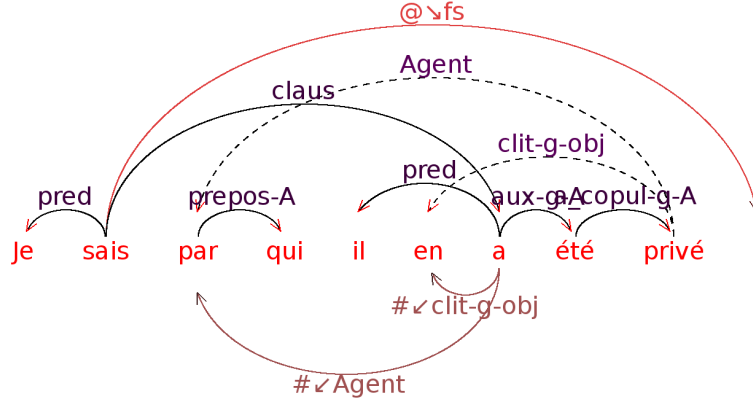


Figure 34: *aux-g-A*: $G = H = a$, $D = \text{été}$

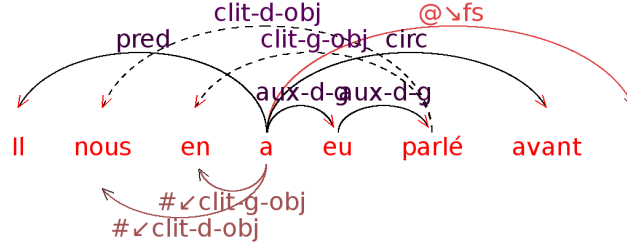


Figure 35: *aux-d-g*: $G = H = eu$, $D = \text{parlé}$

bination of the anchored genitive case clitic *en* and the topicalized agent phrase *par qui*.

In **Figure 35** the combination of a dative case and the genitive case clitics is in the origin of the two dependencies *aux-d-g*. At the same time, this pair of dependencies illustrates the Case 2 below. Case 2: G is an auxiliary verb (*avoir* or *être*) subordinate through dependency *aux-C1-C2* and D is another past participle which inherits these parameters. This kind of constructions, called ‘*temps surcomposé*’, is disused in the metropolitan French, but is grammatical e.g. in Quebec and in Switzerland.

3.6 Group *COPUL* of copulative dependencies

3.6.1 Projective COPULATIVE dependencies *n_copul*, *a_copul*, *c_copul*

G is a copulative verb (*être*, *devenir*, etc.). Semantics of copulative verbs V depends on the kind X of copulative dependency X_copul (X being n , a or c)

n_copul: D is a dependent noun or pronoun. In this case, G expresses the “kind-of” relation: the subject of G is of kind D .

c_copul: D is a dependent adverb or a preposition, governing a circumstantial prepositional phrase. In this case, the subject of G expresses a fact or a

situation and G states that this fact / situation has the circumstance D .

a_copul: D is a dependent adjective or past participle. In this case, G expresses the fact that its subject has the property D .

a_copul-C: a copulative dependency parametrized by the case C (C is p , d , g or l) of a pre-verbal clitic in case C . G is a copulative verb, D is a dependent word (past participle, noun, adjective) with a pronominalized complement in case C .

a_copul-C-A: as in the preceding case, it is a copulative dependency parametrized by the case C of a pre-verbal clitic in case C . G is a copulative verb, D is a dependent word (usually, a past participle) with a pronominalized complement in case C . Besides this, D is in passive voice and its agent (introduced by the preposition *par*) is topicalized and occurs in pre-position with respect to G . *n_copul*, *a_copul* and *c_copul* are illustrated by **Figure 36** and one of the parametrized copular dependencies *a_copul-g* is illustrated by **Figure 37**.

3.6.2 Projective COPULATIVE dependency *clit-copul*

D is the clitic *le*, *l'* which is the pronominalized complement of the copula G . This dependency is illustrated by **Figure 38**.

3.7 Group *INF* of infinitive dependencies

3.7.1 Projective PREPOSITIONAL INFINITIVE dependency *pre-inf*

G is a verb, a deverbal noun, an adjective or an adverb and D is one of prepositions *de*, *à*, *pour*, *sans*, etc. governing a verb in infinitive. **Figure 39** shows the case where the subordinate preposition is *à* and **Figure 40** shows the subordinate *de*. Another example of the subordinate *de* is shown in **Figure 41**.

3.7.2 Projective INFINITIVE dependency *inf*

Case 1: G is one of prepositions *de*, *à*, *pour*, *sans*, etc. and D is a verb in infinitive: see the examples above and also the two in **Figure 42** and **Figure 43**. The examples in **Figure 39** and **Figure 41** show the typical cases where the verbs govern a subordinate verb in infinitive through the prepositions *à* and *de*. Examples in **Figures 42** and **43** show that the word governing such prepositions may be not only verbs, but also nouns and adjectives. Case 2: G is a light verb and D is a verb in infinitive (see **Figure 44**).

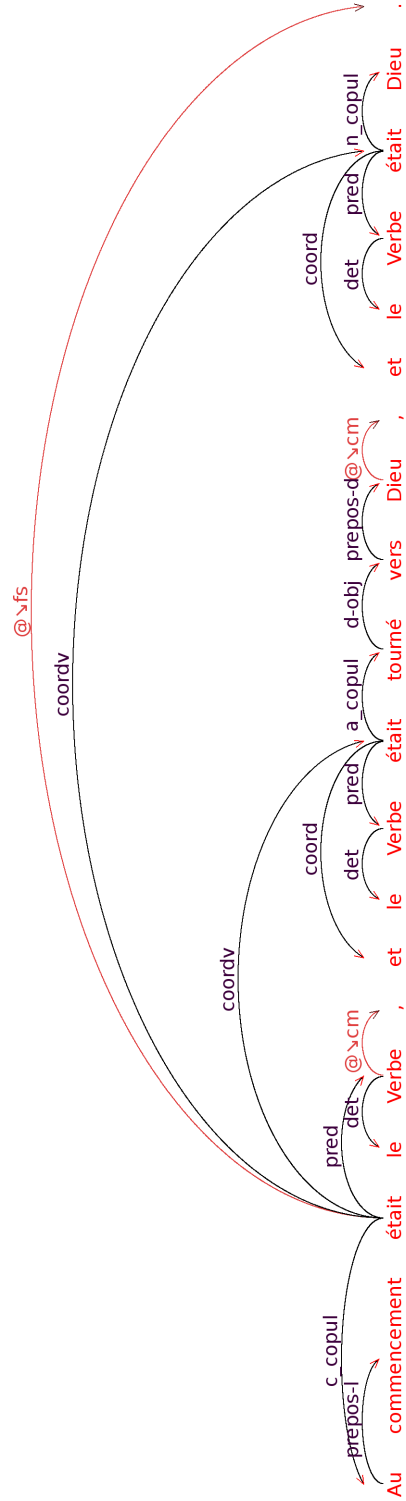


Figure 36: *c_copul*: $G = \text{était}$, $D = \text{au}$; *a_copul*: $G = \text{était}$, $D = \text{tourné}$; *n_copul*: $G = \text{était}$, $D = \text{Dieu}$

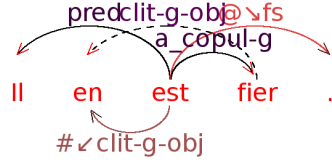


Figure 37: *a_copul-g*: $G = H = est$, $D = fier$

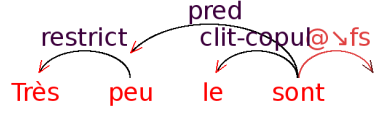


Figure 38: *clit-copul*: $G = sont$, $D = le$

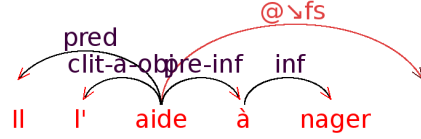


Figure 39: *pre-inf*: $G = aide$, $D = à$

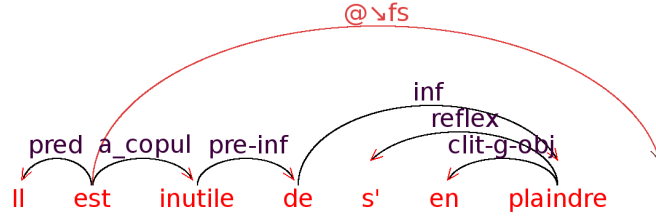


Figure 40: *pre-inf*: $G = inutile$, $D = de$

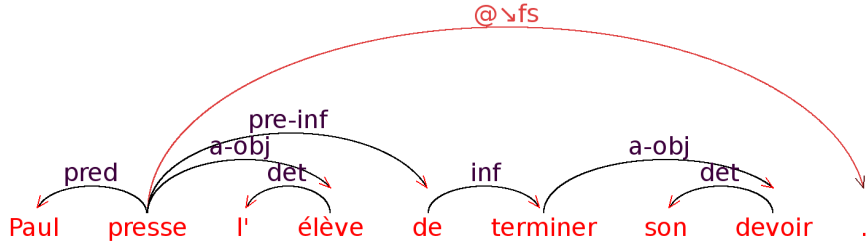


Figure 41: *pre-inf*: $G = presse$, $D = de$

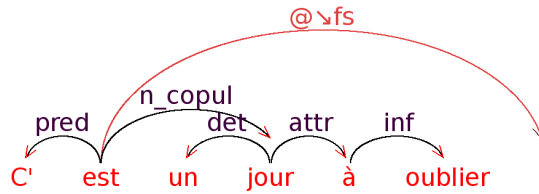


Figure 42: *inf*: $G = à$, $D = oublier$

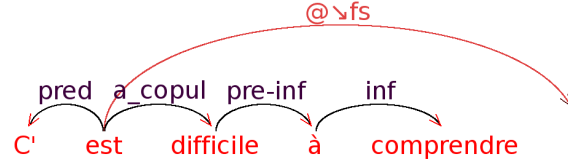


Figure 43: *inf*: $G = \grave{a}$, $D = comprendre$

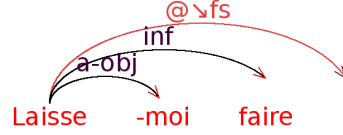


Figure 44: *inf*: $G = laisse$, $D = faire$

3.7.3 Projective INFINITIVE dependencies *inf-C*, *inf-C1-C2*, *inf-A*, *inf-C-A*

These dependencies are parametrized by the cases *C1*, *C2* of pre-verbal clitics and of fronted complements/agent. G is a light verb or one of prepositions *de*, *à*, *pour*, *sans*, etc., D is a verb in infinitive; $G = H$. Two such cases are shown in **Figure 45** and **Figure 46**.

3.8 Group *COORDV* of iterated verbal coordinative dependencies

3.8.1 Projective VERBAL COORDINATIVE dependencies *coordv*, *coordpz*, *coordi*

coordv: G is a finite verb, D is a coordinated finite verb. We have seen this dependency in **Figure 36** ($G = \acute{e}tait$, $D1 = \acute{e}tait$, $D2 = \acute{e}tait$).

coordpz: G is a past participle, D : a coordinated past participle (see **Figure 47**).

coordi: G is a verb in infinitive, D : a coordinated verb in infinitive (see **Figure 48**).

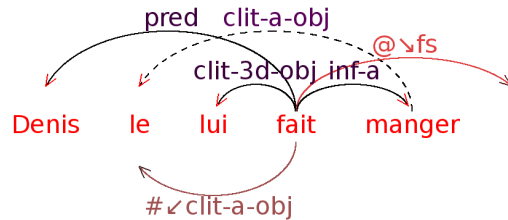
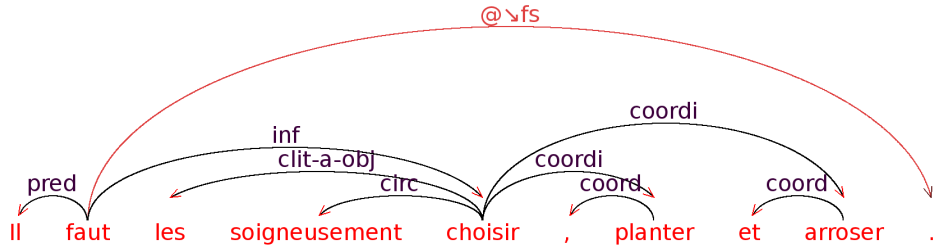
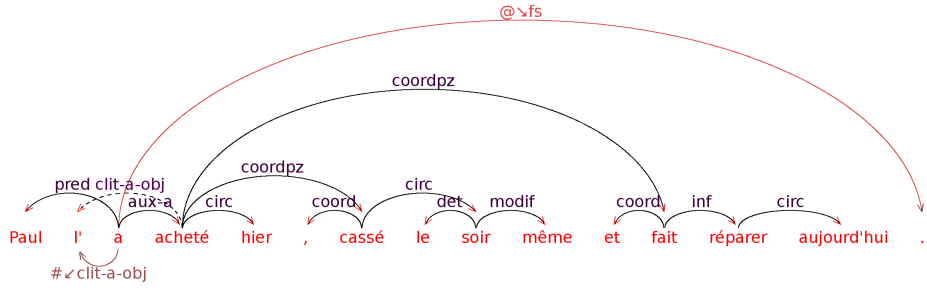
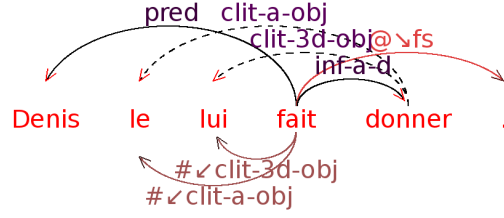


Figure 45: *inf-a*: $G = fait$, $D = manger$



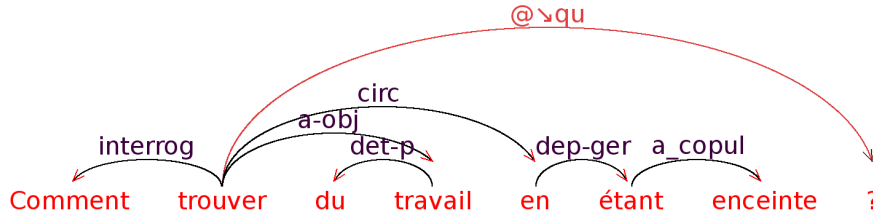


Figure 49: *dep-ger*: $G = en$, $D = \text{étant}$

3.9 Group *GER* of gerundive dependencies

3.9.1 Projective GERUNDIVE dependency *dep-ger*

G is the particle *en*, D is a dependent present participle. A typical example of this dependency is shown in **Figure 49**. See also **Figure 21**: $G = en$, $D = quittant$.

3.10 Group *NEG* of negative dependencies

The negation in French consists of two parts: the (main) **catégorie** part (*pas*, *plus*, *jamais*, *que*, *aucun* etc.) and the **syncatégorie** part *ne*. We distinguish the **restrictive** verbal negation with the catégorie part *que*, *aucun*, etc. and the **pure** verbal negation with the catégorie part other than *que*, *aucun*, etc. because the latter is related through dependencies only with the negated verb, whereas the former is related not only with the verb, but also with one of its complements. This is a purely syntactic opposition because *semantically* the restrictive verbal negation often has a positive reading.

As a rule, the catégorie part of the pure negation is found in post-position with respect to the negated verb, but it may also be found in pre-position, for instance, with verbs in infinitive (but not only). As to the restrictive negation, its catégorie part in post-position is represented by restrictive pronouns, adverbs and adjectives *que*, *aucun*, *aucune*, etc. In pre-position, the catégorie part of this negation may be represented by various adverbs, pronouns and particles: *aucun*, *jamais*, *ni*, *nul*, *pas*, *personne*, *plus*, etc. The dependency relating the two parts of negation is most often non-projective, but when the catégorie part is in pre-position, this dependency may be projective.

3.10.1 Projective NEGATIVE dependencies *neg*, *compos-neg*, *neg-emphat*

neg: G is a verb, D is the catégorie part of negation. This dependency is used only for the pure negation. D may precede or follow G .

compos-neg. This dependency is used only for the pure negation in pre-position with respect to the verb. There are three cases:

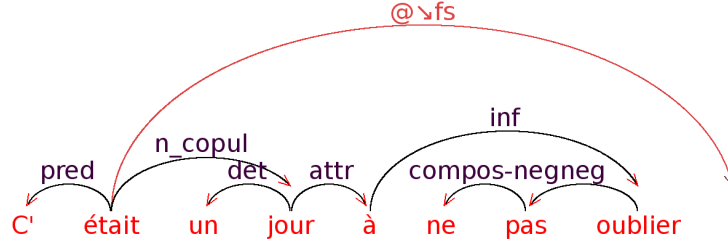


Figure 50: *neg*: $G = oublier$, $D = pas$; *compos-neg*: $G = pas$, $D = ne$

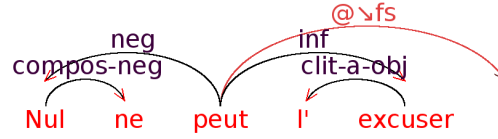


Figure 51: *neg*: $G = peut$, $D = nul$; *compos-neg*: $G = nul$, $D = ne$

Case 1: Both parts of negation are present. In this case, G is the categorematic part of negation, D is its syncategorematic part ne .

Case 2: Only the categorematic part is present. In this case, G is the verb in infinitive. D is the categorematic part of negation.

Case 3: Only the syncategorematic part ne is present. In this case, the verb is in a finite form, its subject is represented by a negative pronoun (e.g. *personne*), G is this pronoun and D is the syncategorematic part ne .

neg-emphat: G is the categorematic part of negation. D is an adverb or a negative particle: *aucun*, *jamais*, *personne*, *plus*, *rien*, etc. which strengthens the negation.

Figure 50 illustrates the case 1. Both dependencies *neg* and *compos-neg* are present. In this example, the verb is in infinitive. Another example of case 1 is shown in **Figure 51**. Here the negated verb is in a finite form. In this case, the order of the the categorematic and syncategorematic parts is inverse to that when the verb is in infinitive. In **Figure 52** is shown dependency *neg-emphat* strengthening the pure negation in pre-position. **Figure 53** illustrates the case 2. The syncategorematic part ne of negation is omitted (which is rather frequently the case in oral speech). In **Figure 54** the categorematic part of pure negation in pre-position is represented by a negative pronoun which is not interpreted as the verb's subject. Nevertheless, in sim-

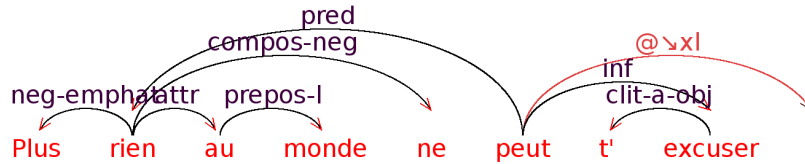


Figure 52: *neg*: $G = peut$, $D = rien$; *compos-neg*: $G = rien$, $D = ne$

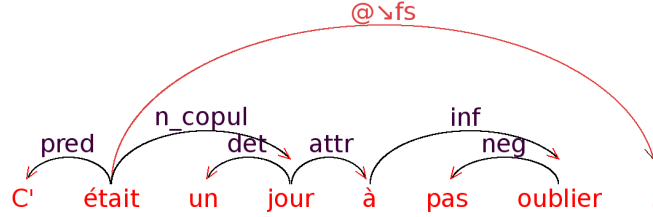


Figure 53: *neg*: $G = oublier$, $D = pas$

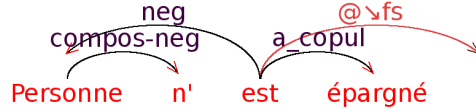


Figure 54: *neg*: $G = est$, $D = personne$; *compos-neg*: $G = personne$, $D = n'$

ilar constructions the negative pronoun may also be naturally subordinate through dependency *pred* (see case 3). This case is illustrated by **Figure 55**.

3.10.2 Non-projective NEGATIVE dependencies

compos-neg, *restr-neg*

compos-neg: **Case 1**: In this case G is the categorematic part of negation (*pas*, *plus*, *jamais*, *aucun* etc.), D is its syncategorematic part (*ne*) with the head type $\#(\surd compos-neg)$. That is, in this case the dependency is oriented from right to left. It is anchored on the left of the main verb H in the following position:

FrontedComplement < D < *Reflexive* < *Clitics* < H .

Several examples of this dependency are shown in **Figure 19** ($G = plus$, $D = n'$; *neg*: $G1 = avait$, $D1 = plus$: $H = avait$), **Figure 33** ($G = pas$, $D = ne$; *neg*: $G1 = a$, $D1 = pas$: $H = a$), **Figure 106** ($G = jamais$, $D = n'$; $H = a$) and in **Figure 123** ($G = jamais$, $D = n'$; *neg*: $G1 = a$, $D1 = jamais$: $H = a$). In **Figure 56** is shown the case where G is an adverb expressing a universal quantifier. A special case, where this dependency has a categorematic part represented by *ni ... ni ... mais ...* aggregate is shown in **Figure 57**. **Case 2**: In this case, the dependency is oriented from left to right. $G = jamais$ and D is the syncategorematic part. An example of this dependency is shown in **Figure 58**. *restr-neg*. **Case 1**: The categorematic part G is found in the post-position with respect to the negated verb. In

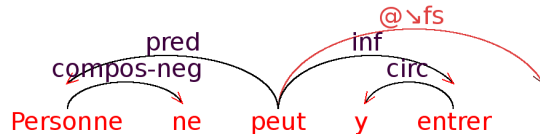


Figure 55: *pred*: $G = peut$, $D = personne$; *compos-neg*: $G = personne$, $D = ne$

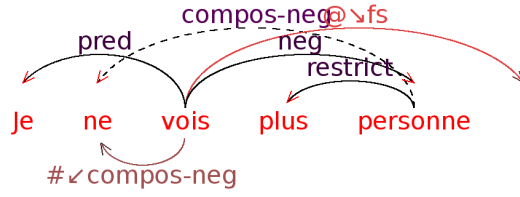


Figure 56: *compos-neg*: $G = \text{personne}$, $D = \text{ne}$

this case, G is a restrictive adverb, adjective or pronoun *que*, *aucun* (*aucune*, etc.), the syncategorematic part D is the particle *ne* with the head type $\#(\swarrow \text{restr-neg})$. It is anchored on the left of the main verb H in the same position as *compos-neg*.

Two examples of this dependency are shown in **Figure 110** ($G = \text{qu'}$, $D = \text{n'}$, $H = \text{offre}$) and in **Figure 111** ($G = \text{que}$, $D = \text{n'}$, $H = \text{a}$). In **Figure 59** is shown an example where $G = \text{aucun}$. A similar example, this time with a rare colloquial form of restrictive negation *que dalle*, is shown in **Figure 60**. **Case 2:** The categorematic part G found in pre-position with respect to the negated verb. In this case, G is an adverb, a pronoun or a particle with a restrictive meaning: *pas*, *plus*, *jamais*, *ni*, etc., and D is as in **Case 1**. A typical example of this negation is shown in **Figure 61**. A more special case, where this dependency has the categorematic part represented by *ni ... ni ...* aggregate, is shown in **Figure 62**. In order to better distinguish between the pure and the restrictive negations, let us compare three lexically similar DS.

In **Figure 56** is shown an example of non-projective pure negation *ne ... personne*.

In **Figure 63** is shown an example of non-projective pure negation *ne ... plus*. Finally, in **Figure 64** is shown an example of non-projective restrictive negation *ne ... aucune*.

3.11 Group *REFLEX* of reflexive dependencies

3.11.1 Projective *REFLEXIVE* dependency *reflex*

G is a reflexive verb, D is a reflexive pronoun in pre- or post-position with respect to G . In **Figures 65, 67** and **68** the reflexive pronoun *se* is in pre-position with respect to the main verb. In **Figure 66** the reflexive pronoun *toi* is in post-position. When a reflexive pronoun is in pre-position with respect to the main verb, it may be separated from it by one or two clitics (see **Figure 67**). Some reflexive verbs incorporate disjoint prefix *en* (cf. *s'en aller*, *s'en vouloir*, etc.). For these verbs we treat the prefix as a part of a composite reflexive pronoun. In **Figure 69** such composite pronoun *m'en* is in pre-position. In **Figure 70** the composite pronoun *vous-en* is in post-position.

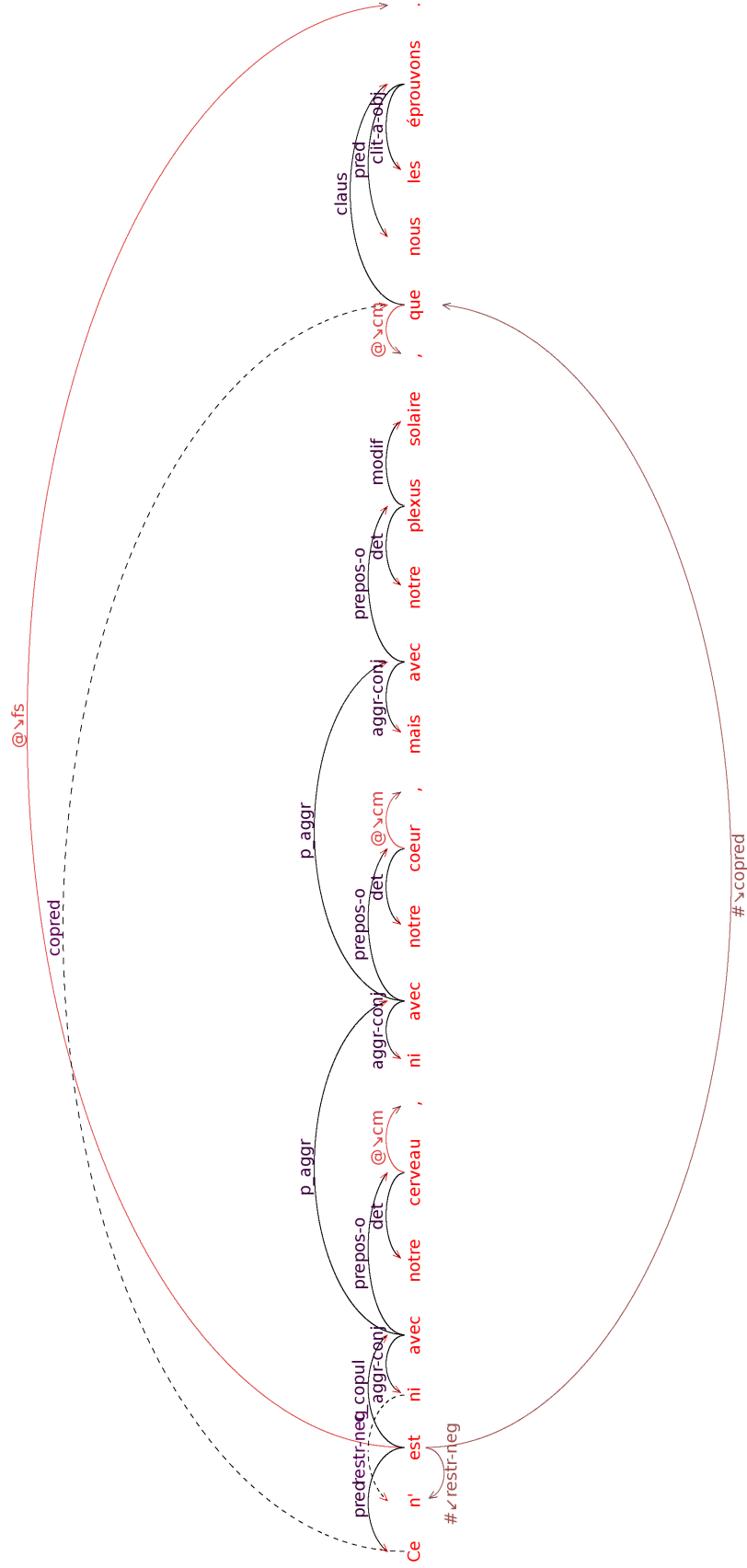


Figure 57: *compos-neg*: $G = ni$, $D = n'$, $H = est$

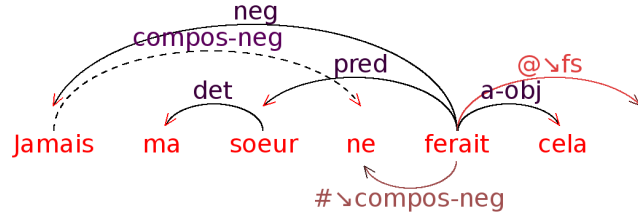


Figure 58: *compos-neg*: $G = \text{jamais}$, $D = \text{ne}$

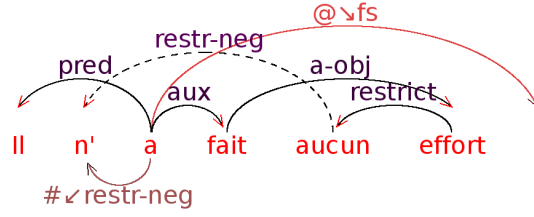


Figure 59: *restr-neg*: $G = \text{aucun}$, $D = \text{ne}$

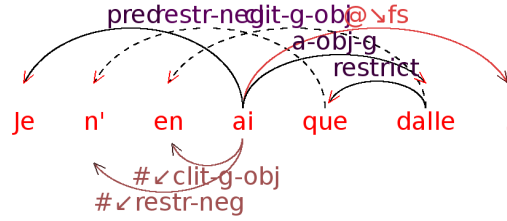


Figure 60: *restr-neg*: $G = \text{que}$, $D = \text{n'}$

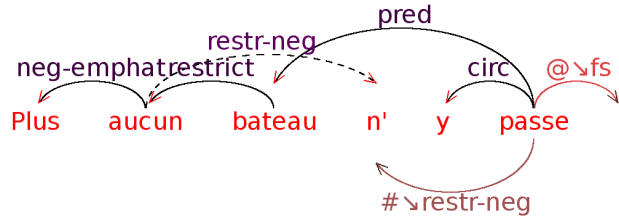


Figure 61: *restr-neg*: $G = \text{aucun}$, $D = \text{n'}$

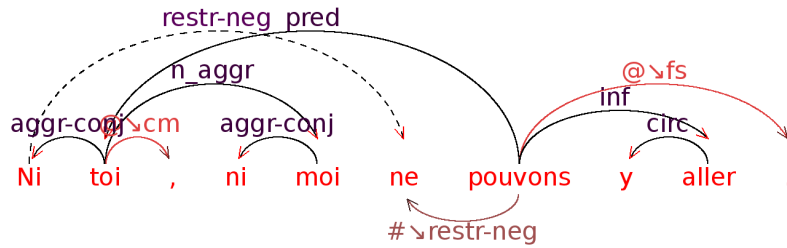


Figure 62: *restr-neg*: $G = \text{ni}$, $D = \text{ne}$

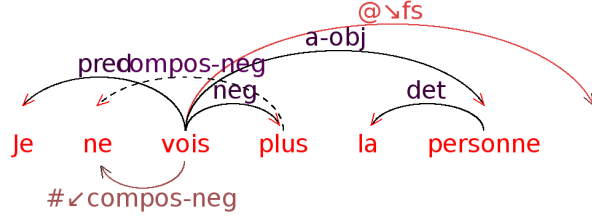


Figure 63: *compos-neg*: $G = plus$, $D = ne$; *neg*: $G1 = vois$, $D1 = plus$

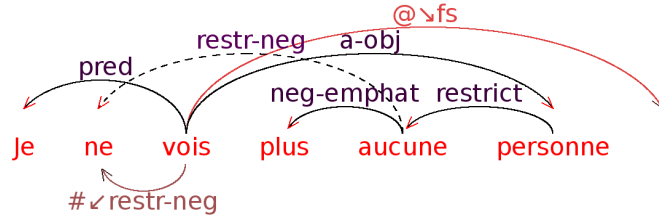


Figure 64: *restr-neg*: $G = aucune$, $D = ne$

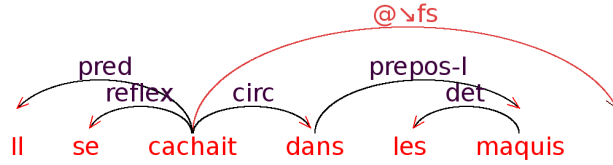


Figure 65: *reflex*: $G = cachait$, $D = se$

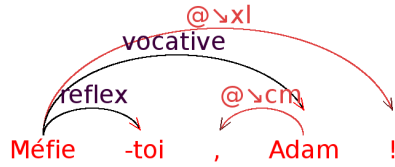


Figure 66: *reflex*: $G = méfie$, $D = -toi$

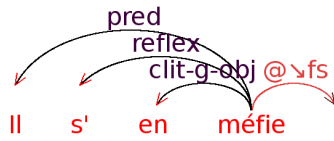


Figure 67: *reflex*: $G = méfie$, $D = s'$

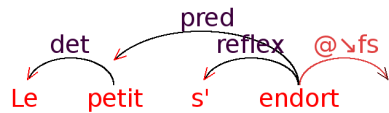


Figure 68: *reflex*: $G = endort$, $D = s'$

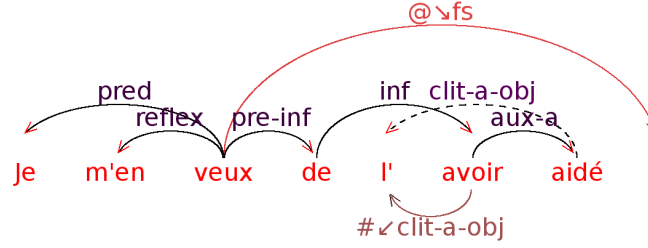


Figure 69: *reflex*: $G = \text{veux}$, $D = \text{m'en}$



Figure 70: *reflex*: $G = \text{allez}$, $D = \text{-vous-en}$

3.11.2 Non-projective REFLEXIVE dependency *reflex*

G is is a reflexive verb, D is a reflexive pronoun with the head type $\#(\swarrow \text{reflex})$ in pre-position with respect to G , H is the main auxiliary or light verb separating G and D . D is anchored immediately on the left of H .

Several examples of this dependency are shown above: **Figure 9** ($G = \text{fait}$, $D = \text{se}$, $H = \text{sont}$), **Figure 31** ($G = \text{lavées}$, $D = \text{se}$, $H = \text{est}$), **Figure 32** ($G = \text{débarassé}$, $D = \text{vous}$, $H = \text{être}$).

3.12 Group *CIRC* of circumstantial dependencies

3.12.1 Projective CIRCUMSTANTIAL dependency *circ*

G is a verb, an adjective or an adverb, D is a dependent circumstantial, e.g. an adverb, a preposition introducing a circumstance of time/location/manner, etc. See **Figure 2** ($G = \text{tenait}$, $D = \text{fort}$), **Figure 47** ($G1 = \text{a}$, $D1 = \text{hier}$; $G2 = \text{cassé}$, $D2 = \text{soir}$; $G3 = \text{fait}$, $D3 = \text{aujourd'hui}$), **Figure 49** ($G = \text{trouver}$, $D = \text{en}$), **Figure 65** ($G = \text{cachait}$, $D = \text{dans}$), **Figure 87** ($G = \text{livre}$, $D = \text{en}$).

3.13 Group *CLAUS* of clausal dependencies

3.13.1 Projective CLAUSAL dependency *claus*

D is always the main verb of a clause. As it concerns G , there are two cases. **Case 1**: In this most usual case, G is a conjunction or a relative pronoun. In **Figure 71** the conjunction *que* governs the head verb *viendra* of the clause through dependency *claus*. In **Figure 72** the relative pronoun *qui* governs through dependency *claus* the head auxiliary verb *a* of the clause and references its elided subject. In **Figure 73** the relative pronoun *dont* governs through dependency *claus* the head verb *parles* of the clause and references its elided genitive case complement. See also **Figure 149** (*claus*: $G1 = \text{qui}$,

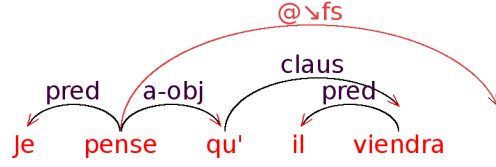


Figure 71: *claus*: $G = qu'$, $D = viendra$

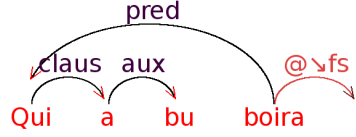


Figure 72: *claus*: $G = qui$, $D = a$

$D1 = grinçaient$, $G2 = qui$, $D2 = coulait$).

Case 2: For some verbs (of belief, of perception, etc.) it is possible that G is the main verb of the main clause. This case may be seen in **Figure 23** ($G = dis$, $D = avait$) and in **Figure 34** ($G = sais$, $D = a$).

3.14 Group *INTERROG* of interrogative dependencies

3.14.1 Projective *INTERROGATIVE* dependency *interrog*

G is the main verb, D is one of interrogative conjunctions (e.g., *comment*, *pourquoi*, *quand*, *que*, etc.). An example of this dependency may be seen in **Figure 74**. **Figure 75** shows the same dependency with the copula in a finite form.

3.15 Group *VOCATIVE* of vocative dependencies

3.15.1 Projective *VOCATIVE* dependency *vocative*

G is the main verb, D is a name (usually proper) or an adjective, a pronoun, in pre- or postposition with respect to G . **Figure 76** shows a pre-position vocative phrase. **Figure 77** shows a vocative phrase in post-position. See also **Figure 66** (*vocative*: $G = méfie$, $D = Adam$).

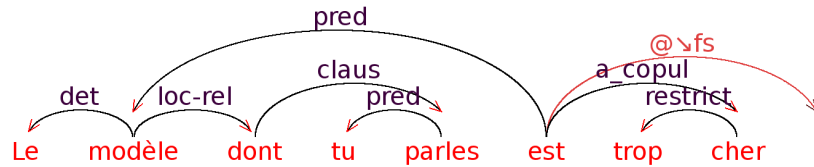


Figure 73: *claus*: $G = dont$, $D = parles$

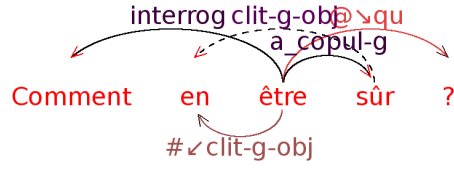


Figure 74: *interrog*: $G = \text{être}$, $D = \text{comment}$

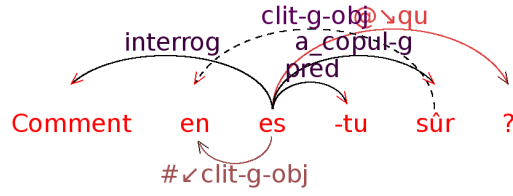


Figure 75: *interrog*: $G = \text{es}$, $D = \text{comment}$

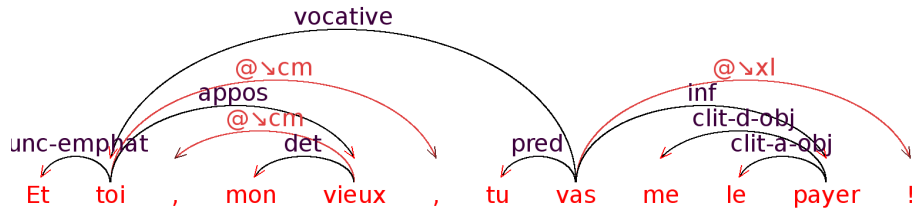


Figure 76: *vocative*: $G = \text{vas}$, $D = \text{toi}$

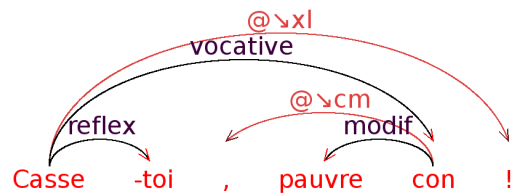


Figure 77: *vocative*: $G = \text{casse}$, $D = \text{con}$

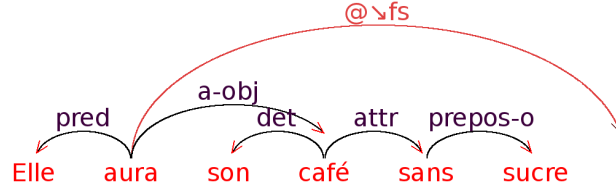


Figure 78: *det*: $G = \text{café}$, $D = \text{son}$

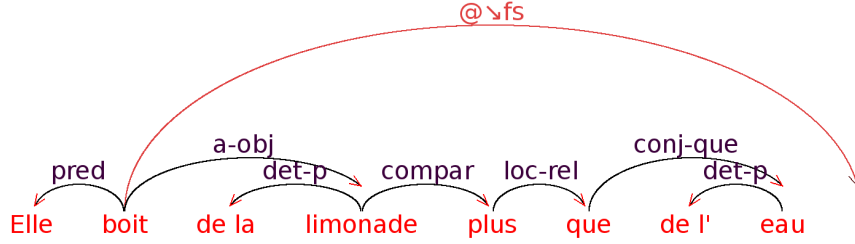


Figure 79: *det-p*: $G1 = \text{limonade}$, $D1 = \text{de la}$, $G2 = \text{eau}$, $D1 = \text{de l'}$

4 Nominal dependencies

4.1 Group *DET* of determinative dependencies

4.1.1 Projective DETERMINATIVE dependencies *det*, *det-p*

G is a noun, an adjective/past participle or a numeral, D is its determiner (an article, a demonstrative or a possessive pronoun²); for *det-p*, D is a partitive article, e.g. *de la*. See, e.g., **Figure 50** ($G = \text{jour}$, $D = \text{un}$), **Figure 65** ($G = \text{maquis}$, $D = \text{les}$). **Figure 78** illustrates the case where the possessive pronoun *son* is a determinant of a noun. In **Figure 79** the partitive article *de la* is used twice (the second time in the reduced form *de l'*).

4.2 Group *MODIF* of noun modifier dependencies

4.2.1 Projective iterated MODIFIER dependency *modif*

G is a noun, D is an adjective or a past participle accorded with G in gender and number. One may see an example of this dependency in **Figure 80**. Another example is shown in **Figure 81**. DS in **Figure 82** illustrates the case where G is a clitic in the standard complement position on the right of the main verb.

²In French grammar the possessive pronouns, such as *mon*, *votre*, are classified as adjectives.

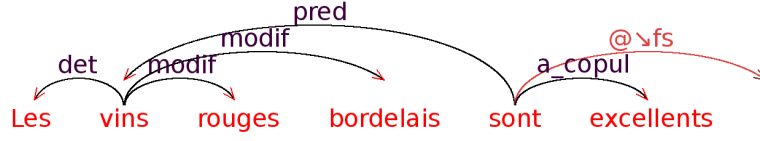


Figure 80: *modif*: $G = \text{vins}$, $D1 = \text{bordeaux}$, $D1 = \text{rouges}$

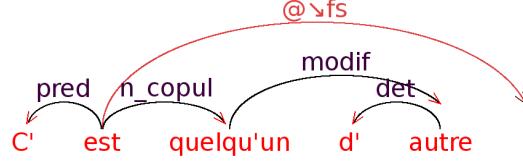


Figure 81: *modif*: $G = \text{quelqu'un}$, $D = \text{autre}$

4.2.2 Non-projective MODIFIER dependency *modif*

G is a noun/pronoun, D is an adjective or a past participle accorded with G in gender and number topicalized through the move to the end of the sentence and separated from G by at least one complement of the main verb. One may see an example of this dependency in **Figure 153** ($G = \text{en}$, $D = \text{rouges}$, $H = a$). Another example is shown in **Figure 83**. Cf. the DS in **Figure 83** with that in **Figure 84**, where the same adjective phrase *immobile et silencieux* is topicalized through the move to the beginning of the sentence, and where the corresponding dependency *modif* is projective.

4.3 Group *ATTR* of iterated attributive dependences

4.3.1 Projective iterated ATTRIBUTIVE dependency *attr*

G is a noun, D is an adjective not accorded with G in gender or number or a preposition (like *de*, *en*, *à*, etc.) governing a noun. In **Figure 85** the noun *vélo* governs through dependency *attr* the prepositions *de* (twice), *à* and *avec*, and the noun *cadre* governs through *attr* the preposition *en*. See also **Figure 149** (*attr*: $G = \text{maison}$, $D = \text{avec}$). Compare the dependency structures in **Figure 86** and **Figure 87**, where the same preposition *en* is dependent on the verb *livre* through dependency *circ* and on the noun *maison* through dependency *attr*.

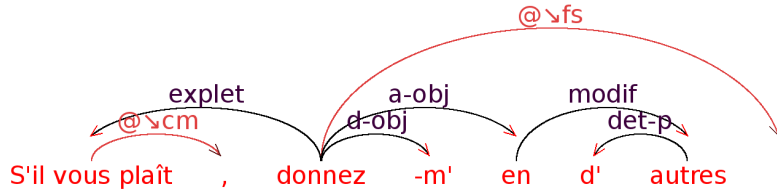


Figure 82: *modif*: $G = \text{en}$, $D = \text{autres}$

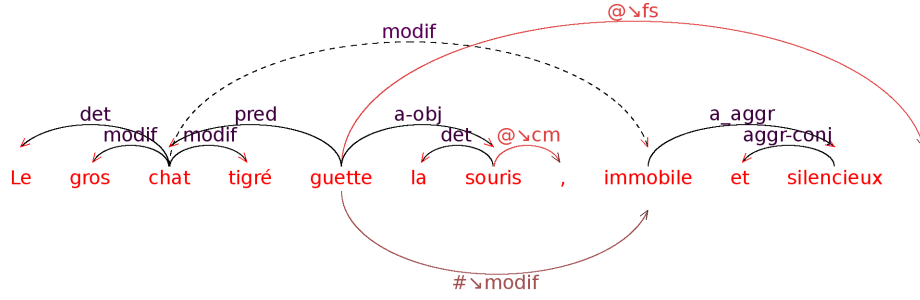


Figure 83: Non-projective *modif*: $G = \text{chat}$, $D = \text{immobile}$, $H = \text{guette}$

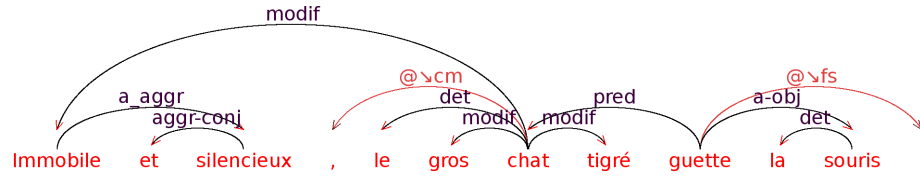


Figure 84: *modif*: $G = \text{chat}$, $D = \text{immobile}$

4.3.2 Non-projective ATTRIBUTIVE dependency *attr*

G is a fronted topicalized noun co-referent with a pronoun. D is an adjective, a past participle, a preposition or a relative pronoun separated from G by the main verb H which is the host word for D .

An example illustrating this dependency is shown in **Figure 88**. Another possible analysis is shown in **Figure 89**.

4.4 Group *REL* of relative dependencies

4.4.1 Projective RELATIVE dependency *loc-rel*

G is a noun/pronoun or an adjective.

Case 1: D is one of relative pronouns *que*, *qui*, *dont*, *auquel*, etc. governing a relative clause.

Case 2: $D = \text{que}$ is the second part of a comparative phrase.

The first case is illustrated by **Figures 90, 93 and 94**. In **Figures 90 and 91** the relative pronouns subordinate through *loc-rel* are respectively *qui* and *que*. Cf. the analysis in **Figure 91** with that in **Figure 92**. In **Figure 93** the relative pronoun subordinate through *loc-rel* is *dont*. In **Figure 94** is shown the case where the governor in dependency *loc-rel* is a demonstrative pronoun. The second case is illustrated by **Figure 95**. Compare it with **Figures 124, 125, 126** where the comparative phrases are discontinuous.

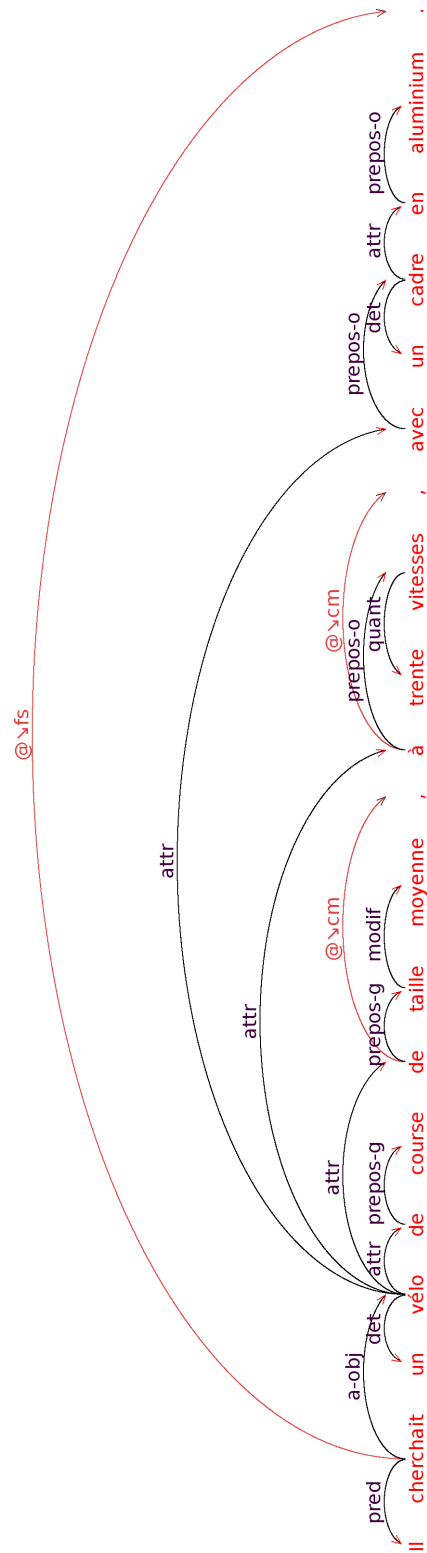


Figure 85: *attr*: $G1 = \text{vélo}$, $D1 = D2 = \text{de}$, $D3 = \text{à}$; $G2 = \text{cadre}$, $D4 = \text{en}$

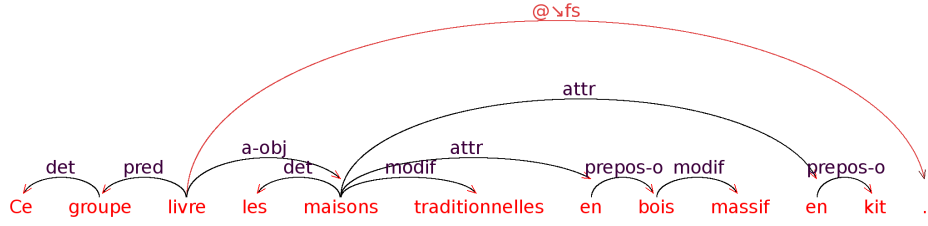


Figure 86: *attr*: $G = maison$, $D1 = D2 = en$

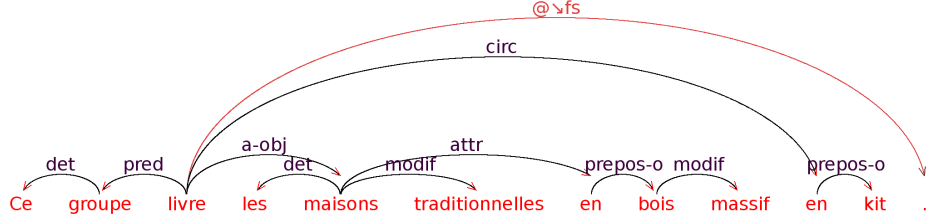


Figure 87: *attr*: $G1 = maison$, $D1 = en$; *circ*: $G2 = livre$, $D2 = en$

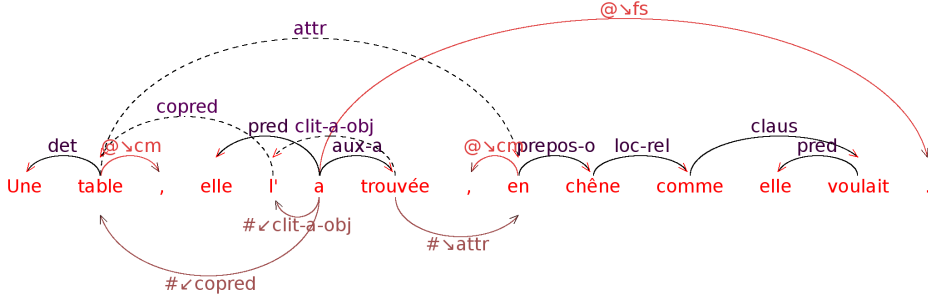


Figure 88: Non-projective *attr*: $G = table$, $D = en$, $H = trouvée$

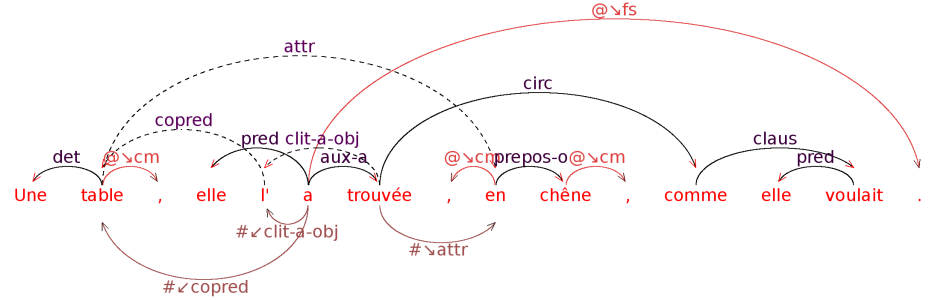


Figure 89: Non-projective *attr*: $G = table$, $D = en$, $H = a$

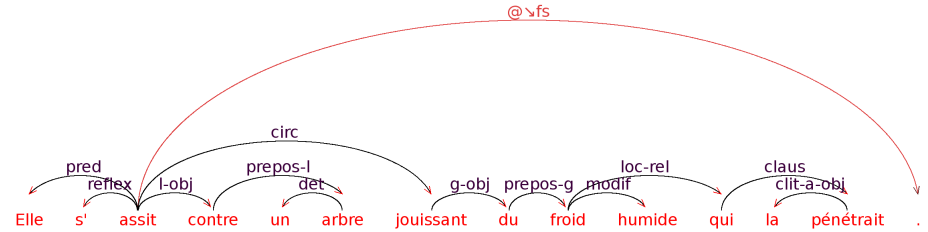


Figure 90: *loc-rel*: $G = froid$, $D = qui$

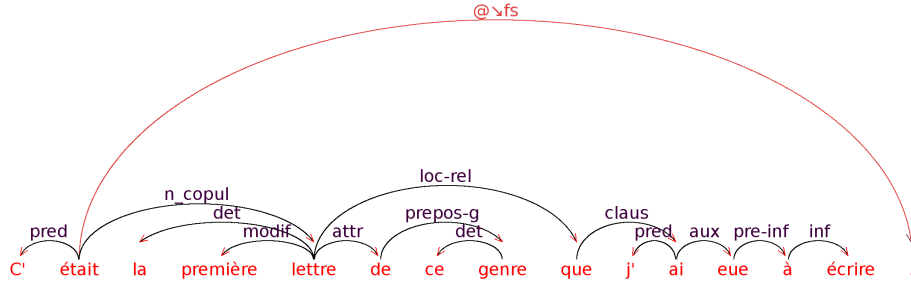


Figure 91: *loc-rel*: $G = \text{lettre}$, $D = \text{que}$

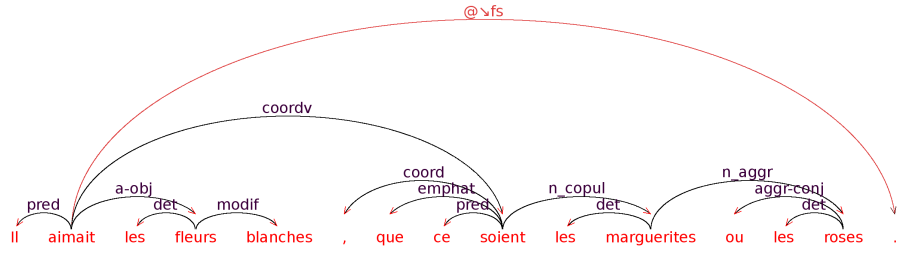


Figure 92: *coordv*: $G = \text{aimait}$, $D = \text{soient}$

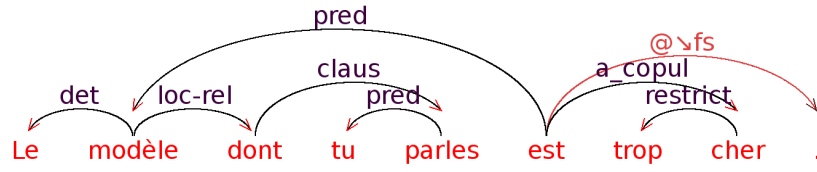


Figure 93: *loc-rel*: $G = \text{modèle}$, $D = \text{dont}$

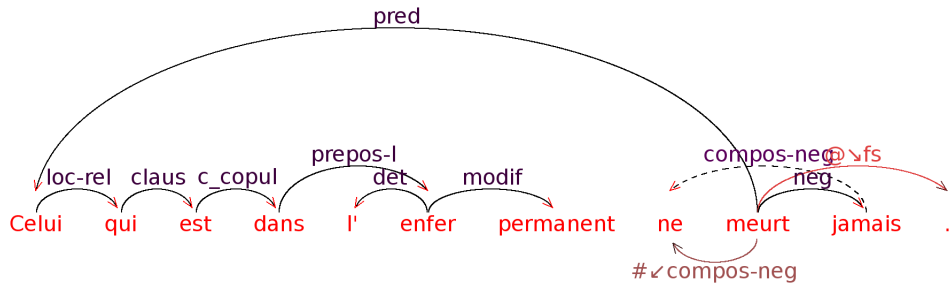


Figure 94: *loc-rel*: $G = \text{celui}$, $D = \text{qui}$

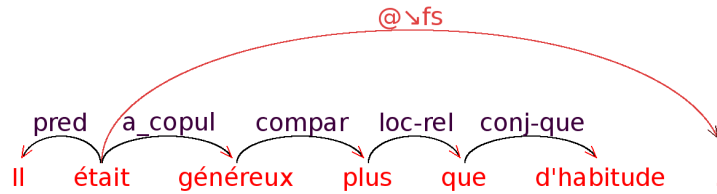


Figure 95: *loc-rel*: $G = \text{plus}$, $D = \text{que}$

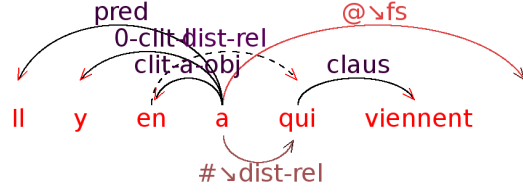


Figure 96: Non-projective *dist-rel*: $G = en$, $D = qui$, $H = a$

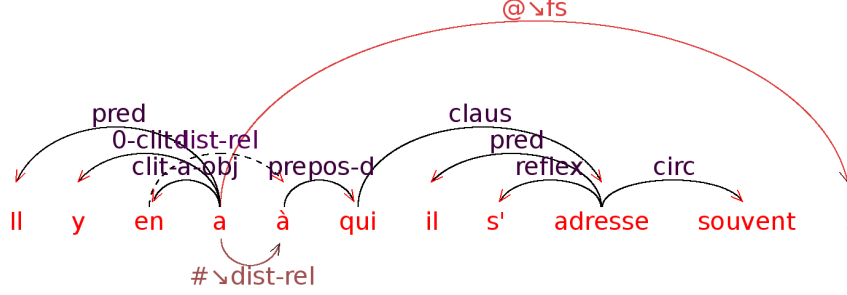


Figure 97: Non-projective *dist-rel*: $G = en$, $D = à$, $H = a$

4.4.2 Non-projective RELATIVE dependency *dist-rel*

Case 1: G is the pronoun *en*.

Case 2: G is a superlative or comparative adjective or a comparative adverb or a demonstrative pronoun.

D is one of relative pronouns, e.g. *qui*, *que* separated from G by a noun/adjective H which governs G and serves as the host word for D .

An example illustrating the Case 1 is shown in **Figure 96**. Another example of this Case is shown in **Figure 97**. Several examples illustrating the Case 2 are shown below: **Figure 124** ($G = moins$, $D = que$, $H = pommes$), **Figure 125** ($G = plus$, $D = que$, $H = généreux$), **Figure 126** ($G = plus$, $D = que$, $H = dangereux$), **Figure 128** ($G = plus$, $D = qui$, $H = avant-gardiste$), **Figure 157** ($G = ce$, $D = que$, $H = coeur$) and **Figure 158** ($G = ce$, $D = que$, $H = plexus$).

4.5 Group *QUANT* of quantitative dependencies

4.5.1 Projective QUANTITATIVE dependency *quant*

G is a noun or an adjective, D is a numeral. An example of this dependency may be seen in **Figure 98**.

4.5.2 Non-projective QUANTITATIVE dependency *quant*

G is a noun or an adjective, D is a numeral. An example of this dependency may be seen in **Figure 99**. In a similar example in **Figure 100** this dependency is combined with *loc-rel*. Another example is shown in **Figure 101** in

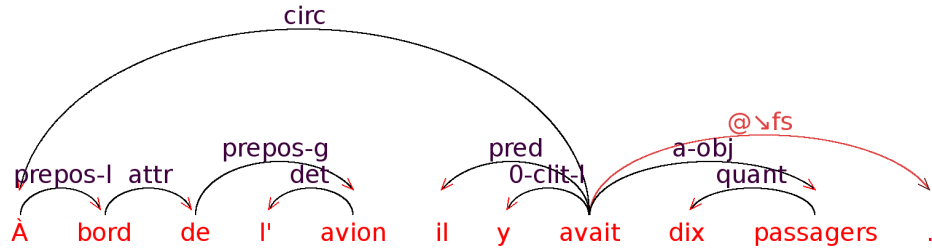


Figure 98: *quant*: $G = \text{passagers}$, $D = \text{dix}$

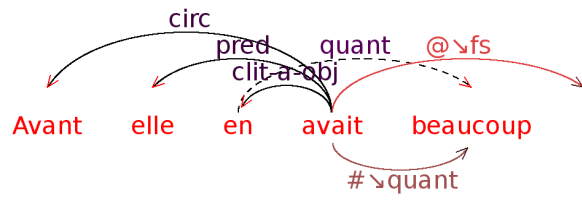


Figure 99: *quant*: $G = \text{en}$, $D = \text{beaucoup}$

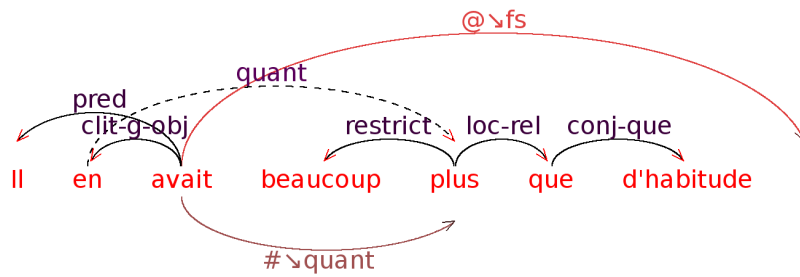


Figure 100: *quant*: $G = \text{en}$, $D = \text{beaucoup}$

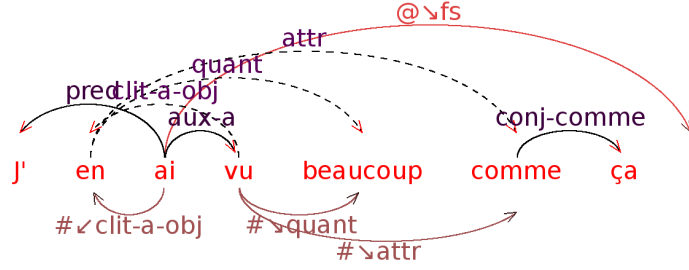


Figure 101: *modif*: $G = en$, $D1 = comme\ ça$; *quant*: $G = en$, $D2 = beaucoup$

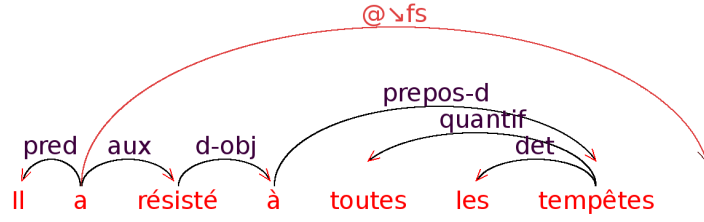


Figure 102: *quantif*: $G = tempêtes$, $D = toutes$

which we also show another example of the non-projective modifier dependency *modif*.

4.6 Group *QUANTIF* of quantifier dependencies

4.6.1 Projective *QUANTIFIER* dependency *quantif*

G is a noun, D is a quantifier adjective or a quantifier pronoun (e.g., *aucun*, *tout*). See **Figure 102**.

4.7 Group *SELECT* of selective dependencies

4.7.1 Projective *SELECTIVE* dependency *select*

G is an adjective (quantifier, superlative), a numeral, a pronoun (e.g., *lequel*, *auquel*, *duquel*, *celui*, etc.). D is one of the prepositions: *dans*, *d'entre*, *de*, *parmi*, *pour*, *sur*. In **Figures 103** and **104** are shown structures where G is a numeral. In **Figure 105** is shown one more structure where the governor through *select* is a pronoun. Compare the analysis in **Figure 105** with that

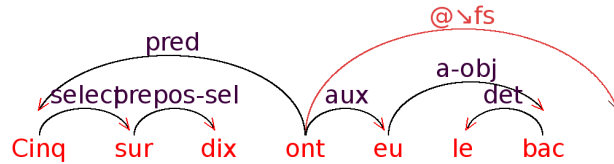


Figure 103: *select*: $G = cinq$, $D = sur$

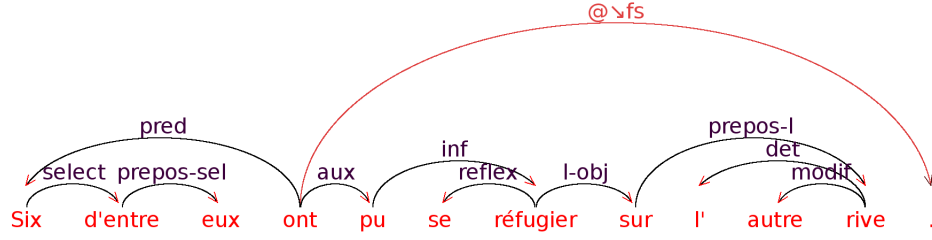


Figure 104: *select*: $G = six$, $D = d'entre$

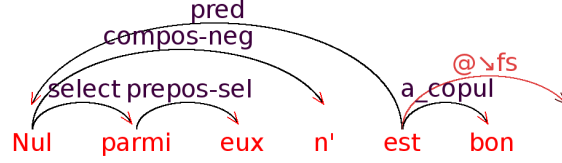


Figure 105: *select*: $G = nul$, $D = parmi$

in **Figure 106**, where n' is subordinate to *jamais* and not to *nul*. **Figure 107** illustrates the case where the governor through *select* is an adjective.

4.8 Group *RESTRICT* of restrictive dependencies

4.8.1 Projective *RESTRICTIVE* dependency *restrict*

G is a noun/pronoun, an adjective, a participle, a verb in infinitive, a comparative adverb or a preposition.

Case 1: D is a restrictive adverb (e.g. *aussi*, *exclusivement*, *même*, *seulement*, *surtout*, *plus*, *moins*, *non*). See, e.g., **Figure 2** (*restrict*: $G = fort$, $D = très$), **Figure 93** (*restrict*: $G = cher$, $D = trop$) and also **Figure 108** where G is a preposition. In **Figure 109** is shown an example of this dependency for an adjective. **Case 2:** D is pronoun *que* which is the catemorematic part of the restrictive negation *ne ... que*. **Figure 110** illustrates this case with G being a preposition. **Figure 111** illustrates case 2 with G being a verb in infinitive. **Case 3:** This is a special case, where D is a measure noun (*fois*, *pour cent*, *euros*, etc.). This case is illustrated by the structure in **Figure 112**. Another example may be found in **Figure 121** (*restrict*: $G = plus$, $D = fois$).

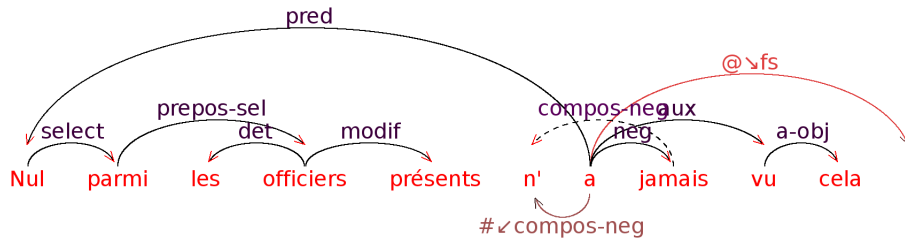


Figure 106: *select*: $G = nul$, $D = parmi$

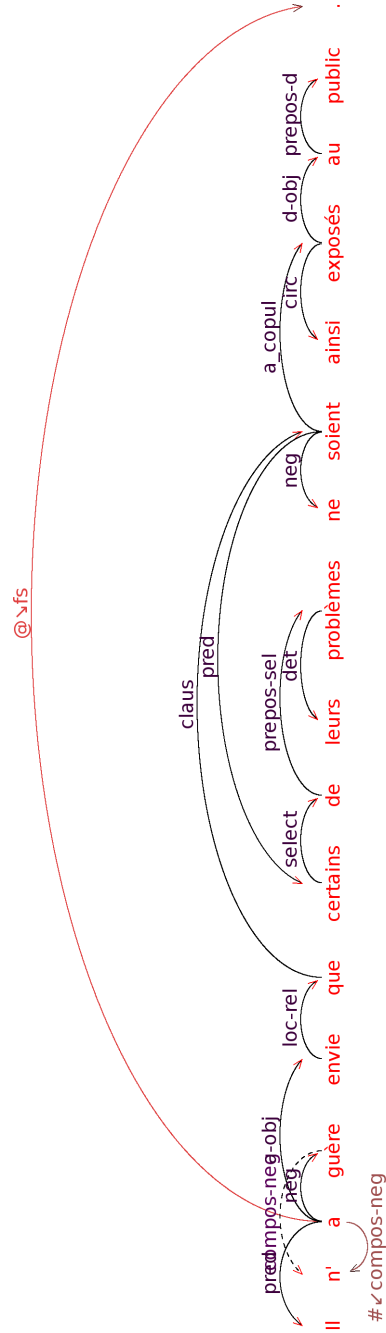


Figure 107: *select*: $G = \text{certains}$, $D = \text{de}$

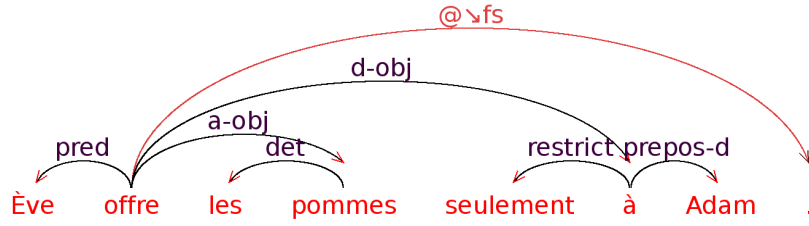


Figure 108: *restrict*: $G = \text{à}$, $D = \text{seulement}$

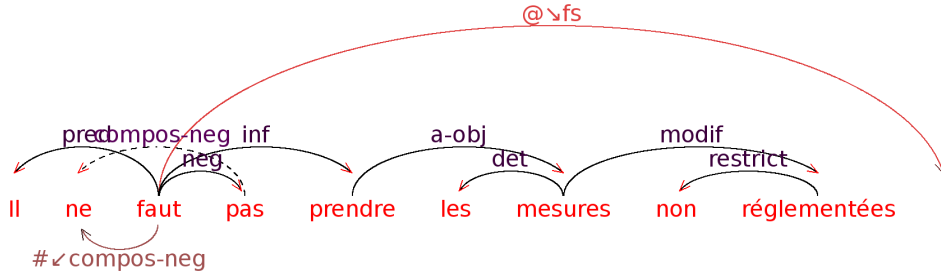


Figure 109: *restrict*: $G = \text{réglementaires}$, $D = \text{non}$

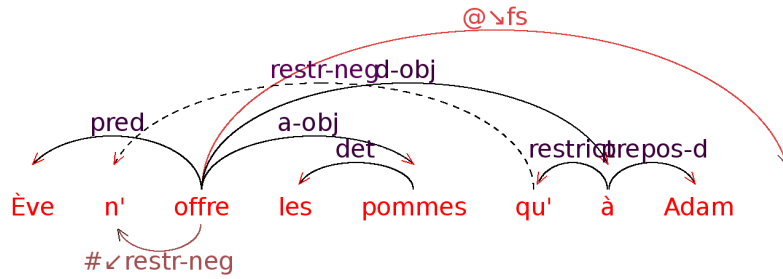


Figure 110: *restrict*: $G = \text{à}$, $D = \text{qu'}$

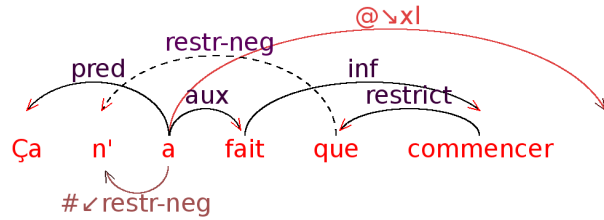


Figure 111: *restrict*: $G = \text{commencer}$, $D = \text{que}$

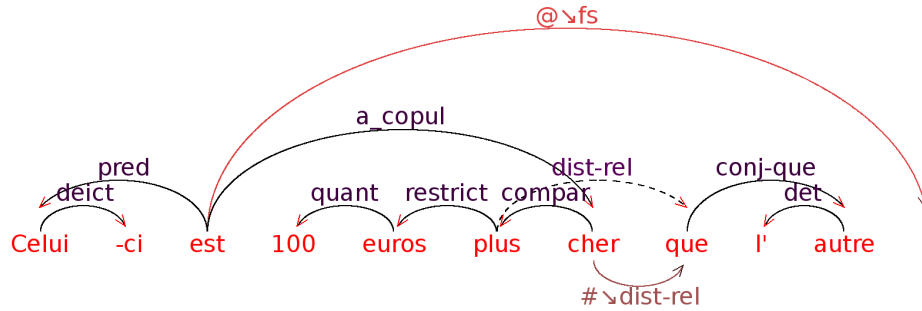


Figure 112: *restrict*: $G = \text{plus}$, $D = \text{euros}$

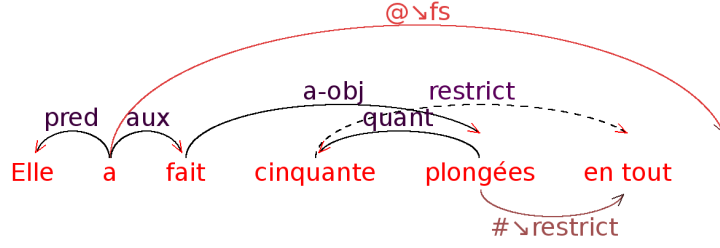


Figure 113: *restrict*: $G = cinquante$, $D = en\ tout$

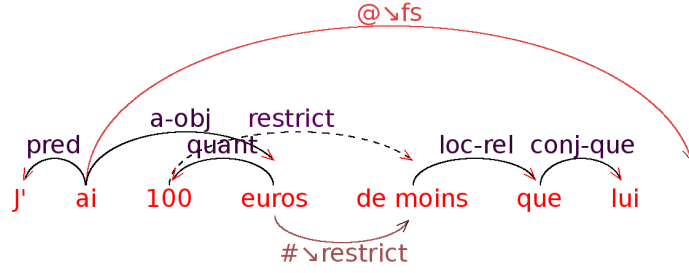


Figure 114: *restrict*: $G = 100$, $D = de\ moins$

4.8.2 Non-projective RESTRICTIVE dependency *restrict*

G is a numeral, D is a restrictive adverb (e.g. *aussi*, *exclusivement*, *même*, *seulement*, *surtout*, *plus*, *moins*, *non*). An example of this dependency is shown in **Figure 113**. One more example is shown in **Figure 114**.

4.9 Group *CORREL* of correlative dependencies

4.9.1 Projective CORRELATIVE dependency *correl*

Case 1: G is a noun, D is one of prepositions *à* or *par*. In **Figure 115** is shown the case, where D is *à*. In **Figure 116** is shown an example of the case where $D = par$. Another example in **Figure 117** illustrates the case $D = par$ when the governor G is a noun which has a pronominalized argument. Cf. this example with that in **Figure 118**, where the preposition *par* is dependent through dependency *attr*. In **Figure 119** is shown an example

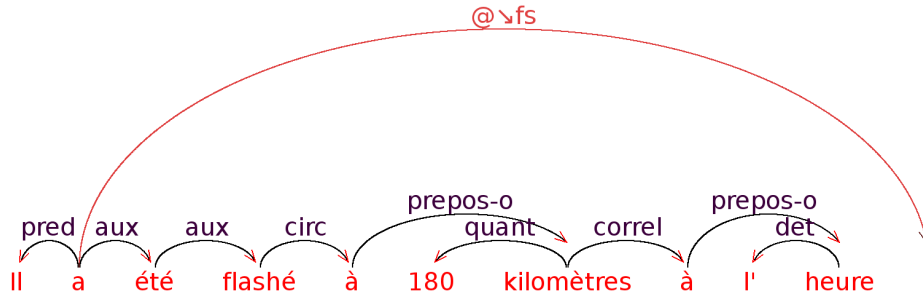


Figure 115: *correl*: $G = kilomètres$, $D = à$

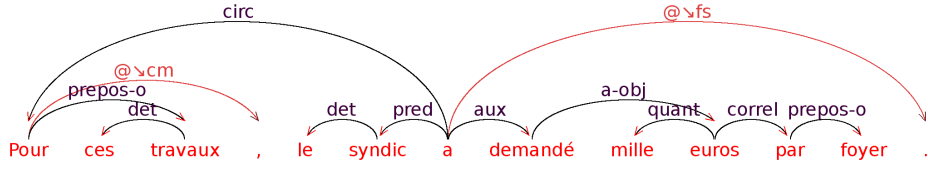


Figure 116: *correl*: $G = \text{euros}$, $D = \text{par}$

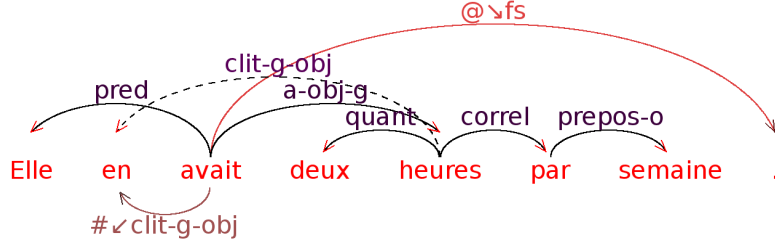


Figure 117: *correl*: $G = \text{heures}$, $D = \text{par}$

where this dependency is related to an aggregate. **Case 2:** G is a currency name (e.g., *euro*) and D is a noun. An example illustrating this case is shown in **Figure 120**.

4.10 Group *APPROX* of approximative dependencies

4.10.1 Projective APPROXIMATIVE dependency *approx*

G is a numeral and D is an adverb with an approximative meaning (e.g., ‘*au plus*’, *exactement*, ‘*plus ou moins*’, *précisément*, *presque*, ‘*près de*’). This dependency may be found in **Figure 121**.

4.11 Group *COMPAR* of comparative dependencies

4.11.1 Projective COMPARATIVE dependency *compar*

G is a noun/pronoun, an adjective, a numeral, an adverb, or a preposition, D is the first word of a comparative construction (e.g. *si*, *aussi*, *autant*, *moins*, *plus de*, *le plus*, etc.).

Figure 122 shows the case where the adverb *plus* is subordinate through comparative dependency. Compare this example with that in **Figure 123**

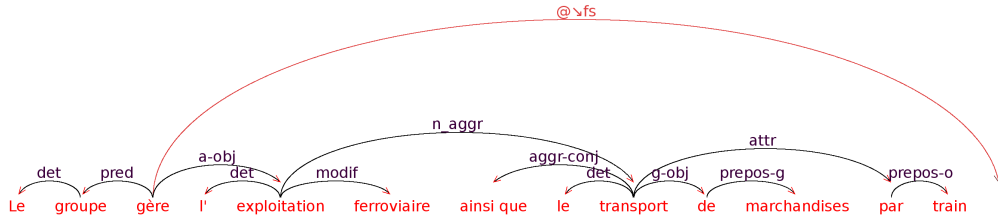


Figure 118: *attr*: $G = \text{transport}$, $D = \text{par}$

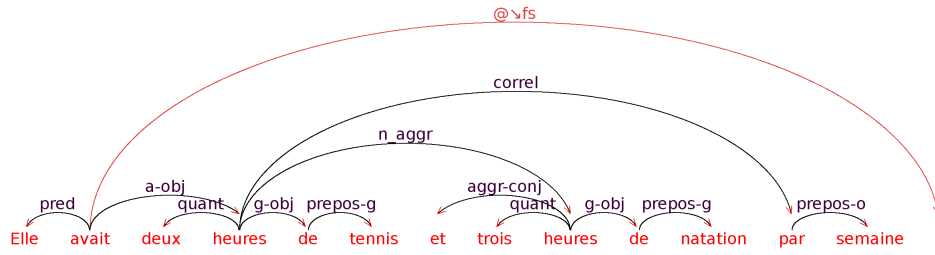


Figure 119: *correl*: $G = \text{heures}$, $D = \text{par}$

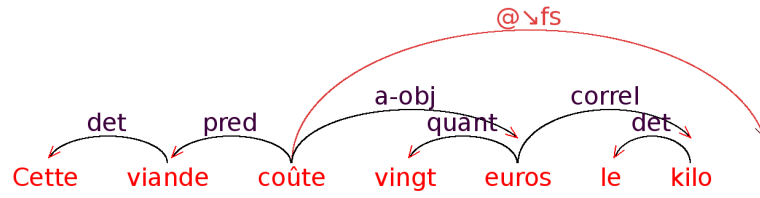


Figure 120: *correl*: $G = \text{euros}$, $D = \text{kilo}$

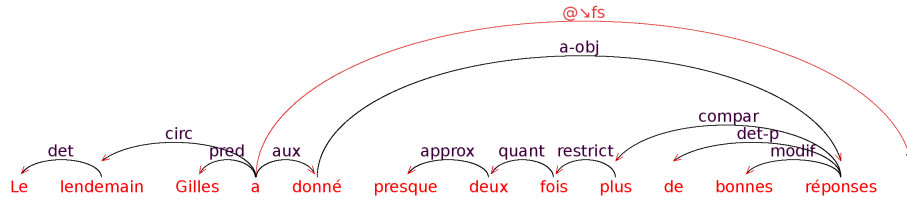


Figure 121: *approx*: $G = \text{deux}$, $D = \text{presque}$; *restrict*: $G1 = \text{plus}$, $D1 = \text{fois}$

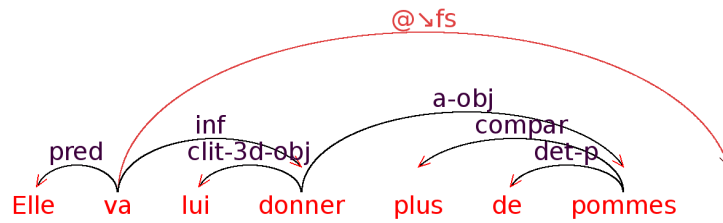


Figure 122: *compar*: $G = \text{pommes}$, $D = \text{plus}$

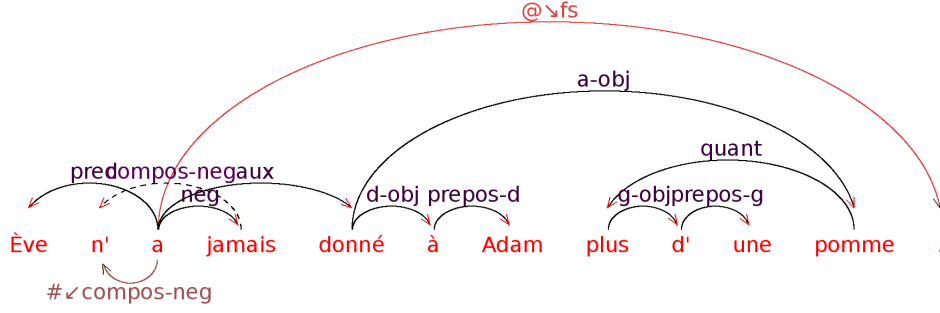


Figure 123: *quant*: $G = pomme$, $D = plus$

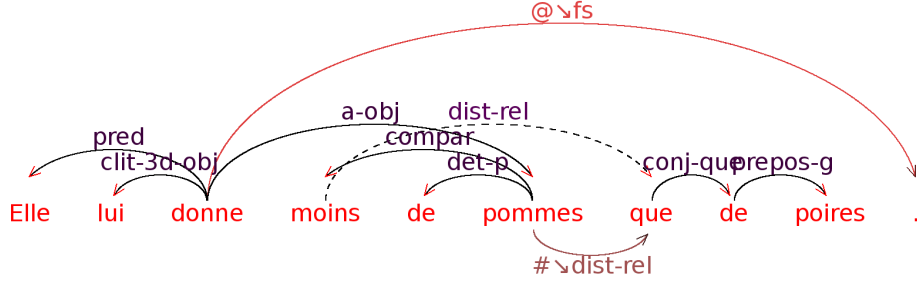


Figure 124: *compar*: $G = pommes$, $D = moins$

where *plus* is subordinate through dependency *quant*. In **Figures** 124, 125, 126, 128 are shown non-projective comparative constructions with subordinate comparative adverbs. In **Figure** 124 the comparative adverb is subordinate to a noun with the partitive article. In **Figure** 125 the comparative adverb is subordinate to an adjective. A similar example is shown in **Figure** 126. Compare this example with that in **Figure** 127 where *n'* is the syncategorematic part of restrictive negation. In **Figure** 128 is shown a discontinuous superlative comparative construction. **Figure** 129 shows an example of comparative dependency, where the subordinate comparative conjunction *comme* is in post-position with respect to the governor.

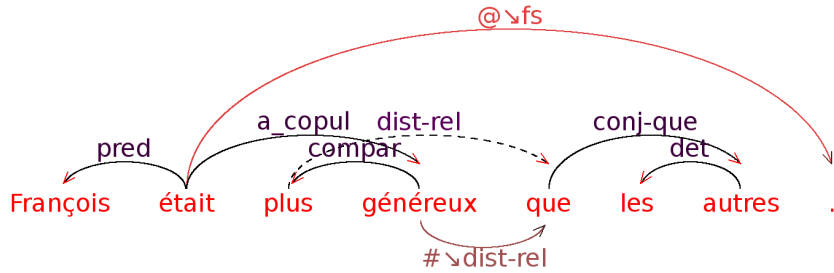


Figure 125: *compar*: $G = généreux$, $D = plus$

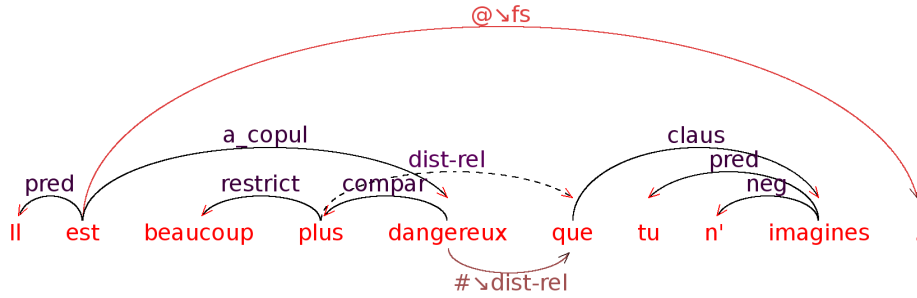


Figure 126: *compar*: $G = dangereux$, $D = plus$

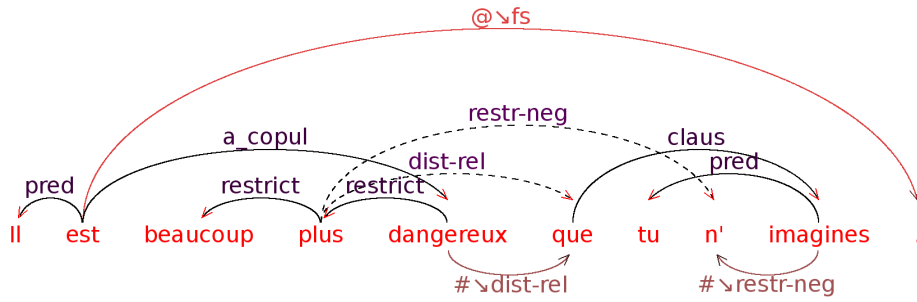


Figure 127: *restrict*: $G = dangereux$, $D = plus$

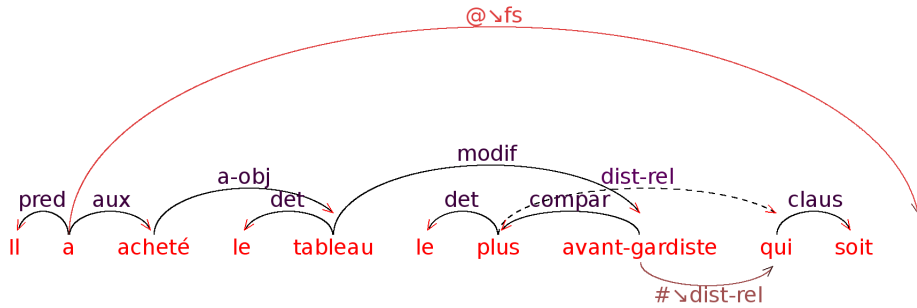


Figure 128: *compar*: $G = avant-gardiste$, $D = plus$

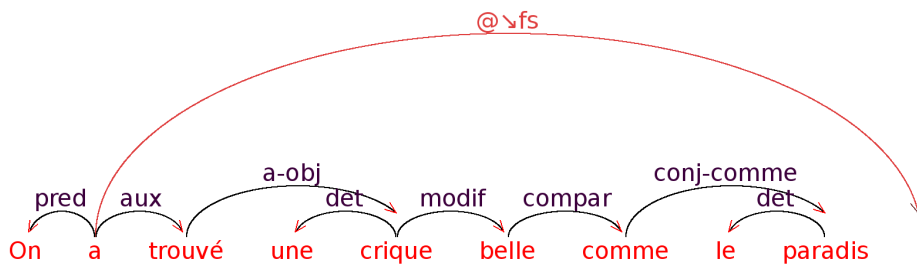


Figure 129: *compar*: $G = belle$, $D = comme$

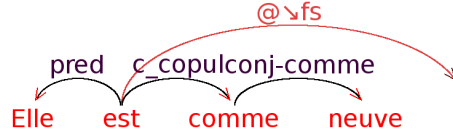


Figure 130: *conj-comme*: $G = \text{comme}$, $D = \text{neuve}$

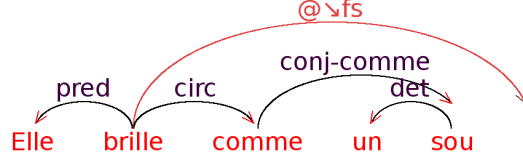


Figure 131: *conj-comme*: $G = \text{comme}$, $D = \text{sou}$

4.11.2 Projective COMPARATIVE dependency *conj-comme*

G is the comparative conjunction *comme*, D is a noun or a pronoun, an adjective or the main verb of a clause. **Figure 130** shows an example of this dependency, where G is subordinate to a copula. **Figure 131** shows another example, where G is a circumstantial modifier of a verb. See also **Figure 129** (*conj-comme*: $G = \text{comme}$, $D = \text{paradis}$) where the governor is a noun modifier.

4.11.3 Projective COMPARATIVE dependency *conj-que*

G is the comparative conjunction *que*, D is a noun, an adjective or the main verb of a clause. See **Figure 95** (*conj-que*: $G = \text{que}$, $D = \text{d'habitude}$), **Figure 124** (*conj-que*: $G = \text{que}$, $D = \text{de}$), **Figure 125** (*conj-que*: $G = \text{que}$, $D = \text{autres}$).

4.12 Group *APPOS* of appositive nominal dependencies

4.12.1 Projective APPOSITIVE dependency *appos*

G is a noun/pronoun, D is a word in apposition with G , e.g., *de Gaulle* in *président de Gaulle*, *Adam* in *Toi, Adam*. See **Figure 76** (*appos*: $G = \text{toi}$, $D = \text{vieux}$). *appos* may be recursive as it shows **Figure 132**.

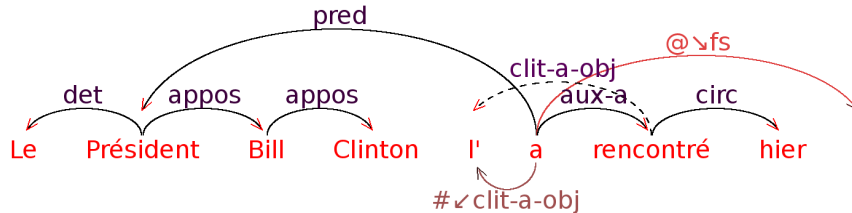


Figure 132: *appos*: $G_1 = \text{président}$, $D_1 = \text{Bill}$, $G_2 = \text{Bill}$, $D_2 = \text{Clinton}$

4.12.2 Non-projective APPOSITIVE dependency *appos*

Appositive dependencies may also be non-projective. In this case they have the same properties of *G* and *D*. As to the host word *H*, it may be the main verb and also the head of a nominal phrase. In **Figure 133** is shown one such case.

4.13 Group *COPRED* of co-predicative dependencies

4.13.1 Projective CO-PREDICATIVE dependency *copred*

G is an antecedent (anaphoric/cataphoric) pronoun, *D* is the locally co-referential word. An example of this dependency is shown in **Figure 134**. One more example is shown in **Figure 135**.

4.13.2 Non-projective CO-PREDICATIVE dependency *copred*

G is an antecedent (anaphoric/cataphoric) pronoun, *D* is the co-referential word separated from *G* by the main verb which is the host word *H*. An example of this dependency is shown in **Figure 136**. Compare another example of non-projective dependency *copred* in **Figure 137** with the example of projective *copred* in **Figure 135**.

5 Prepositional Dependencies

In general, the dependencies in this group relate prepositions with the governed noun, pronoun, adjective or numeral. The majority of them correspond to four of six main semantic object cases: *g* (genitive), *d* (dative), *l* (locative) and *o* (oblique) (i.e. all but *n* (nominative) and *a* (accusative)).

5.1 Group *PREPOS* of prepositional dependencies

5.1.1 Projective CASE PREPOSITIONAL dependencies *prepos-C*

In these dependencies, *G* is a preposition in one of the four cases *C* above, *D* is the governed noun, pronoun, adjective or numeral.

Even if the case is not morphologically marked in French, there is a simple criterion of its definition:

- (i) French clitics mark for the cases *a*, *g*, *d* and *l* ³ ;
- (ii) *D* is subordinate to the preposition *G* through dependency *prepos-C*, where *C* is *g*, *d* or *l* if *D* can be pronominalized using a clitic in case *C*;

³*a* is here of no concern because it is not marked with a preposition.

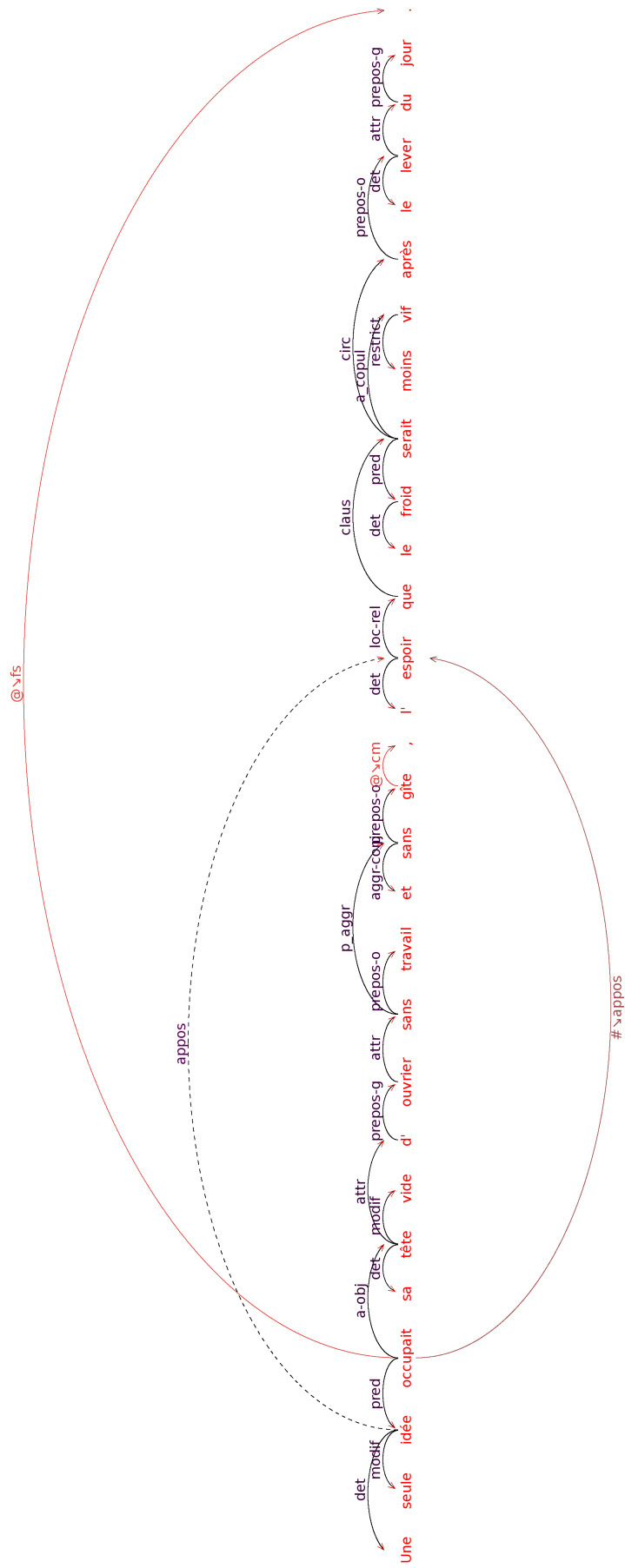


Figure 133: *appos*: $G = idée$, $D = espoir$, $H = occupait$

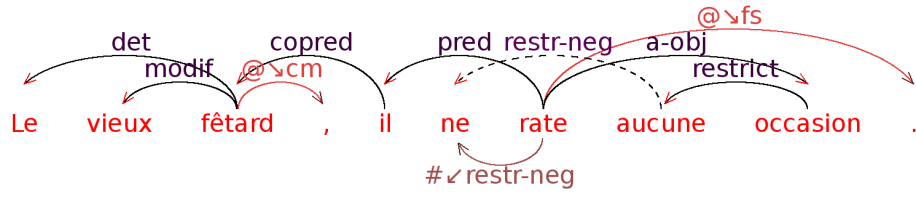


Figure 134: *copred*: $G = il$, $D = f\hat{e}tard$

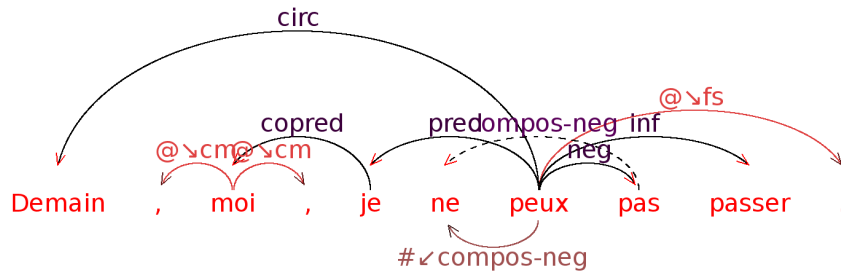


Figure 135: *copred*: $G = je$, $D = moi$

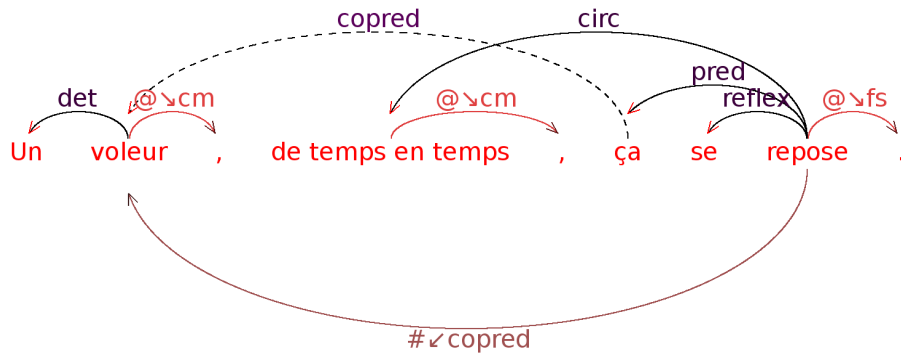


Figure 136: *coref*: $G = \grave{c}a$, $D = voleur$

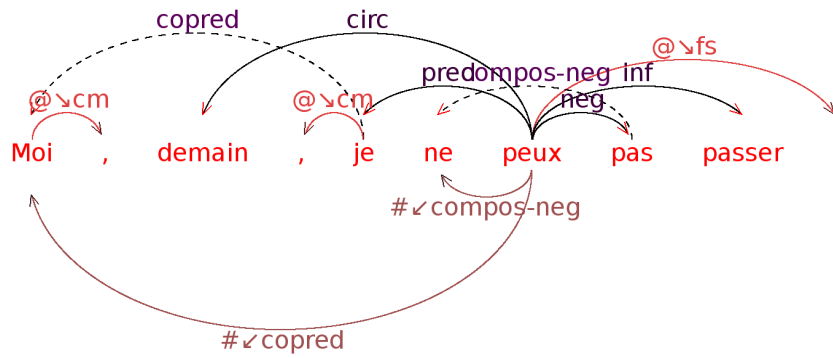


Figure 137: *coref*: $G = je$, $D = moi$

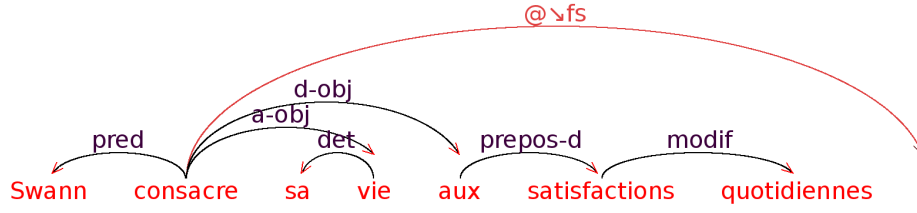


Figure 138: *prepos-d*: $G = aux$, $D = satisfactions$

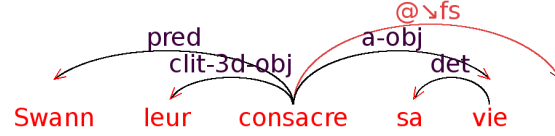


Figure 139: *clit-3d-obj*: $G = consacre$, $D = leur$

(iii) otherwise, D is subordinate to G through one of dependencies *prepos-o*, *prepos-A* (**a**gentive dependency) or *prepos-sel* (**s**elective dependency).

Dependency *prepos-d* is shown in **Figure 138**. Compare the structures in **Figures 138** and **Figure 139**. Dependency *prepos-g* is shown in **Figure 140**. Compare the structures in **Figures 140** and **Figure 99**, 100.

Dependency *prepos-l* is shown in **Figure 141**. Compare the structures in **Figures 141** and **Figure 142**. Dependency *prepos-o* is shown in **Figure 143**, in **Figure 144** and in **Figure 145**. For *prepos-d*, see also: **Figure 12** ($G = \grave{a}$, $D = tout$), **Figures 108**, 110 ($G = \grave{a}$, $D = Adam$).

For *prepos-g*, see also: **Figure 14** ($G = de$, $D = scandale$), **Figure 15** ($G = de$, $D = foule$), **Figure 85** ($G_1 = de$, $D_1 = course$; $G_2 = de$, $D_2 = taille$; $G_1 = d'$, $D_1 = aluminium$), **Figure 98** ($G = de$, $D = avion$), **Figure 124** ($G = de$, $D = poires$).

For *prepos-l*, see also: **Figure 16** ($G = au$, $D = milieu$), **Figure 21** ($G = en$, $D = 2001$).

For *prepos-o*, see also: **Figure 17** ($G = sur$, $D = moi$), **Figure 26** ($G = de$, $D = route$), **Figure 31** ($G = avec$, $D = savon$), **Figure 78** ($G = sans$, $D = sucre$), **Figure 85** ($G = avec$, $D = cadre$), **Figure 86**, 87 ($G_1 = en$, $D_1 = bois$; $G_2 = en$, $D_2 = kit$), **Figure 149** ($G = avec$, $D = portes$).

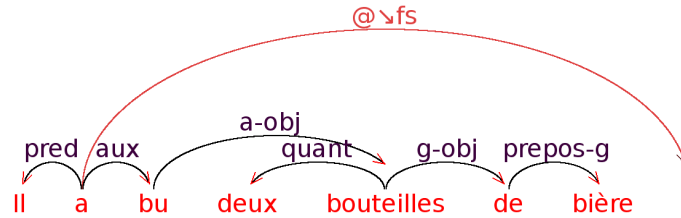


Figure 140: *prepos-g*: $G = de$, $D = bière$

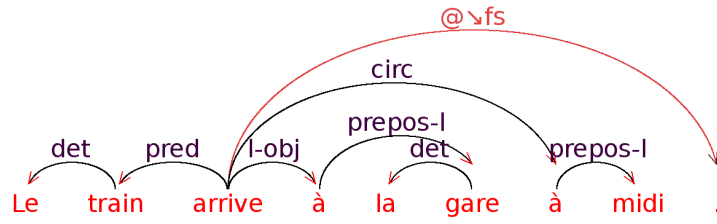


Figure 141: *prepos-l*: $G = \text{à}$, $D = \text{gare}$

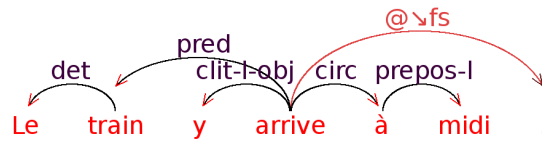


Figure 142: *clit-l-obj*: $G = \text{arrive}$, $D = y$

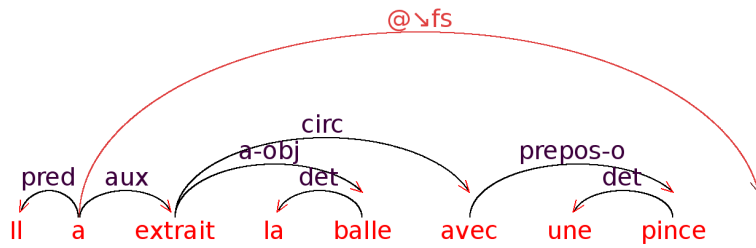


Figure 143: *prepos-o*: $G = \text{avec}$, $D = \text{pince}$

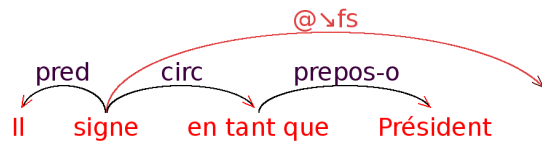


Figure 144: *prepos-o*: $G = \text{en tant que}$, $D = \text{Président}$

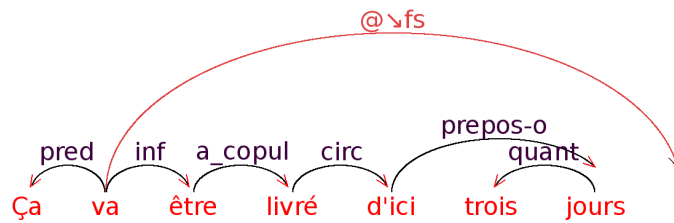


Figure 145: *prepos-o*: $G = \text{d'ici}$, $D = \text{jours}$

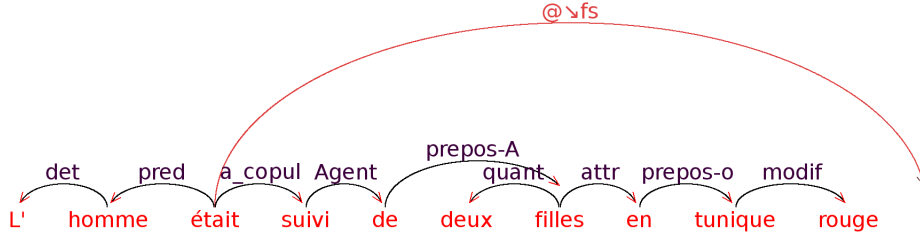


Figure 146: *prepos-A*: $G = de$, $D = filles$

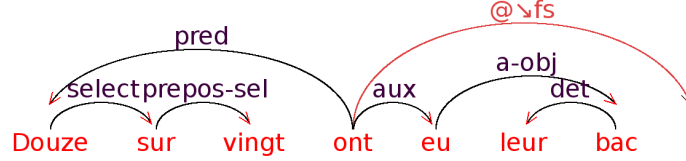


Figure 147: *prepos-sel*: $G = sur$, $D = vingt$

5.1.2 Projective AGENTIVE PREPOSITIONAL dependency *prepos-A*

In French this dependency is marked for with the passive voice.

G is one of the prepositions *de* (*d'*, *des*, *du*) or *par* (*de* is used when the subject doesn't undergo the action expressed by the participle).

Case 1: G is subordinate to a past participle through dependency *Agent*, D is a noun or a pronoun expressing the semantic agent. See **Figure 8** ($G = par$, $D = CRS$) and **Figure 34** ($G = par$, $D = qui$). In **Figure 146** one can see the case $G = de$. **Case 2:** G is subordinate through dependency *Agent* to a verb in infinitive, which itself is subordinate to the light verb *faire*. This case is illustrated by **Figure 9** (*prepos-A*: $G = par$, $D = CRS$).

5.1.3 Projective SELECTIVE PREPOSITIONAL dependency *prepos-sel*

G is one of the prepositions with selective semantics, as for instance, *d'entre*, *de*, *des*, *parmi*, *sur*, etc., D is a word (a noun, an adjective, a numeral, a pronoun) which references a set serving as the domain of selection.

In **Figure 147** one may find this dependency in the case where D is a numeral. **Figure 148** shows this dependency in the case where D is a pronoun.

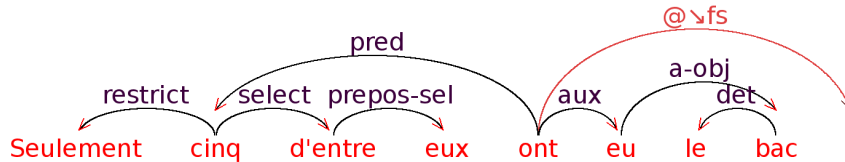


Figure 148: *prepos-sel*: $G = d'entre$, $D = eux$

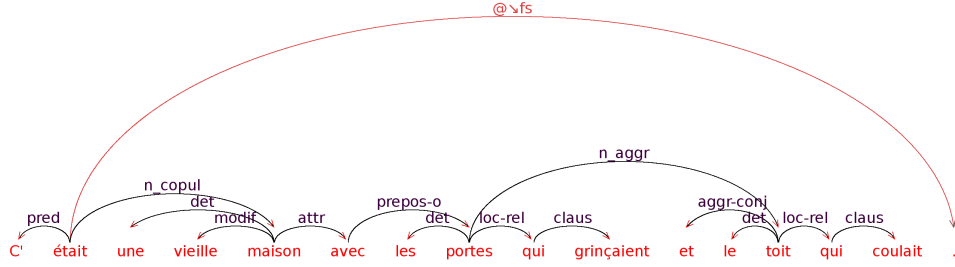


Figure 149: n_aggr : $G = portes$, $D = toit$

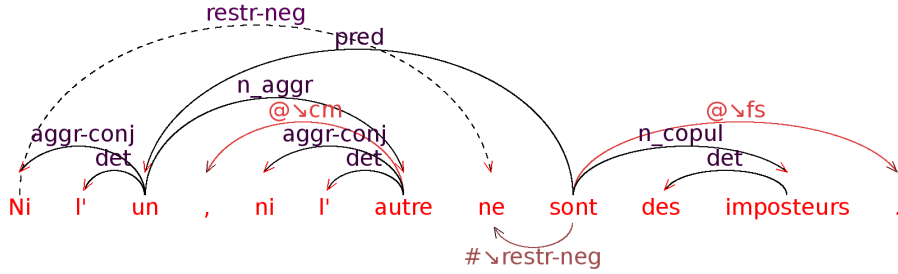


Figure 150: n_aggr : $G = un$, $D = autre$

6 Aggregation Dependencies

In CDGFr, only verb forms are coordinated through dependencies in the group COORD. All other coordinated forms are related through aggregation dependencies and are separated by junctions and punctuation markers subordinate through dependency *aggr-conj*. Semantically, they constitute an aggregate, a group of homogeneous or opposed elements (the opposition, if any, is expressed by the separator junctions).

6.1 Group *AGGR* of aggregation dependencies

6.1.1 Projective *AGGREGATION* dependencies X_aggr

In these dependencies, X is one of categories: n (nominal aggregation), or a (adjectival), or p (prepositional), or num (numeral), or finally, c (circumstantial/aspectual). G is a member of an aggregate of one of these categories and D is the next its member.

The simplest example of nominal aggregation is shown in **Figure 7** (n_aggr : $G1 = Jean$, $D1 = Paul$, $G2 = Paul$, $D1 = Sophie$). Another example of this dependency may be seen in **Figure 149**. Nominal aggregates may also express semantic “non-membership” as in **Figure 150**. They may also be mixed, positive - negative, as in **Figure 151**. By the way, compare this structure with that in **Figure 172**. This sentence is ambiguous.

In **Figure 152** is shown an adjectival aggregate. An example of a numeral aggregate is given in **Figure 153**. We show two examples of prepositional aggregates in **Figures 154** and **155**. Prepositions may be different as in

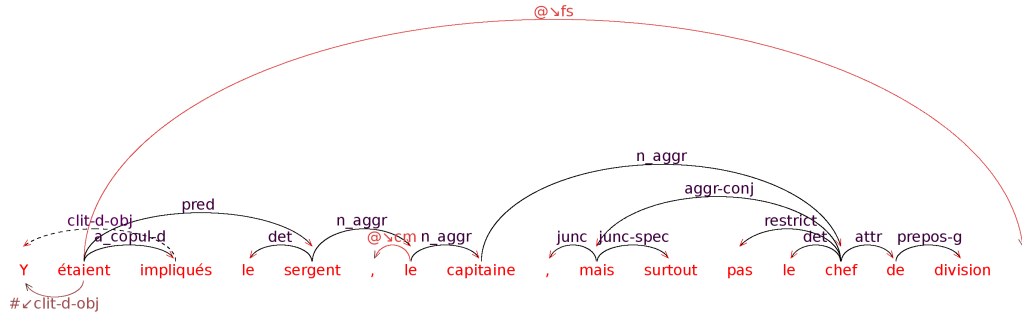


Figure 151: n_aggr : $G1 = sergent$, $D1 = capitaine$; $G2 = capitaine$, $D2 = chef$

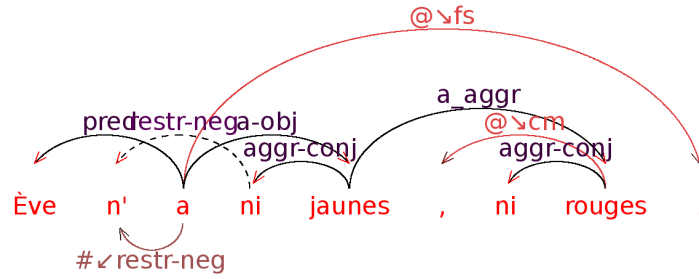


Figure 152: a_aggr : $G = jaunes$, $D = rouges$

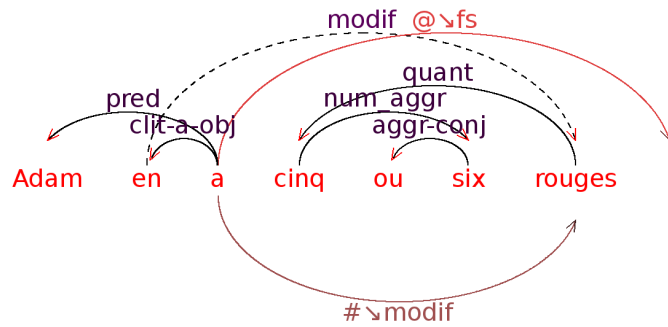


Figure 153: num_aggr : $G = cinq$, $D = six$

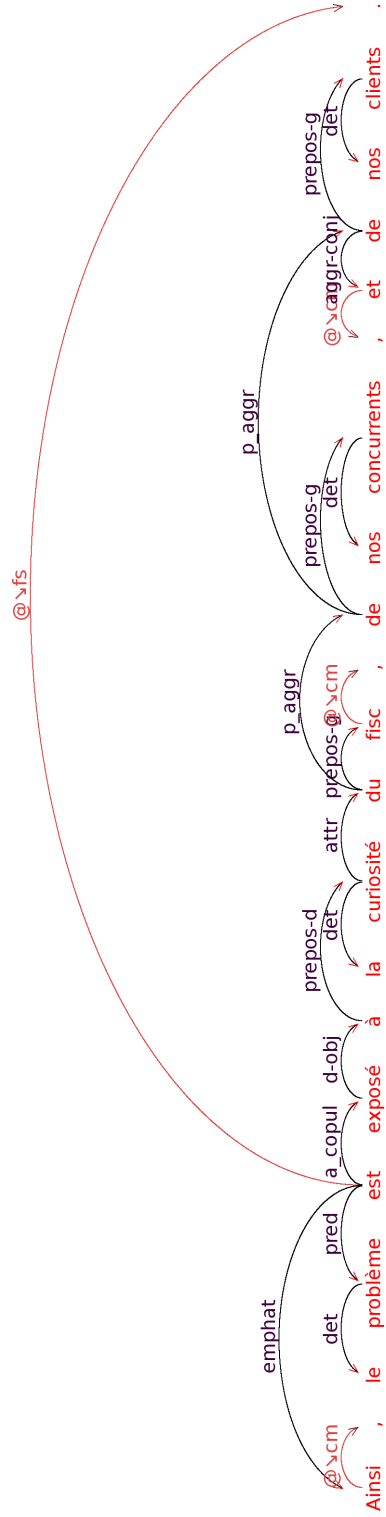


Figure 154: p_aggr : $G1 = du$, $D1 = de$; $G2 = de$, $D2 = de$

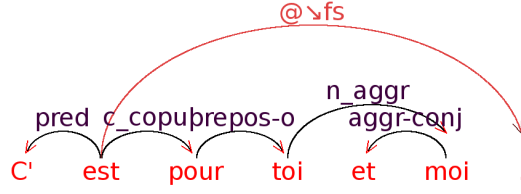


Figure 155: *p_aggr*: $G = \text{pour}$, $D = \text{pour}$

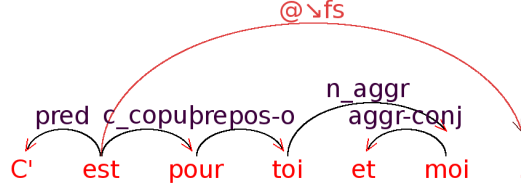


Figure 156: *n_aggr*: $G = \text{toi}$, $D = \text{moi}$

Figure 154 or the same as in **Figure 155**. Compare the analysis in **Figure 155** with that in **Figure 156**, in which a nominal aggregate is used in the place of a prepositional aggregate. In **Figure 157** is given an example of a prepositional aggregate broken by a displaced clause. This example may be compared with that in **Figure 158**, where the clause does not break the aggregate.

6.1.2 Non-projective AGGREGATION dependency *aggr*

This dependency is used in the aggregates split in two parts by a word not belonging to the aggregate. G is the *last* member of the first fragment of the aggregate, D is *first* member of the second fragment of the aggregate. G also serves as the host word for D (i.e. $G = H$).

An example of this dependency is shown in **Figure 159**.

7 Expletive and Emphatic Dependencies

7.1 Group *EXPLET* of expletive dependencies

7.1.1 Projective EXPLETIVE (parenthetical) dependency *explet*

G is a verb, D is the head of a parenthetical clause or phrase (*une incise*). In **Figure 160** is shown the case where the parenthetical phrase follows the main clause. The case where a parenthetical clause splits the main clause is illustrated by **Figure 161**. The case of a parenthetical noun phrase is illustrated by **Figure 162**.

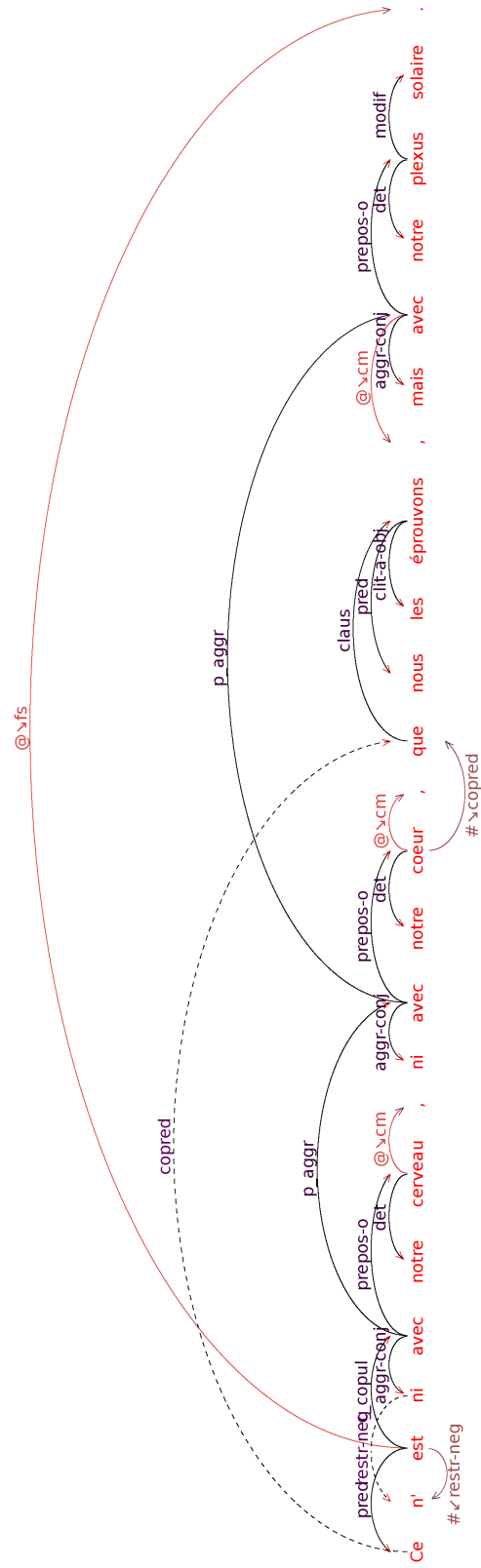


Figure 157: p_aggr : $G = avec$, $D = avec$

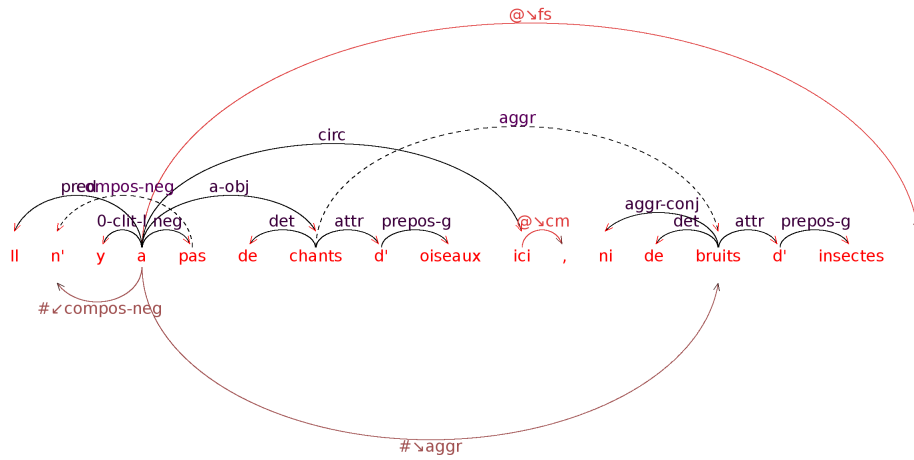


Figure 159: Non-projective *aggr*

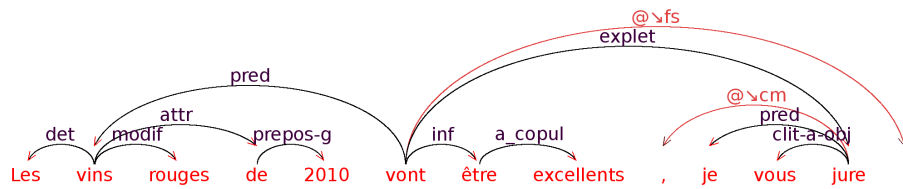


Figure 160: *explet*: $G = vont$, $D = jure$

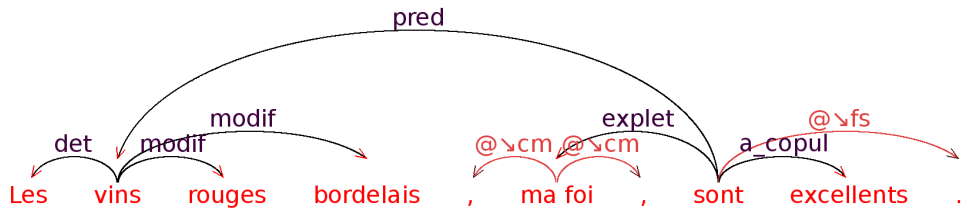


Figure 161: *explet*: $G = sont$, $D = ma foi$

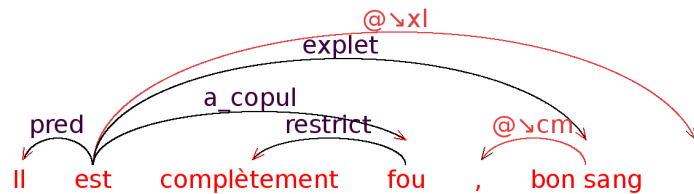


Figure 162: *explet*: $G = est$, $D = bon sang$

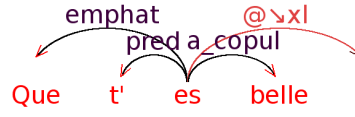


Figure 163: *emphat*: $G = es$, $D = que$

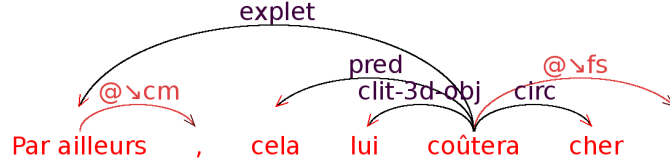


Figure 164: *emphat*: $G = coûtera$, $D = par ailleurs$

7.1.2 Non-projective EXPLETIVE (parenthetical) dependency *explet*

G is a verb. D is the head of a parenthetical clause or phrase. It may be anchored on the main verb or on one of its complements. Examples of this dependency may be seen in **Figure 181** ($G = signe$, $D = dit$, $H = ordre$) and in **Figure 182** ($G = donne$, $D = dit$, $H = accord$).

7.2 Group *EMPHAT* of emphatic dependencies

7.2.1 Projective EMPHATIC dependency *emphat*

G is the main verb, D is an emphatic conjunction, such as *que*, *et*, or an interjection, like *ah bah*, *allez*, *attention*, or an emphatic adverb, such as: *ainsi*, *à savoir* etc. **Figure 163** shows an emphatic conjunction. **Figure 164** shows an emphatic adverb.

7.2.2 Projective INTERROGATIVE-EMPHATIC dependency *qu-emphat*

G is an interrogative conjunction (e.g., *comment*, *où*, *pourquoi*, *quand*, *que*, *qui*, etc.), D is an emphatic post-positive composite lexical unit *est ce que* or *est ce qui*. One example is shown in **Figure 165**. A more complex example is shown in **Figure 166**.

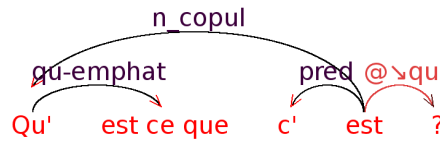


Figure 165: *qu-emphat*: $G = qu'$, $D = est ce que$

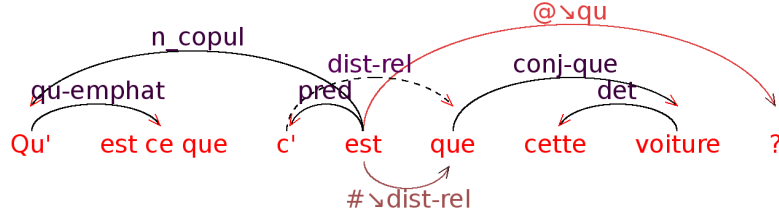


Figure 166: *qu-emphat*: $G = qu'$, $D = est\ ce\ que$

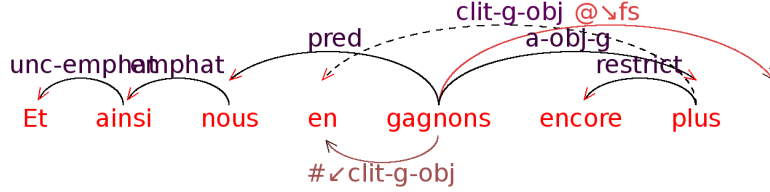


Figure 167: *qu-emphat*: $G = ainsi$, $D = et$

7.2.3 Projective JUNCTION-EMPHATIC dependency *junc-emphat*

G is a junction (e.g., *ensuite*, *et*, *mais*, *même*, *ou*, *par ailleurs*, *par conséquent*, *par contre*, etc.), an adverb or an interjection (*à savoir*, *attention*, *alors*, *au contraire*, *surtout*, *contrairement*, *bah*, etc.) or a noun or a personal pronoun like *toi*. D is an emphatic pre- or post-positive junction or adverb, for instance: *aussi que*, *autant que*, *comme*, *et*, *mais*, *moins que*, *ou*, *plus que*, *que*.

An example of this dependency is shown in **Figure 76** ($G = toi$, $D = et$). One more example is shown in **Figure 167**.

8 Junction and Punctuation Dependencies

8.1 Group *JUNC* of junction dependencies

8.1.1 Projective VERB JUNCTION dependency *coord*

G is a verb and D is a junction separating coordinated verbs, like comma (‘,’), *et*, *mais*, *ou*, etc. The junction dependent on verbs through *coord* may not have a right dependent ‘junction specifier’ dependent through *junc-spec*. So in such combination as *et au contraire*, *au contraire* becomes a left circumstantial modifier of the next coordinated verb. On the contrary, the coordinated nouns (see below) are separated by junctions dependent through *junc*. These junctions may have a right dependent ‘junction specifier’.

See **Figures 36, 47, 48**, where the coordinated verbs govern junctions through *coord*. For instance, in **Figure 47**, $G1 = planter$, $D1 = ‘,’$, $G2 = aroser$, $D1 = et$.

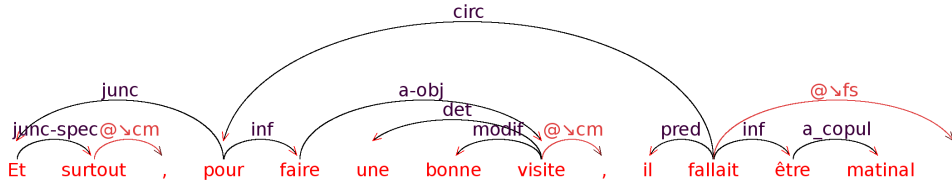


Figure 168: *junc*: $G1 = \text{pour}$, $D1 = \text{et}$; *junc-spec*: $G2 = \text{et}$, $D2 = \text{surtout}$

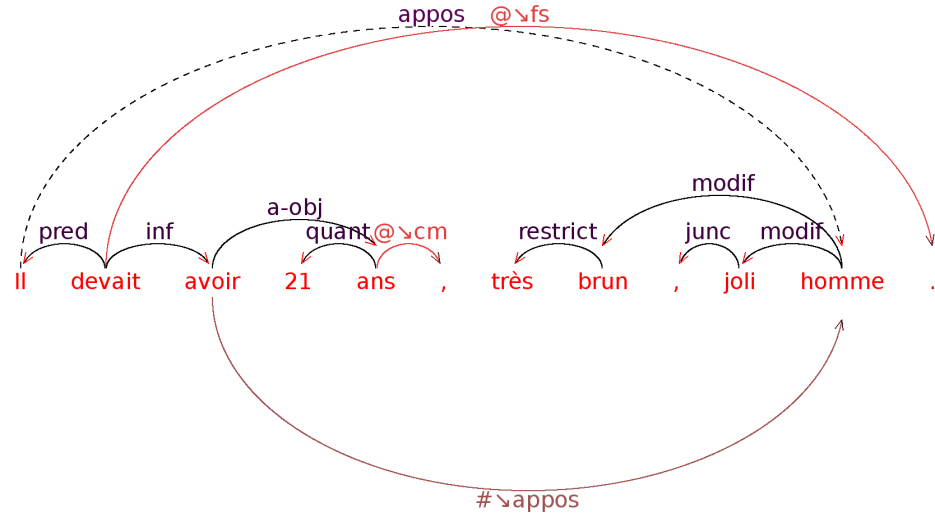


Figure 169: *junc*: $G = \text{joli}$, $D = \text{' , '}$

8.1.2 Projective NONVERBAL JUNCTION dependency *junc*

The subordinate through this dependency D is always a junction like *et*, *mais*, *ou*, *ainsi que*, *au même titre que*, etc. or a punctuation mark (‘,’, ‘:’, ‘-’). These junctions may have a right junction specifier subordinate through dependency *junc-spec*.

As to the governor, there may be at least the following three cases :

Case 1. G is an adjective, an adverb or a preposition subordinate to a word through *circ*, *conj-comme*, *aggr-conj* or *compar*.

Case 2. G is an adjective or a pronoun subordinate through *modif* or *X_copul*.

Case 3. G is a preposition or a pronoun subordinate through *attr* or *X-rel*.

Figure 168 illustrates case 1. It is also an example of dependency structure with both dependencies *junc* and *junc-spec*.

Figure 169 is an example of case 2. Finally, **Figure 170** is an example of case 3.

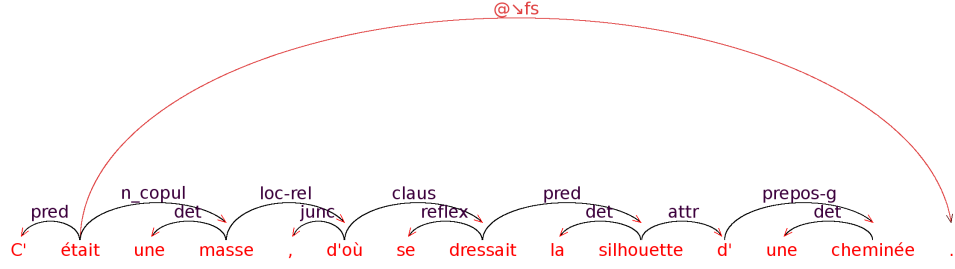


Figure 170: *junc*: $G = d'où$, $D = ','$

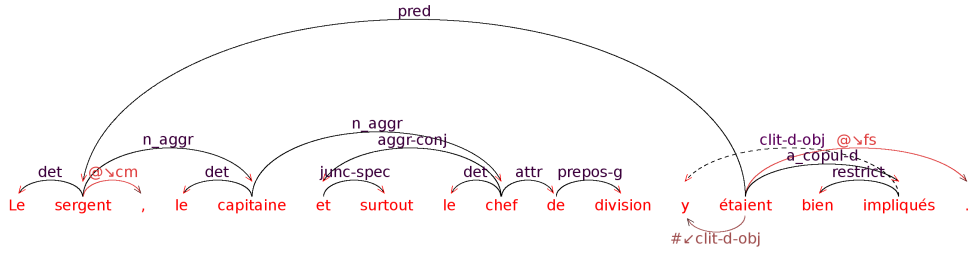


Figure 171: *junc*: $G1 = capitaine$, $D1 = ','$, $G2 = chef$, $D2 = et$

8.1.3 Projective JUNCTION SPECIFIER dependency *junc-spec*

G is a nonverbal junction (*et*, *mais*, *ou*, etc.), D is an adverb strengthening or specifying it (e.g., *alors*, 'au contraire', 'au moins', *aussi*, etc.). See **Figure 171** (*junc-spec*: $G = et$, $D = surtout$) and also the example in **Figure 172**.

8.1.4 Projective AGGREGATION-JUNCTIVE dependency *aggr-conj*

G is a member of an aggregate, D is a separator conjunction or a punctuation mark. All examples of aggregates above also show this dependency *aggr-conj*. For instance, in **Figure 150** (*aggr-conj*: $G1 = un$, $D1 = ni$, $G2 = autre$, $D2 = ni$), in **Figure 151** (*aggr-conj*: $G = chef$, $D = mais$).

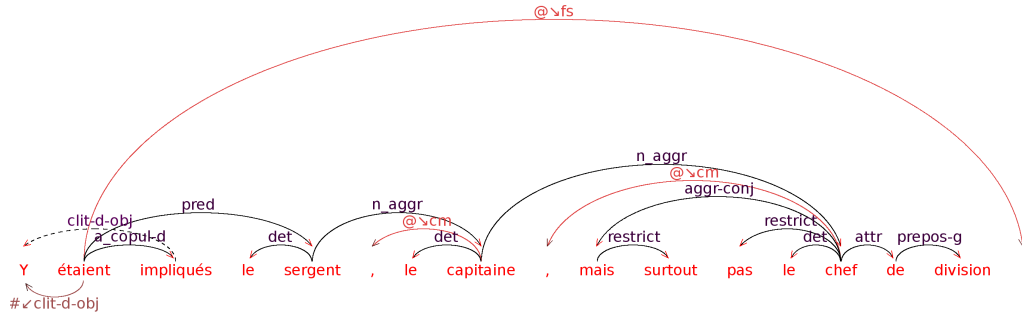


Figure 172: *junc-spec*: $G = mais$, $D = pas$

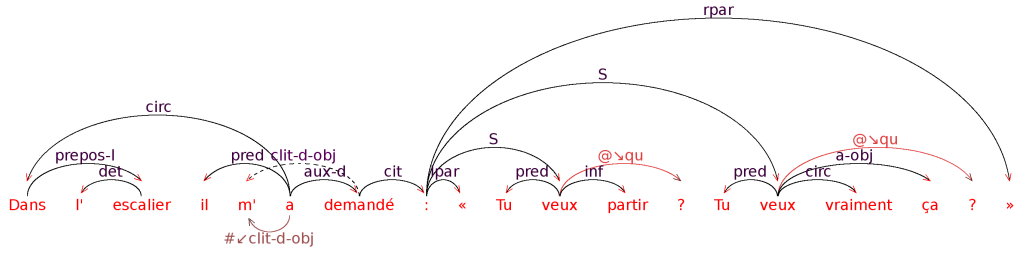


Figure 173: *cit*: $G = demandé$, $D = ':'$

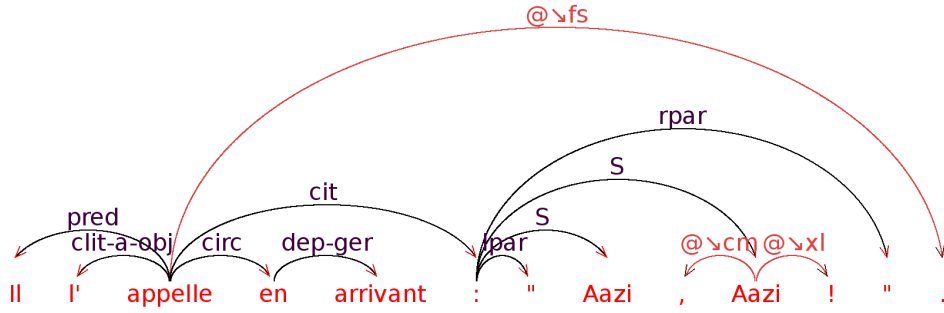


Figure 174: *cit*: $G = appelle$, $D = ':'$

8.1.5 Projective CITATION JUNCTIVE dependency *cit*

cit serves to relate verbs with a punctuation mark or a junction separating the verb from a cited clause or sentence or even a number of sentences cited as a whole unit.

G is the verb, D is the punctuation mark / junction.

In **Figure 173** and in **Figure 174** we show the case where D is on the right of G . In the former, the cited sentences are complete, in the latter they collapse to a vocative proper name. In **Figure 175** D is on the left of G .

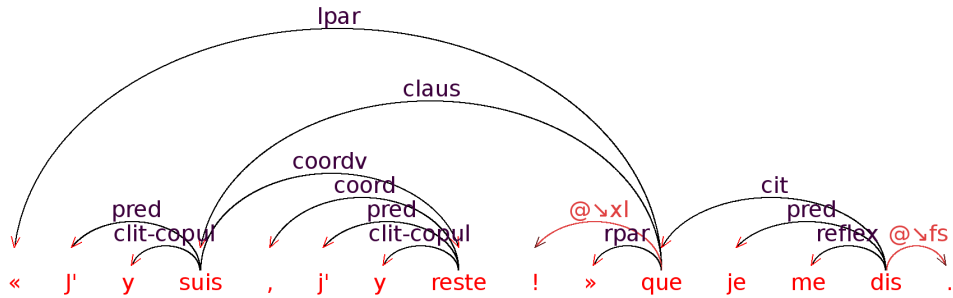


Figure 175: *cit*: $G = dis$, $D = que$

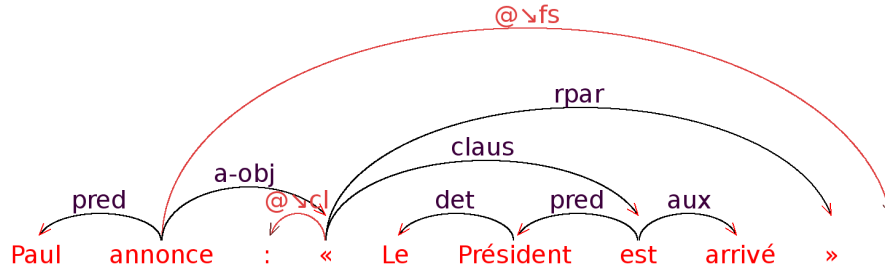


Figure 176: *a-obj*: $G1 = annonce$, $D1$ is the left chevron; *rpar*: $G2$ is left chevron, $D2$ is right chevron

8.2 Group *PUNCT* of punctuation dependencies

8.2.1 Projective PUNCTUATION dependencies

There are twelve main punctuation dependencies in CDG of French: $@\backslash fs$: full stop, $@\backslash qu$: question mark, $@\backslash xl$: exclamation mark, $@\backslash cl$: colon, $@\backslash ds$: dash, $@\backslash sc$: semicolon, $@\backslash dq$: double quote, $@\backslash lp$: left parenthesis, $@\backslash rp$: right parenthesis, $@\backslash cg$: left chevron, $@\backslash cd$: right chevron, $@\backslash cm$: comma. Above, we have seen many examples using the dependencies $@\backslash fs$, $@\backslash qu$, $@\backslash xl$, $@\backslash cm$. There are also two more general dependencies *lpar* (left marker) and *rpar* (right marker) which serve to mark out direct speech, citations or lexical units with figurative meaning: For *lpar*: G is the head of the marked construction (a verb, a noun) and D is the left chevron or the double quote or the dash. For *rpar*: G is either the same as for *lpar* or it is the left chevron (double quote or dash). D is the right chevron or the double quote or the dash.

Below we show several dependency structures in which these punctuation dependencies mark for apposition and direct speech. First, we show continuous (i.e. not split by expletive clauses) intra-sentential citations/direct speech. Then we will show discontinuous constructions.

Figure 176 illustrates the general way of marking out continuous direct speech or citations. In this example, the left chevron depends on the main verb through dependency *a-obj* whereas the corresponding right chevron depends on it through *rpar*. The order may also be inverse as it is shown in **Figure 177**. Citations/direct speech may also be marked out using double quotes and dashes. Moreover, it may also be just separated by commas (see examples in the next Subsection).

The next examples illustrate the use of parenthesis dependencies. In **Figure 178** illustrates left parenthesis dependency $@\backslash lp$ and right parenthesis dependency $@\backslash rp$ marking out a phrase in apposition to a common noun. In **Figure 179** is shown a similar example where the phrase marked out by parentheses is in apposition to a proper name. A more complex example is shown in **Figure 180**, where parentheses mark out several appositive

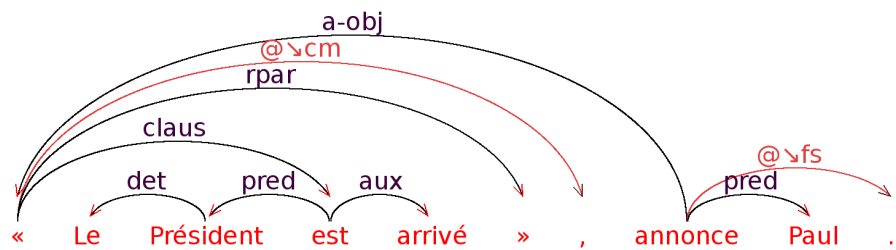


Figure 177: Citation preceding the main verb

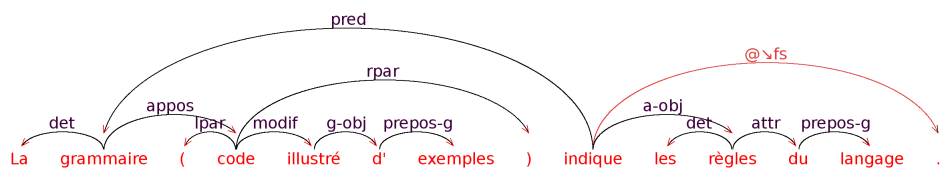


Figure 178: $@\backslash lp: G = code, D1 = '(\text{'}; @\backslash rp: D2 = ')$

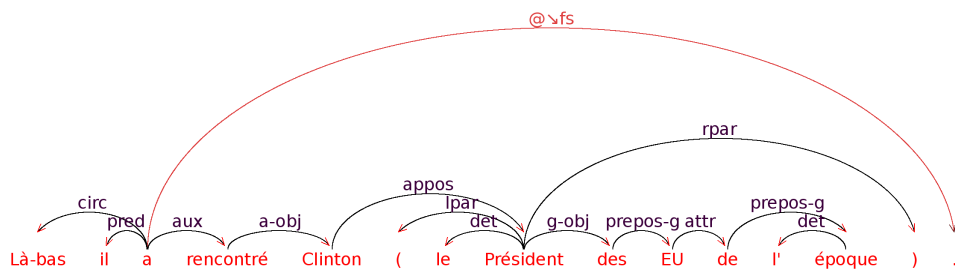


Figure 179: $@\backslash lp: G = Président, D1 = '(\text{'}; @\backslash rp: D2 = ')$

phrases related between them through aggregate dependencies.

8.2.2 PUNCTUATION dependencies in discontinuous citation/direct speech

Direct speech and citations may also be split by an incorporated expletive clause introduced using the non-projective dependency *explet* as it is shown in **Figure 181** where the direct speech is marked out by chevrons. Cf. the analysis shown in **Figure 182** where the direct speech is marked out by double quotes. Moreover, discontinuous citations and direct speech may be just separated by commas as it is shown in **Figure 183**.

9 Special dependencies

9.1 GROUP *PREFIXA* of prefix-attributive dependencies

9.1.1 Projective PREFIX-ATTRIBUTIVE dependency *pre-attr*

G is an adverb or an adjective, *D* is a prefix adverb (like *co-*, *ante-*, *contre-*, *quasi-*) joined to *G* with the dash. A typical example of this dependency is shown in **Figure 184**.

9.2 GROUP *DEICT* of deictive dependencies

9.2.1 Projective DEICTIC Dependency *deict*

G is a noun, a demonstrative pronoun, a numeral or an adjective, *D* is one of two attached deictic pronouns *-ci* or *-là*.

In **Figure 185**, one can see the case where the governors are demonstrative pronouns. In **Figure 186** is shown the case where the governor is a noun.

10 Acknowledgements

It is my pleasure to thank Danièle Beauquier for numerous influencing discussions of many of these dependencies and dependency structures and Denis Béchet for sharing much practical work on this text and especially for implementing the advanced linguist’s interface of CDG Lab. Without them, this document would hardly ever be completed.

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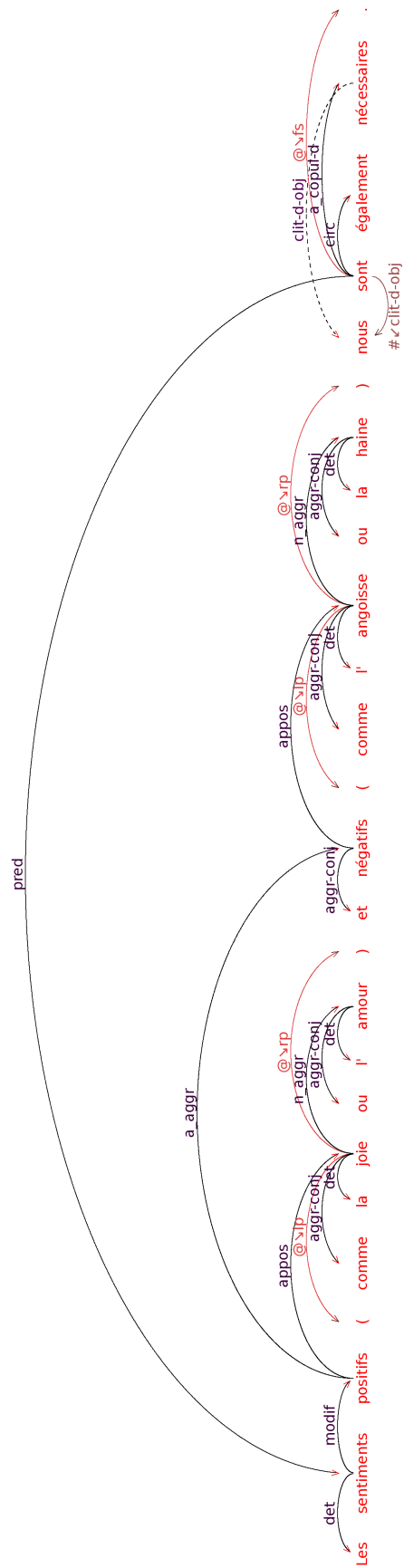


Figure 180: Combination of aggregation and appositive dependencies

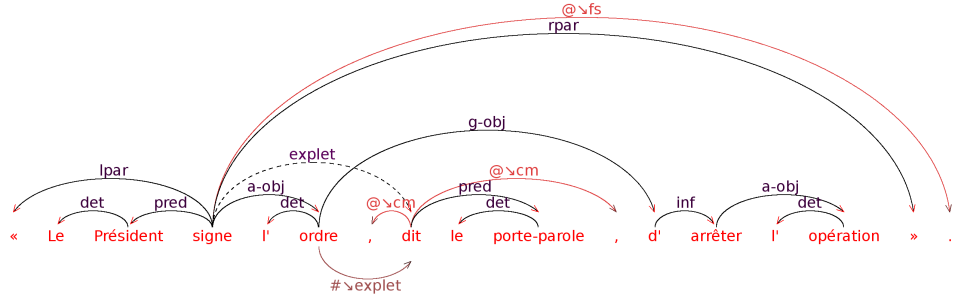


Figure 181: *lpar*: $G1 = \text{signe}$, $D1 = \text{left chevron}$; *rpar*: $G2 = \text{signe}$, $D2 = \text{right chevron}$

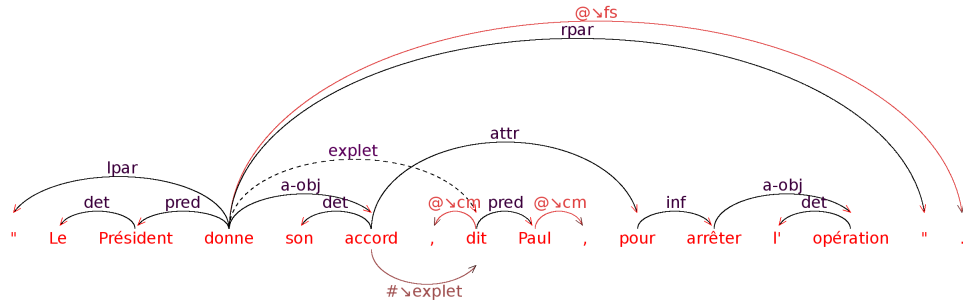


Figure 182: Direct speech in quotes including an expletive phrase

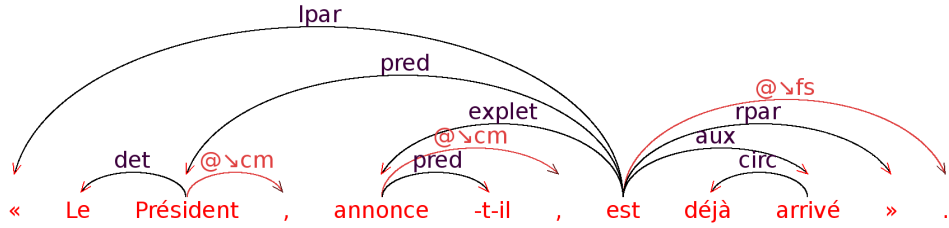


Figure 183: Non marked direct speech split by an expletive phrase

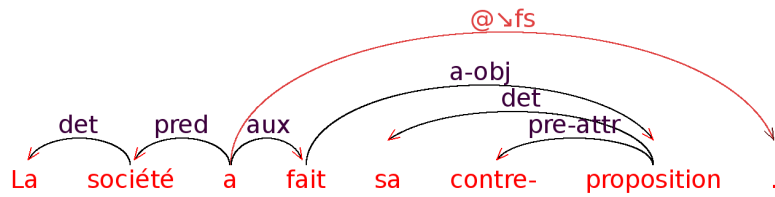


Figure 184: *pre-attr*: $G = \text{proposition}$, $D = \text{contre-}$

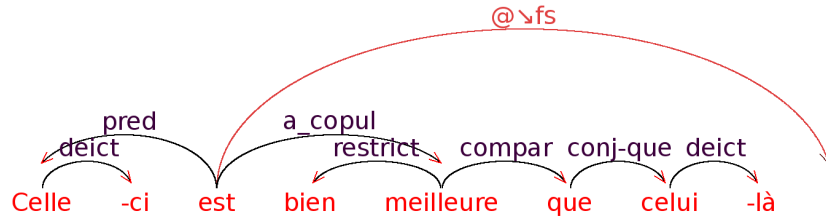


Figure 185: *pre-attr*: $G1 = \text{celle}$, $D1 = -ci$, $G2 = \text{celui}$, $D2 = -là$

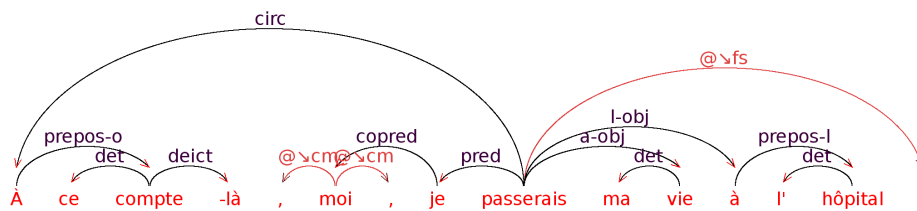


Figure 186: *pre-attr*: $G = \text{compte}$, $D = \text{-là}$

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