Chapter 13

Control and Raising

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1 Introduction

The distinction between raising and control predicates has been a hallmark of syntactic theory since Postal (1974). Contrary to transformational analyses, HPSG treats the difference as mainly a semantic one: Raising verbs (*seem, begin, start*) do not semantically select their subject (or object) nor assign them a semantic role, while control verbs (*want, promise, try*) semantically select all their syntactic arguments. On the syntactic side, raising verbs share their subject (or object) with the subject of their non finite complement while control verbs only coindex them. The distinction is also relevant for non verbal predicates such as adjectives (*likely* vs *eager*). We will see how the raising analysis naturally extends to copular constructions (*become, expect*) and auxiliary verbs.

2 The distinction between control and raising predicates

2.1 Obligatory and arbitrary control

Verbs taking non finite complements usually determine the interpretation of the missing subject of the non finite verb. With *promise*, the subject is understood as the subject of the infinitive, while with *permit* it is the object, as shown by the reflexives. In (1a) the controller is the main verb subject, while it is the object in (1b).

(1) a. John promised Mary to buy himself / * herself a coat.

b. John permitted Mary to buy herself/*himself a coat.

c. Buying a coat can be expensive.

This is 'obligatory' control, or 'equi', while other constructions in which the missing subject remains vague (1c) are called 'arbitrary' control (Bresnan 1982). Verbs taking such non finite complements may also take nominal or sentential complements. For a discussion whether constructions such as 1a, 1b involve some form of sentential complement or a VP, see below.

(2)   John promised Mary a book/ that she will be rewarded.

2.2 Control verbs and semantic classes

Following Pollard & Sag (1992) (see also Jackendoff & Culicover 2003), the choice of the controler is determined by the semantic class of the verb. Verbs of influence (*permit, forbid*) are object-control while verbs of commitment (*promise, try*)(3a) and orientation (*want, hate*)(3b) are subject-control, as shown by the reflexive in the following examples.

(3)   a. John promised Mary to buy himself / * herself a coat.

b. John permitted Mary to buy herself/ * himself a coat.

The classification of control verbs is cross-linguistically widespread (Van Valin & LaPolla 1997), but Romance verbs of mental representation and speech report are an exception in being subject-control without having a commitment or an orientation component.

(4)   a. Marie dit   ne pas être convaincue.
          Mary says NEG   be   convinced
          'Mary says she is not convinced.'

b. Paul pensait avoir compris.
          Paul thought have understood
          'Paul thought he understood.'

As shown by Bresnan (1982), who attributes the generalization to Visser, object-control verbs may passivize (and become subject-control) while subject-control verbs do not (with a verbal complement).

(5)   a. Mary was persuaded to leave (by John)

b. * Mary was promised to leave (by John)

2.3 Raising constructions

Another type of verbs also takes a non finite complement and identifies its subject (or its object) with the missing subject of the non finite verb. Since Postal (1974), they are called 'raising' verbs. Verbs like *seem* (6a) are subject-raising, while causative and perception verbs like *expect* (6b) are object-raising.

(6) a. John seemed to like himself

b. John expected Mary to buy herself/ * himself a coat

A number of syntactic and semantic tests show how they differ for subject-control and object-control verbs, respectively. As observed by Jacobson (1990), control verbs may allow for a null complement, or a non verbal complement, while raising verbs may not (but She just started. is fine):

(7) a. Leslie wants this/ a raise.

b. Leslie tried.

c. *Leslie seemed.

d. *Leslie seemed this.

Different tests show that the subjet (or the object) of a raising verb is only selected by the non finite verb. Let us first consider non referential subjects : meteorological *it* is selected by predicates such as *rain*. It can be the subject of *start, seem*, but not of *try,want*. It can be the object of *expect, believe* but not of *force, persuade*.

(8) a. It rains

b. It seems/started to rain

c. We expect it to rain tomorrow

(9) a. *It wants/tries to rain

b. *The sorcier forced it to rain

The same contrast holds with an idiomatic subject such *the cat* in the expression *the cat is out of the bag* (the secret is out). It can be the subject of *seem* or the object of *expect*, with its idiomatic meaning. If it is the subject of *want*, or the object of *persuade*, the idiomatic meaning is lost and only the literal meaning remains.

(10) a. The cat is out of the bag

b. The cat seems to be out of the bag

c. We expected the cat to be out of the bag

d. # The cat wants to be out of the bag (non idiomatic)

e. # We persuaded the cat to be out of the bag (non idiomatic)

From a cross-linguistic point of view, raising verbs usually belong to other semantic classes than control verbs. The distinction between subject-raising and control-raising also has some semantic basis: verbs marking tense, aspect, modality (*start, cease, keep*) are subject-raising, while causative and perception verbs (*let, see*) are usually object-raising:

(11)   a. John started to like himself

b. John let Mary buy herself/*himself a coat

2.4 The problems with a 'raising' analysis

Transformational analyses posit two distinct 'deep structures': subject-raising verbs select a sentential complement (and no subject), while subject-control verbs select a subject and a sentential complement (Postal 1974; Chomsky 1981). They also posit three distinct rules: A movement rule for 'raising' the subject of *seem* verbs (the embedded clause's subject move to the position of matrix verb subject); An exceptional case marking (ECM) rule for assigning case to the embedded clause's subject of *expect* verbs); A co-indexing rule between the empty subject (PRO) of the infinitive and the subject (*promise*) or the object (*persuade*) of the matrix verb for control verbs. In this approach, both control and raising verbs have a sentential complement, but while the embedded subject is a PRO with control verbs, it is the trace left by 'raising' or a full NP with raising verbs

(12)   a. subject-raising: $[_{NP}e\,]$ seems $[_S$ John to leave $]\rightsquigarrow[_{NP}$John$_i\,]$ seems $[_S$ e_i to leave $]$

b. subject-control: $[_{NP}$John$_i\,]$ wants $[_S$ PRO$_i$ to leave $]$

(13)   a. object-raising (ECM): We expected $[_S$ John to leave $]$

b. object-control: We persuaded $[_{NP}$John$_i\,]$ $[_S$ PRO$_i$ to leave $]$

As observed by Bresnan (1982) and Sag & Pollard (1991), the putative correspondence between source and target for raising structures is not systematic: *seem* may take a sentential complement (with an expletive subject) but the other subject-raising verbs (aspectual and modal verbs) do not.

(14)   a. Paul seems to understand

b. It seems [that Paul understands]

(15) a. Paul started to understand

b. *It started [that Paul understands]

Similarly, while some object-raising verbs (*expect, see*) may take a sentential complement, others do not (*let, make, prevent*).

(16) a. We expect Paul to understand

b. We expect [that Paul understands]

(17) a. We let Paul sleep

b. * We let [that Paul sleeps]

Even when a finite sentential complement is attested with a raising verb, it is not the same structure as with a non finite complement. Heavy NP shift is possible with a non finite complement, and not with a sentential complement Bresnan (1982): this shows that *expect* has two complements in 2 and only one in 1.

(18) a. We expected [to understand] [all those who attended the class]

b. * We expected that understand [all those who attended the class]

Fronting also shows that the NP VP sequence does not behave as a single constituent, contrary to the finite complement:

(19) a. That Paul understood, I did not expect.

b. * Paul to understand, I did not expect.

Furthermore, if the subject of the non finite verb is supposed to raise to receive case from the matrix verb, we expect it to be nominative. But the subject of *seem* or *start* need not be in the nominative since it can be a verbal subject.

(20)   Drinking one liter of water each day s
       eems to benefit your health

Data from languages with 'quirky' case such as Icelandic, also show this prediction not to be borne out. Subjects of raising verbs in fact keep the quirky case assigned by the embedded verb in Icelandic (Zaenen et al. 1985), contrary to the subject of subject control verbs which are in the nominative. A verb like *need* takes an accusative subject, and a raising verb (*seem*) takes an accusative suject as well when combined with *need* (21b). With a control verb (*hope*), on the other hand, the subject must be nominative (21c.

(21)   a.   Mig   vantar peninga
            I-ACC need   money-ACC

       b.   Mig   virdast vanta peninga
            I-ACC seem   need money-ACC

       c.   Eg   vonast till ad vanta ekki peninga
            I-NOM hope   for to need not money-ACC
            'I hope I won't need money'

Turning now to object-raising verbs, the subject of the non finite verb has all properties of an object of the matrix verb. It is an accusative in English (*him, her*) and it can passivize, like the object of an object-control verb (23).

(22)   a.   We expect him to understand
       b.   We persuaded him to work on this

(23)   a.   Paul was expected to understand
       b.   Paul was persuaded to work on that

To conclude, the movement-based raising analysis for subject-raising verbs, as well as the ECM analysis of object-raising verbs is motivated by semantic considerations: an NP which receives a semantic role from a verb should be a syntactic argument of this verb. But it leads to syntactic structures which are not motivated and/or make wrong empirical predictions.

3 An HPSG analysis

3.1 Coindexing or full sharing?

In a nutshell, the HPSG analysis rests on a few leading ideas: Non finite complements are unsaturated VPs (a verb phrase with a non empty SUBJ list); A syntactic argument need not be assigned a semantic role; Control and raising verbs have the same syntactic arguments; Raising verbs do not assign a semantic role to all their syntactic arguments. We continue to use the term 'raising', but it is just a cover term, since no raising is taking place in HPSG analyses.

As a result, Control supposes identity of semantic indices (discourse referents) while Raising means identity of *synsem*s. Co-indexing is compatible with the controler and the controled subject not bearing the same case (21c) or having different parts of speech (24). This would not be possible with raising verbs, where there is full sharing of syntactic and semantic features between the subject (or the object) of the matrix verb and the (expected) subject of the non finite verb.

(24) Paul appealed [to Mary] to stay.

Subject-raising-verbs (and object-raising verbs) can be defined as subtypes inheriting from verb-lexeme and subject-raising- (or object raising-) lexeme types.
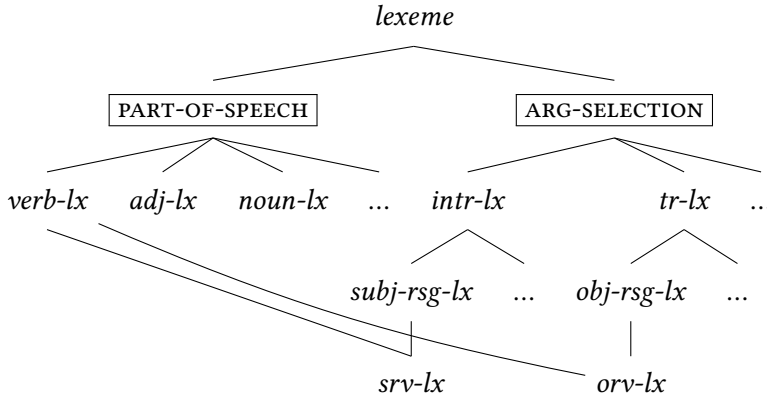

Figure 1: A type hierarchy for subject- and object-raising verbs

As in Elements and properties Chapter, upper case letters are used for the two dimensions of classification, and *verb-lx*, *intr-lx*, *tr-lx*, *subj-rsg-lx*, *obj-rsg-lx*, *orv-lx* and *srv-lx* abbreviate *verb-lexeme*, *intransitive-lexeme*, *transitive-lexeme*, *subject-raising-lexeme*, *object-raising-lexeme*, *object-raising-verb-lexeme* and *subject-raising-verb-lexeme*, respectively. Constraints on types *subj-rsg-lx* and *obj-rsg-lx* are as follows:[1]

(25) *subj-rsg-lx* $\rightarrow$ $\left[\text{ARG-ST}\ \left\langle \boxed{1}, \left[\text{SUBJ}\ \left\langle \boxed{1} \right\rangle\right]\right\rangle\right]$

(26) *obj-rsg-lx* $\rightarrow$ $\left[\text{ARG-ST}\ \left\langle \boxed{0}, \boxed{1}, \left[\text{SUBJ}\ \left\langle \boxed{1} \right\rangle\right]\right\rangle\right]$

Similary, for control verbs, subject-cont-lx and object-cont-lx types can be defined as follows:

(27) *subj-cont-lx* $\rightarrow$ $\left[\text{ARG-ST}\ \left\langle \text{NP}_{\boxed{i}}, \left[\text{SUBJ}\ \left\langle \left[\text{IND}\ \boxed{i}\right]\right\rangle\right]\right\rangle\right]$

(28) *obj-cont-lx* $\rightarrow$ $\left[\text{ARG-ST}\ \left\langle \boxed{0}, \boxed{1}\left[\text{IND}\ \boxed{i}\right], \left[\text{SUBJ}\ \left\langle \left[\text{IND}\ \boxed{i}\right]\right\rangle\right]\right\rangle\right]$

---

[1]The category of the complement is not specified as a VP since the same lexical types will also be used for copular verbs that take non verbal predicative complements, see next section.

Thus a subject-raising verb (*seem*) and a subject-control verb (*want*) inherit from *subj-rsg-v* and *subj-cont-v* respectively; their entries look as follows:

(29) *seem* →
$$
\begin{bmatrix}
\text{SUBJ} & \langle \boxed{1} \rangle \\[4pt]
\text{COMPS} & \left\langle \text{VP} \begin{bmatrix} \text{HEAD} & [\text{VFORM} \;\; \textit{inf}] \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{CONT} & [\text{IND} \;\; \boxed{2}] \end{bmatrix} \right\rangle \\[4pt]
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{seem-rel} \\ \text{ARG} \;\; \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

(30) *want* →
$$
\begin{bmatrix}
\text{SUBJ} & \langle \text{NP}_{\boxed{i}} \rangle \\[4pt]
\text{COMPS} & \left\langle \text{VP} \begin{bmatrix} \text{HEAD} & [\text{VFORM} \;\; \textit{inf}] \\ \text{SUBJ} & \langle [\text{IND} \;\; \boxed{i}] \rangle \\ \text{CONT} & [\text{IND} \;\; \boxed{2}] \end{bmatrix} \right\rangle \\[4pt]
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{want-rel} \\ \text{EXP} \;\; \boxed{i} \\ \text{ARG} \;\; \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

The corresponding simplified trees are as follows. Notice that the syntactic structures are the same.
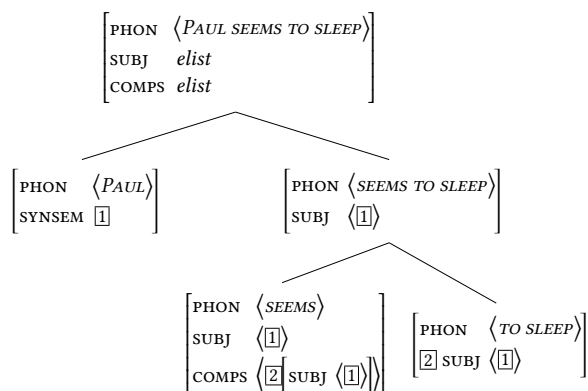
Figure 2: A sentence with a subject-raising verb

An object-raising verb (*expect*) and an object-control verb (*persuade*) inherit from *obj-rsg-v* and *obj-cont-v* respectively. Their lexical entries look as follows:
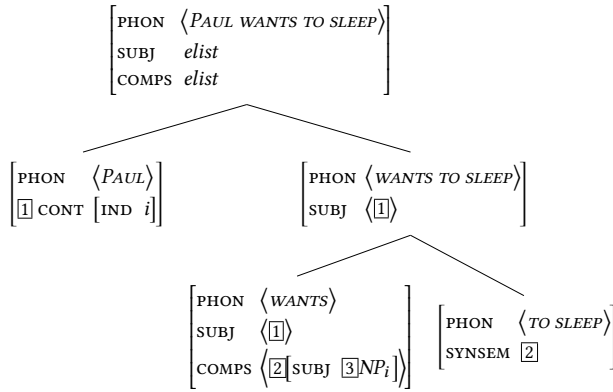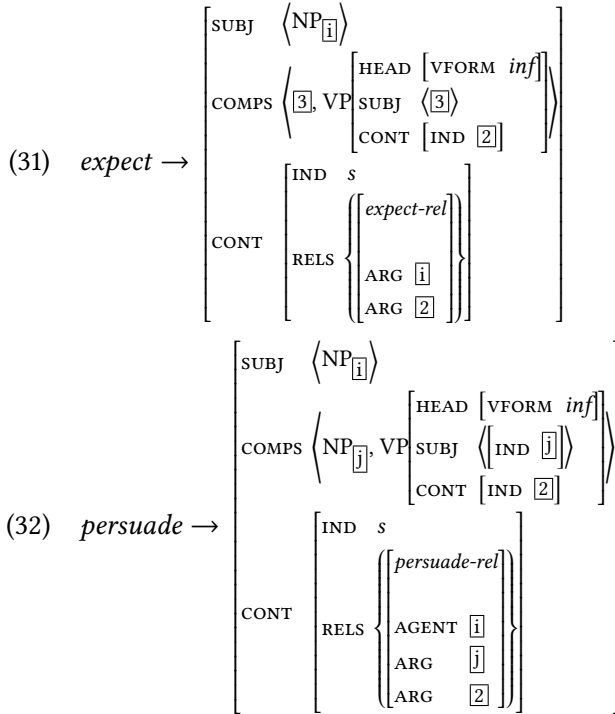
$$
\begin{bmatrix}
\text{PHON} & \langle \textit{PAUL WANTS TO SLEEP} \rangle \\
\text{SUBJ} & \textit{elist} \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\fbox{1}\begin{bmatrix}
\text{PHON} & \langle \textit{PAUL} \rangle \\
\text{CONT} & [\text{IND} \quad i]
\end{bmatrix}
\qquad
\begin{bmatrix}
\text{PHON} & \langle \textit{WANTS TO SLEEP} \rangle \\
\text{SUBJ} & \langle \fbox{1} \rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle \textit{WANTS} \rangle \\
\text{SUBJ} & \langle \fbox{1} \rangle \\
\text{COMPS} & \langle \fbox{2}[\text{SUBJ} \ \fbox{3}NP_i] \rangle
\end{bmatrix}
\qquad
\begin{bmatrix}
\text{PHON} & \langle \textit{TO SLEEP} \rangle \\
\text{SYNSEM} & \fbox{2}
\end{bmatrix}
$$

Figure 3: A sentence with a subject-control verb

(31) *expect* →
$$
\begin{bmatrix}
\text{SUBJ} & \langle NP_{\fbox{i}} \rangle \\
\text{COMPS} & \left\langle \fbox{3}, VP\begin{bmatrix} \text{HEAD} & [\text{VFORM} \ \textit{inf}] \\ \text{SUBJ} & \langle \fbox{3} \rangle \\ \text{CONT} & [\text{IND} \ \fbox{2}] \end{bmatrix} \right\rangle \\
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{expect-rel} \\ \\ \text{ARG} \ \fbox{i} \\ \text{ARG} \ \fbox{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

(32) *persuade* →
$$
\begin{bmatrix}
\text{SUBJ} & \langle NP_{\fbox{i}} \rangle \\
\text{COMPS} & \left\langle NP_{\fbox{j}}, VP\begin{bmatrix} \text{HEAD} & [\text{VFORM} \ \textit{inf}] \\ \text{SUBJ} & \langle [\text{IND} \ \fbox{j}] \rangle \\ \text{CONT} & [\text{IND} \ \fbox{2}] \end{bmatrix} \right\rangle \\
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{persuade-rel} \\ \\ \text{AGENT} & \fbox{i} \\ \text{ARG} & \fbox{j} \\ \text{ARG} & \fbox{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

The corresponding trees are as follows. Notice that the syntactic structures are the same.

Sag & Pollard (1991) propose a semantic-based control theory. The semantic class of the verb determines whether it is subject-control or object-control: verbs
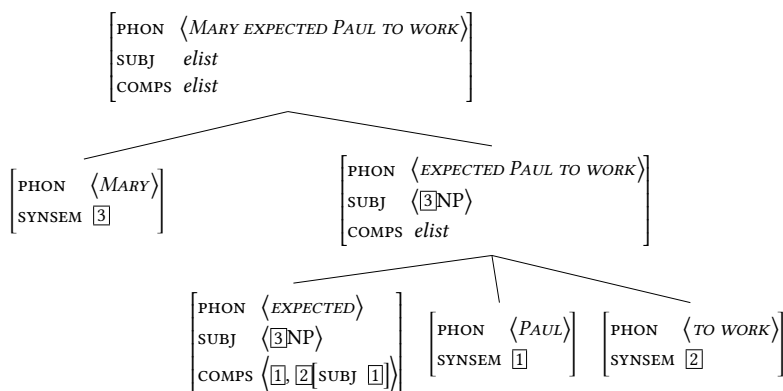
$$
\begin{bmatrix}
\text{PHON} & \langle\textit{MARY EXPECTED PAUL TO WORK}\rangle \\
\text{SUBJ} & \textit{elist} \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle\textit{MARY}\rangle \\
\text{SYNSEM} & \boxed{3}
\end{bmatrix}
\qquad
\begin{bmatrix}
\text{PHON} & \langle\textit{EXPECTED PAUL TO WORK}\rangle \\
\text{SUBJ} & \langle\boxed{3}\text{NP}\rangle \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle\textit{EXPECTED}\rangle \\
\text{SUBJ} & \langle\boxed{3}\text{NP}\rangle \\
\text{COMPS} & \langle\boxed{1}, \boxed{2}[\text{SUBJ } \boxed{1}]\rangle
\end{bmatrix}
\quad
\begin{bmatrix}
\text{PHON} & \langle\textit{PAUL}\rangle \\
\text{SYNSEM} & \boxed{1}
\end{bmatrix}
\quad
\begin{bmatrix}
\text{PHON} & \langle\textit{TO WORK}\rangle \\
\text{SYNSEM} & \boxed{2}
\end{bmatrix}
$$

Figure 4: A sentence with an object-raising verb

$$
\begin{bmatrix}
\text{PHON} & \langle\textit{MARY PERSUADED PAUL TO WORK}\rangle \\
\text{SUBJ} & \textit{elist} \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle\textit{MARY}\rangle \\
\text{SYNSEM} & \boxed{3}
\end{bmatrix}
\qquad
\begin{bmatrix}
\text{PHON} & \langle\textit{PERSUADED PAUL TO WORK}\rangle \\
\text{SUBJ} & \langle\boxed{3}\text{NP}\rangle \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle\textit{PERSUADED}\rangle \\
\text{SUBJ} & \langle\boxed{3}\text{NP}\rangle \\
\text{COMPS} & \langle\boxed{1}, \boxed{2}[\text{SUBJ } \boxed{4}NP_i]\rangle
\end{bmatrix}
\quad
\begin{bmatrix}
\text{PHON} & \langle\textit{PAUL}\rangle \\
\boxed{1} \text{ CONT} & [\text{IND } i]
\end{bmatrix}
\quad
\begin{bmatrix}
\text{PHON} & \langle\textit{TO WORK}\rangle \\
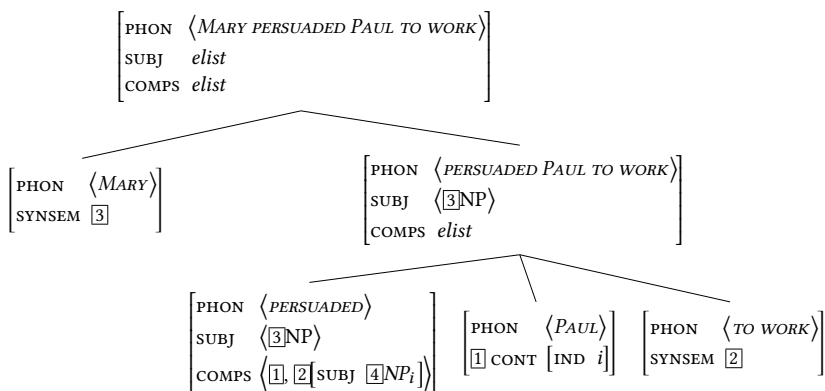\text{SYNSEM} & \boxed{2}
\end{bmatrix}
$$

Figure 5: A sentence with an object-control verb

of comitment and verbs of influence have a semantic content such as the following, with SOA meaning state-of-affair and denoting the content of the non finite complement:

$$
(33) \quad \textit{promise} \rightarrow
\begin{bmatrix}
\textit{PROMISE-REL} \\
\text{COMMITTER} & \boxed{1} \\
\text{COMMITTEE} & \boxed{2} \\
\text{SOA} &
\begin{bmatrix}
\text{RELATION} \\
\text{ARG} & \boxed{1}
\end{bmatrix}
\end{bmatrix}
$$

(34) *persuade* → $\begin{bmatrix} \textsc{persuade-rel} \\ \textsc{influencer} & \boxed{1} \\ \textsc{influenced} & \boxed{2} \\ \textsc{soa} & \begin{bmatrix} \textsc{relation} \\ \textsc{arg} & \boxed{2} \end{bmatrix} \end{bmatrix}$

To account for Visser's generalization (object-control verbs passivize while subject-control verbs do not), Sag & Pollard (1991) analyse the missing subject of the infinitive as a reflexive, which must be bound by the controler. According to binding theory (see chapter on binding theory), the controler must be less oblique than the reflexive, hence less oblique than the controlled complement which contains the reflexive: the controler can be the subject and the VP a complement as in 35a; it can be the first complement when the VP is the second complement as in (35b), but it cannot be a by-phrase, which is more oblique than the VP complement, as in (35c).

(35)   a.   Kim was persuaded to leave (by Lee)
       b.   Lee persuaded Kim to leave
       c.   *Kim was promised to leave (by Lee)

Thus, the ungrammaticality of 35c is predicted by the binding theory (Lee should not be bound according to principle C, and the subject of *leave* should be bound according to principle A).

Turning now to raising verbs, they exhibit some kind of mismatch between syntactic arguments and semantic arguments: the raising verb has a subject or an object which is not one of its semantic arguments (it does not appear in the CONT feature of the raising verb). To constrain this type of mismatches, Pollard & Sag (1994: 140)propose a Raising principle.

(36)   Raising Principle: Let X be a non expletive element subcategorized by Y, X is not assigned any semantic role by Y iff Y also subcategorizes a complement which has X as its first argument.

This principle accounts for the fact that most raising verbs cannot have a null complement, nor a non verbal complement, contrary to control verbs (Jacobson 1990). Without a non finite complement, the subject of *seem* is not assigned any semantic role, which violates the Raising principle.

(37)   a.   * John seems
       b.   * John seems this.
       c.   John tried.
       d.   John tried this.

3.2 Raising and control in Mauritian

Henri & Laurens (2011: 197) argue that "while Mauritian data can be brought in accordance with the open complement analysis, both morphological data on the control or raising verb and the existence of genuine verbless clauses put up a big challenge for both the clause and small clause analysis." Mauritian is a French-based creole, which has raising and control verbs. Verbs marking aspect or modality (continue, stop) are subject-raising verbs and causative and perception verbs are object-raising. Raising verbs differ from TMA markers by different properties: they are preceded by the negation, which follows TMA; they can be coordinated unlike TMA (Henri & Laurens 2011) page 209:

(38) To pou kontign   ou aret   bwar?
     2SG IRR continue.SF or stop.SF drink.LF

     'You will continue or stop drinking?'

(39) *To'nn   ou pou aret   bwar   ?
     2SG'PERF or IRR stop.SF drink.LF?

     'You have or will stop drinking?'

If their verbal complement has no external argument, as is the case with impersonal expressions such as *ena lapli* 'to rain', then the raising verb itself has no external argument, contrary to a control verb like *sey* 'try':

(40) Kontign   / Sey ena   lapli.
     continue.SF / *try have.SF rain

     'It continued /*tries to rain.'

Unlike French, its superstrate, Mauritian verbs neither inflect for tense, mood and aspect nor for person, number and gender. But they have a short form and a long form (henceforth SF and LF), with 30 % verbs showing a syncretic form.

(41)   a. manz/manze ('eat' SF/LF), koz/koze ('talk' SF/LF), sant/sante ('sing')

        b. pans/panse ('think' SF/LF), kontign/kontigne ('continue' SF/LF), konn/kone ('know' SF/LF)

As described in Henri (2010), the verb form is determined by the construction: the short form is required before a phrasal complement and the long form appears otherwise. [2]

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[2] *yer* 'yesterday' is an adjunct. See Hassamal 2017 for an analysis of Mauritian adverbs which treats as complements those trigering the verb short form.

(42)   a. Zan sant   sega / manz pom /   trov so   mama /
            John sing.SF sega / eat.SF apple/ find.SF poss mother /   think.SF
            pans Paris.
            Paris

            'John sings a sega / eats an apple / finds his mother/ thinks about
            Paris.'

      b. Zan sante   manze.
            John sing.LF / eat.LF

            'John sings / eats'

      c. Zan ti   zante   yer.
            John PERF sing.LF yesterday

            'John sang yesterday'

Henri (2010) proposes to define two possible values (SF and LF) for the Head feature VFORM, with the following lexical constraint (nelist means non-empty list):

(43)   [VFORM *SF*]→[COMPS *nelist*]

Interestingly, clausal complements do not trigger the verb short form (Henri 2010 analyses them as extraposed). The complementizer (ki) is optional.

(44)   a. Zan panse   (ki)   Mari pou vini.
            John think.LF (that) Mary FUT come.LF

            'John thinks that Mary will come'

      b. Mari trouve (ki)   so   mama tro manze.
            Mary find.LF (that) POSS mother too much   eat.LF

            Mari finds that her mother eats too much

On the other hand, subject-raising and subject-control verbs occur in a short form before a verbal complement.

(45)   a. Zan kontign   sante (Subject-raising verb, p.198)
            John continue.SF sing.LF

            'John continues to sing.'

      b. Zan sey   sante   (Subject-control verb)
            John try.SF sing.LF

            'John tries to sing'

The same is true with object-control and object-raising verbs:

(46)   a. Zan inn fors   Mari vini.   (Object-control verb)
          John PERF force.SF Mary come.LF

          'John has forced Mary to come.'

       b. Zan pe   get   Mari dormi. (Object-raising verb, p.200)
          John PROG watch.SF Mary sleep.LF

          'John is watching Mary sleep.'

Raising and control verbs thus differ from verbs taking sentential complements. Their SF form is predicted if they take unsaturated VP complements. Assuming the same lexical type hierarchy as defined above, verbs like *kontign* ('continue') and *sey* (try) inherit from subj-rsg-v and subj-cont-v respectively and have the following lexical entries (Henri and Laurens use SBCG, we adapt their analyses to HPSG):

$$
(47) \quad kontign\text{'continue'} \rightarrow
\begin{bmatrix}
\text{SUBJ} & \langle \boxed{1} \rangle \\[4pt]
\text{COMPS} & \left\langle \text{VP}\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{CONT} & [\text{IND } \boxed{2}] \end{bmatrix} \right\rangle \\[20pt]
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} continue\text{-}rel \\ \\ \text{ARG } \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

$$
(48) \quad sey\text{'try'} \rightarrow
\begin{bmatrix}
\text{SUBJ} & \langle \text{NP}_{\boxed{i}} \rangle \\[4pt]
\text{COMPS} & \left\langle \text{VP}\begin{bmatrix} \text{HEAD} & verb \\ \text{SUBJ} & \langle [\text{IND } \boxed{i}] \rangle \\ \text{CONT} & [\text{IND } \boxed{2}] \end{bmatrix} \right\rangle \\[24pt]
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} try\text{-}rel \\ \\ \text{EXP } \boxed{i} \\ \text{ARG } \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

3.3 Raising and control in Balinese

Balinese offers an intriguing case of syntactic ergativity. It displays rigid SVO order, regardless of the verb's voice form Wechsler & Arka (1998). In the 'objective voice' (OV), the verb is transitive, and the subject is the initial NP, although it is

not the first argument. In the 'agentive Voice' (AV), the subject is the ARG-ST initial member (see chapter on linking):

(49) a. Bawi adol   ida.
          pig   OV.sell 3sg
          'He/She sold a pig.'

      b. Ida ng-adol bawi.
          3sg AV-sell pig
          'He/She sold a pig.'

Different properties argue in favor of a subject status of the first NP in the objective voice. For binding properties that show that the agent is always the first element on the ARG-ST list, see Wechsler & Arka (1998); Manning & Sag (1999) and the chapter on binding. The objective voice is also different from the passive: the passive may have a passive prefix, an agent by-phrase, and does not constrain the thematic role of its subject.
See Chapter on linking for the two verbal types?

In many languages, only a subject can be controlled (Zaenen et al. 1985). In Balinese, only the pre-verbal argument, whether the Theme of an OV verb or the Agent of an AV verb, can be a controllee:

(50) a. Tiang edot [___ teka]. (W and A ex 25)
          1   want come
          I want to come.

      b. Tiang edot [___   meriksa dokter].
          1   want AV.examine doctor
          I want to examine a doctor.

      c. Tiang edot [___   periksa dokter].
          1   want OV.examine doctor
          I want to be examined by a doctor.

Turning to *majanji* 'promise', in this type of commitment relation, the promiser must have semantic control over the action promised Farkas (1988); Kroeger (1993); Sag & Pollard (1991). The promiser should therefore be the actor of the downstairs verb. This semantic constraint interacts with the syntactic constraint that the controllee must be the subject to predict that the controlled VP must be in AV voice, which places the Agent in subject role. The same facts obtain for other control verbs such as *paksa* 'force'.

(51) a. Tiang majanji maang Nyoman pipis.   (W and A ex 27)
       1   promise AV.give Nyoman money

    b. *Tiang majanji Nyoman baang   pipis.
        1   promise Nyoman OV.give money

    c. *Tiang majanji pipis   baang   Nyoman.
        1   promise money OV.give Nyoman

       I promised to give Nyoman money.

Cross-linguistically, only the embedded subject can be 'raised'. In Balinese, with an intransitive verb, the subject *ia* '(s)he' can be raised to the position to the left of the matrix predicate *ngenah* 'seem':

(52) a. Ngenah ia mobog. (W and A ex 7)
       seem   3 lie

       It seems that (s)he is lying.

    b. Ia ngenah mobog.
       3 seem   lie

       (s)he seems to be lying.

The same applies to a transitive verb in the agentive voice: the agent can appear as the subject of 'seem' but not the patient.

(53) a. Ngenah sajan [ci ngengkebang kapelihan-ne]. (W and A ex 9)
       seem   much 2 AV.hide   mistake-3POSS

       It is very apparent that you are hiding his/her wrongdoing.

    b. Ci ngenah sajan ngengkebang kapelihan-ne.
       2 seem   much AV.hide   mistake-3POSS

       you seem to be hiding his/her wrongdoing.

    c. ?*Kapelihan-ne ngenah sajan ci ngengkebang.
       mistake-3POSS seem much 2 AV.hide

On the other hand, only the patient can be 'raised' in the objective voice:

(54) a. Ngenah sajan [kapelihan-ne   engkebang ci]. (W and A ex 8)
       seem   much mistake-3POSS OV.hide   2

       It is very apparent that you are hiding his/her wrongdoing.

    b. Kapelihan-ne   ngenah sajan engkebang ci.
       mistake-3POSS seem   much OV.hide   2

       His/her wrongdoings seem to be hidden by you

c. ?*Ci ngenah sajan kapelihan-ne   engkebang.
   2   seem   much mistake-3POSS OV.hide

The conclusions of the authors is that the preverbal NP is always the syntactic subject, regardless of its thematic role and of the verbal voice (see also Manning & Sag 1999.

Balinese also displays object-raising. While the subject of 'go home' has been 'raised' to the subject of 'know' in the objective voice, it can be analysed as the object of 'know' in the agentive voice.

(55)   a. Nyoman Santosatawang tiangmulih. (W   and A ex 22)
          (name)   OV.know   1   go.home
          I knew that Nyoman Santosa went home.

       b. Tiang nawang   Nyoman Santosa   mulih.
          1   AV-know (name)   go.home
          I knew that Nyoman Santosa went home.

In Balinese, the semantic difference between control verbs and raising verbs has a consequence for their complementation: raising verbs (which do not constrain the semantic role of the raised argument) can take verbal complements either in the agentive or objective voice, while control verbs (which select an agentive argument) can only take a verbal complement in the agentive voice.

3.4 XARG and the control of some saturated complements

As noted by Farkas (1988), in certain languages the expressed subject of a verbal complement may display obligatory control. It is the case in Romanian or Persian Karimi (2008), and in Mauritian for instance. As shown by Henri & Laurens (2011), after some subject-control verbs like 'think', the VP complement may have an optional pronominal subject which must be coindexed with the matrix subject. It is not a clausal complement since the matrix verb is in the short form (SF) and not in the long form (see above).

(56)   Zan$_i$ pans   pou   (li$_i$)   vini. (p.202)
       John think.SF COMP 3SG come.LF
       John thinks about coming.

This may be a challenge for the theory of control presented here, since a clausal complement is a saturated complement, with an empty SUBJ list, and the matrix verb cannot access the SUBJ value of the embedded verb. This is why Kay and

Sag 2009, Sag 2010 proposed to introduce a Head feature X-ARG that takes as its value the first syntactic argument of the head verb, and is accessible at the clause level. Under such an analysis, the entry for 'think' looks like the following. The VP complement must have an X-ARG coindexed with the subject of 'think' but it can have a clausal complement (and an empty SUBJ list) or a VP complement (and a non empty SUBJ list).

(57) $pans$('think') $\rightarrow$

$$\begin{bmatrix} \text{SUBJ} & \langle \text{NP}_{\boxed{i}} \rangle \\ \text{COMPS} & \left\langle \text{VP} \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{X-ARG} & \begin{bmatrix} \text{IND} & \boxed{i} \end{bmatrix} \end{bmatrix} \\ \text{MARKING} & pou \\ \text{CONT} & \begin{bmatrix} \text{IND} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \\ \text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} think\text{-}rel \\ \\ \text{ARG} & \boxed{i} \\ \text{ARG} & \boxed{2} \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

See also Sag and Kay 2009 for the obligatory control of possessive determiners in English expressions such as *lose X's temper*, with an XARG feature on nouns and NPs:

(58) a. John lost his /*her temper
      b. Mary lost *his/ her temper

4 Copular constructions

Copular verbs can also be considered as 'raising' verbs (Chomsky 1981). While attributive adjectives are adjoined to N or NP, predicative adjectives are complements of copular verbs and share their subject with these verbs. Like raising verbs (section 1), copular verbs come in two varieties: subject copular verbs (*be, get, seem, …*), and object copular verbs (*consider, prove, expect, …*).

Let us review a few properties of copular constructions. The adjective selects for the verb's subject or object: *likely* may selects a nominal or a sentential argument, while *expensive* only takes a nominal argument. As a result, *seem* combined with *expensive* only takes a nominal subject, and *consider* combined with the same adjective only takes a nominal object.

(59) a. A storm/ [That it rains] seems likely
      b. This trip/ * [That he comes] seems expensive

(60)   a. I consider a storm likely / likely [that it rains]
        b. I consider this trip expensive/ *expensive [that he comes]

In English, copular *be* also has the properties of an auxiliary, see next section.

4.1 The pro and cons of a clausal analysis

To account for these properties, transformational grammar since Chomsky (1986); Stowell (1983) has proposed a clausal or *small clause* analysis: the predicative adjective heads a (small) clause; the subject of the adjective raises to the subject position of the embedding clause (61) or stays in its subject position and receives accusative case from the matrix verb via ECM (62).

(61)   [NPe] be [SJohn sick] $\leadsto$ [NPJohn] is [S e_i sick]

(62)   We consider [S John sick]

It is true that the adjective may combine with its subject to form a verbless sentence. It is the case in AAVE (Bender 2001), in French Laurens (2008) and creole languages Henri & Abeillé (2007), in Slavic languages (Zec 1987), in Semitic languages (see Borsley on Arabic), among others.

(63)   Magnifique ce   chapeau !
        beautiful   this hat
        'what a beautiful hat'

But this does not entail that 'be' takes a sentential complement.
(Pollard & Sag 1994: Ch.3) present several arguments against a (small) clause analysis. The putative sentential source is sometimes attested (64c) but more often ungrammatical:

(64)   a. John is / gets / becomes sick
        b. *It is / gets / becomes that John is sick
        c. John considers Lou a friend / that Lou is a friend
        d. Paul regards Mary as crazy
        e. *Paul regards that Mary is crazy

When a clausal complement is possible, its properties differ from those of the putative small clause. Pseudoclefting shows that *Lou a friend* is not a constituent in (65a).

(65)   a. We consider Lou a friend

        b. *What we consider is Lou a friend

        c. We consider [that Lou is a friend]

        d. What we consider is [that Lou is a friend]

Following Bresnan (1982), Pollard & Sag (1994: 113) also show that Heavy-NP shift applies to the putative subject of the small clause, exactly as it applies to the first complement of a ditransitive verb (page 113):

(66)   a. We would consider [acceptable] [any candidate who supports the proposed amendment]

        b. I showed [to Dana] [all the cookies that could be made from betel nuts and molasses]

Indeed, the "subject" of the adjective with object-raising verbs has all the properties of an object: it bears accusative case, it can be the subject of a passive.

(67)   a. We consider him /*he guilty

        b. We consider that he/*him is guilty

        c. He was proved guilty (by the jury)

Furthermore, the matrix verb may select the head of the putative small clause, which is not the case with verbs taking a clausal complement, and which violates the locality of subcategorization. The verb *expect* takes a predicative adjective but not a preposition or a nominal predicate, *get* selects a predicative adjective or a preposition, but not a predicative nominal, while *prove* selects a predicative noun or adjective but not a preposition.

(68)   a. I expect that man (to be) dead by tomorrow (p.103)

        b. I expect that island *(to be) off the route

        c. I expect that island *(to be) a good vacation spot

(69)   John got political/*a success (p.105)

(70)   a. Tracy proved the theorem (to be) false (p.100)

        b. I proved the weapon *(to be) in his possession (p.101)

4.2 An HPSG analysis of copular verbs

Copular verbs such as *be* or *consider* may be analysed as subtypes of subject-raising and object-raising verbs respectively. They share their subject (or object) with the expected subject of their predicative complement. Instead of taking a VP complement, they take a predicative complement (PRED +), which they may select the category of. A copular verb like *be* or *seem* does not assign any semantic role to its subject, while verbs like *consider* or *expect* do not assign any semantic role to their object. The structure of (transitive) verbs that take a predicative complement is as follows:

NP V NP AP_{pred+}/NP_{pred+}/PP_{pred+}

For more details, see Pollard & Sag (1994); Van Eynde (2015). The lexical entries for predicative (subject-raising) *seem* and predicative (object-raising) *consider* inherit from the subject-raising-v type and object-raising-v type respectively, and are as follows:

$$
\text{(71)} \quad seem \rightarrow \begin{bmatrix} \text{SUBJ} & \langle\boxed{1}\rangle \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{HEAD} & [\text{PRED} \ +] \\ \text{SUBJ} & \boxed{1} \\ \text{CONT} & [\text{IND} \ \boxed{2}] \end{bmatrix} \right\rangle \\ \text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} seem\text{-}rel \\ \text{ARG} \ \boxed{2} \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}
$$

$$
\text{(72)} \quad consider \rightarrow \begin{bmatrix} \text{SUBJ} & \langle\text{NP}_i\rangle \\ \text{COMPS} & \left\langle \boxed{1}, \begin{bmatrix} \text{HEAD} & [\text{PRED} \ +] \\ \text{SUBJ} & \boxed{1} \\ \text{CONT} & [\text{IND} \ \boxed{2}] \end{bmatrix} \right\rangle \\ \text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} consider\text{-}rel \\ \text{EXP} \ i \\ \text{ARG} \ \boxed{2} \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}
$$

The subject of *seem* is unspecified: it can be any category selected by the predicative complement; the same holds for the first complement of *consider*: it can be any category selected by the predicative complement (see examples 59 above). *Consider* selects a subject and two complements, but only takes two semantic arguments: one corresponding to its subject, and one coresponding to its predicative complement. It does not assign a semantic role to its non predicative complement.

Let us take the example *Paul seems happy*. As a predicative adjective, *happy* has

a Head feature [PRED +] and a non empty SUBJ feature: it subcategorizes for a nominal subject and assigns a semantic role to it, as shown in (73).

(73)   *happy* →
$$\begin{bmatrix} \text{PHON} & \langle \textit{HAPPY} \rangle \\ \text{HEAD} & \begin{bmatrix} \textit{adj} \\ \text{PRED} & + \end{bmatrix} \\ \text{SUBJ} & \langle \text{NP}_i \rangle \\ \text{COMPS} & \textit{elist} \\ \text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{happy-rel} \\ \text{EXP} & i \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

In the tree in (6) and (7), the SUBJ feature of *happy* is shared with the SUBJ feature of *seem* and the first element of the COMPS list of *consider*.
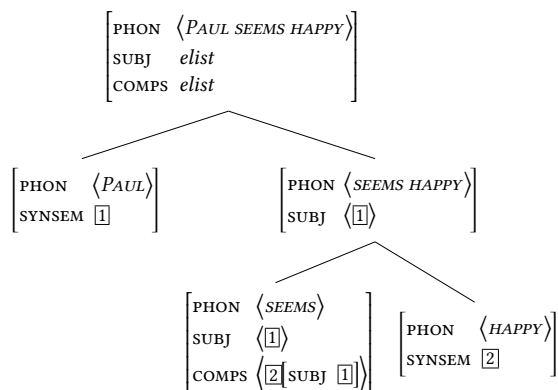

Figure 6: A sentence with an intransitive copular verb

Pollard & Sag (1994) mention a few verbs taking a predicative complement which can be considered as control verbs. A verb like *feel* selects a nominal subject and assigns a semantic role to it.

(74)   John feels tired / in a good mood

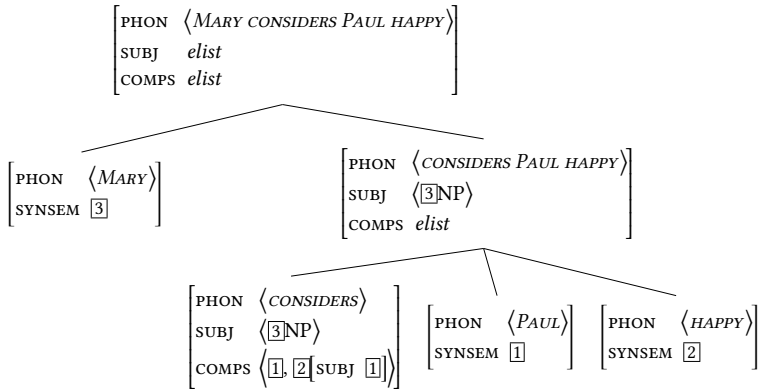It inherits from the subject-control-type ; its lexical entry is as follows:

$$
\begin{bmatrix}
\text{PHON} & \langle \textsc{Mary considers Paul happy} \rangle \\
\text{SUBJ} & \textit{elist} \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle \textsc{Mary} \rangle \\
\text{SYNSEM} & \boxed{3}
\end{bmatrix}
\qquad
\begin{bmatrix}
\text{PHON} & \langle \textsc{considers Paul happy} \rangle \\
\text{SUBJ} & \langle \boxed{3}\text{NP} \rangle \\
\text{COMPS} & \textit{elist}
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{PHON} & \langle \textsc{considers} \rangle \\
\text{SUBJ} & \langle \boxed{3}\text{NP} \rangle \\
\text{COMPS} & \langle \boxed{1}, \boxed{2}[\text{SUBJ } \boxed{1}] \rangle
\end{bmatrix}
\quad
\begin{bmatrix}
\text{PHON} & \langle \textsc{Paul} \rangle \\
\text{SYNSEM} & \boxed{1}
\end{bmatrix}
\quad
\begin{bmatrix}
\text{PHON} & \langle \textsc{happy} \rangle \\
\text{SYNSEM} & \boxed{2}
\end{bmatrix}
$$

Figure 7: A sentence with a transitive copular verb

(75) $feel \rightarrow$

$$
\begin{bmatrix}
\text{SUBJ} & \langle \text{NP}_{\boxed{i}} \rangle \\
\text{COMPS} & \left\langle \begin{bmatrix} \text{HEAD} & [\text{PRED } +] \\ \text{SUBJ} & \langle [\text{IND } \boxed{i}] \rangle \\ \text{CONT} & [\text{IND } \boxed{2}] \end{bmatrix} \right\rangle \\
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{feel-rel} \\ \\ \text{EXP} & \boxed{i} \\ \text{ARG} & \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

4.3 Copular verbs in Mauritian

As shown by Henri & Laurens (2011), Mauritian data also argue in favor of a non clausal analysis. A copular verb takes a short form before an attributive complement, and a long form before a clausal one. Despite the lack of inflection on the embedded verb, and the possibility of subject prodrop, clausal complements differ from non clausal complements by the following properties: they do not trigger the matrix verb short form, they may be introduced by the complementizer *ki*, their subject is a weak pronoun (*mo, to* I, you). On the other hand, a VP or AP complement cannot be introduced by *ki*, and an NP complement is a strong pronoun (*mwa, twa* me, you).

(76) a. Mari ti res malad. (p.198)
Mary PST remain.SF sick
'Mary remained sick'

    b. Mari trouv so   mama malad
        Mary find.SF POSS mother sick
        'Mary finds her mother sick'

    c. Mari trouve (ki) mo   malad
        Mary find.LF that 1SG-WK is   sick
        'Mary finds that I am sick'

    d. Mari trouv (*ki)   mwa malad
        Mary find.SF 1SG-STR sick
        'Mary finds me sick'

Henri and Laurens conclude that 'Complements of raising and control verbs systematically pattern with non-clausal phrases such as NPs or PPs. This kind of evidence is seldom available in world's languages because heads are not usually sensitive to the properties of their complements. The analysis as clause or small clauses is also problematic because of the existence of genuine verbless clauses in Mauritian which pattern with verbal clauses and not with complements of raising and control verbs.' (p. 218)

4.4 Control and raising adjectives

Adjectives taking a non finite complement can themselves be divided between subject-raising and subject-control adjectives. Adjectives such as *likely* have 'raising' properties: they do not select the category of their subject, nor assign it a semantic role, contrary to adjectives like *eager*. Meteorological *it* is thus compatible with *likely*, not with *eager*.

(77)   a. It is likely to rain
        b. John is eager to work here
        c. *It is eager to rain

Like control and raising verbs, both types of adjectives take a non saturated VP complement; the subject of *likely* shares its *synsem* value with the expected subject of that VP complement, while the subject of *eager* is coindexed with it. Such adjectives thus inhrit from subj-rsg-lexeme and subj-control-lexeme type, respectively, as well as from adjective-lexeme type.

5 Auxiliaries as raising verbs

Following pionneering work in GPSG Gazdar et al. (1982), *be*, *do*, *have*, and modals (e.g., *can*, *should*) in HPSG are not considered a special part of speech (*aux*) but verbs with the head property in (36)

(78) $\left[\text{HEAD} \ \left[\text{AUX} \ +\right]\right]$

Auxiliaries take VP complements and do not select their subjects, just like subject-raising verbs. They are thus compatible with non referential subjects, such as meteorological *it* and existential *there*. They select the verb form of their non finite complements: *have* selects a past participle, *be* a gerund, *can* and *will* a bare form.

(79)   a. Paul has left
       b. Paul is leaving
       c. Paul can leave
       d. It will rain
       e. There can be a riot

In this approach, English auxiliaries are subtypes of subject-raising-verbs, and thus take a VP complement and share their subject with the expected subject of the non finite verb. The entry for auxiliaries *will* or *have* look as follows:

(80)   *will* →

$$
\begin{bmatrix}
\text{HEAD} & \left[\text{AUX} \ +\right] \\
\text{SUBJ} & \langle\boxed{1}\rangle \\
\text{COMPS} & \left\langle \text{VP}\begin{bmatrix} \text{HEAD} & \left[\text{VFORM} \ base\right] \\ \text{SUBJ} & \langle\boxed{1}\rangle \\ \text{CONT} & \left[\text{IND} \ \boxed{2}\right] \end{bmatrix} \right\rangle \\
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} future\text{-}rel \\ \\ \text{ARG} & \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

(81)   *have* →

$$
\begin{bmatrix}
\text{HEAD} & \begin{bmatrix} \text{AUX} & + \end{bmatrix} \\
\text{SUBJ} & \langle \boxed{1} \rangle \\
\text{COMPS} & \left\langle \text{VP}\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{VFORM} & past\text{-}part \end{bmatrix} \\ \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{CONT} & \begin{bmatrix} \text{IND} & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \\
\text{CONT} & \begin{bmatrix} \text{IND} & s \\ \text{RELS} & \left\{ \begin{bmatrix} perfect\text{-}rel \\ \text{ARG} & \boxed{2} \end{bmatrix} \right\} \end{bmatrix}
\end{bmatrix}
$$

To account for their NICE (negation, inversion, contraction, ellipsis) properties, Pollard and Sag use a binary Head feature AUX, so that only [AUX +] verbs may allow for subject inversion (82a), sentential negation (82c), contraction or VP Ellipsis (82e, see Ellipsis chapter).[3]

(82)   a. Is Paul working?

b. *Keeps Paul working ?

c. Paul is (probably) not working

d. *Paul keeps (probably) not working

e. John promised to come and he will.

f. *John promised to come and he seems.

Subject raising verbs such as *seem, keep* or start are [AUX -].[4]

Sagetal2020 revised this analysis and proposed a new analysis couched in Sign-based Construction Grammar. We try to translate it into more common HPSG. In their approach, the head feature AUX is both lexical and constructional: the constructions restricted to auxiliaries require their head to be [AUX +], while the constructions available for all verbs are [AUX -]. In this approach, non auxiliary verbs are lexically specified as [AUX -]:

(83)   non-auxiliary-verb → $\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \text{AUX} & - \\ \text{INV} & - \end{bmatrix} \end{bmatrix}$

---

[3]Copular *be* has the NICE properties (*Is John happy?*), it is an auxiliary verb with [PRED +] complement. Since 'to' allows for VP ellipsis, it is also analysed as an auxiliary verb: *John promised to work and he started to.*

[4]see Kim and Sag 2002 for a comparison of French and English auxilaires, Abeillé and Godard 2002 for a thorough analysis of French auxilaires as 'generalized' raising verbs, inheriting not only the subject but also any complement from the past participle; see also the Complex predicate chapter in this volume.

Auxiliary verbs, on the other hand are unspecified for the feature AUX, and are contextually specified; except for unstressed *do* which is [AUX +] and must occur in constructions restricted to auxiliaries.

(84) a. Paul is working [AUX -]

     b. Is Paul working ? [AUX +]

     c. * John does work [AUX -]

     d. Does John work ? [AUX +]

Subject inversion is handled by a specific (non binary) construction, of which other constructions such as polar-interrogative-clause are subtypes, and whose head must be [INV +].

$$
(85) \quad \text{initial-aux-cx} \rightarrow
\begin{bmatrix}
\text{SUBJ} & \textit{elist} \\
\text{COMPS} & \textit{elist} \\
\text{HEAD-DTR} & \boxed{0}\begin{bmatrix} \text{AUX} & + \\ \text{SUBJ} & \boxed{1} \\ \text{COMPS} & \boxed{2} \end{bmatrix} \\
\text{DTRS} & \boxed{0}+\boxed{1}+\boxed{2}
\end{bmatrix}
$$

Most auxiliaries are lexically unspecified for the feature INV and allow for both constructions (non inverted and inverted), while the 1st person *aren't* is obligatory inverted (lexically marked as [INV +]) and the modal *better* obligatory non inverted (lexically marked as [INV -]):

(86) a. Aren't I dreaming?

     b. *I aren't dreaming

     c. We better be carefull

     d. *Better we be carefull?

While the distinction is not always easy to make between VP ellipsis and Null complement anaphora (*Paul tried*), Sag et al. observe that certain elliptical constructions are restricted to auxiliaries, for example pseudogapping (Miller 2014).

(87) a. John can eat more pizza than Mary can tacos.

     b. *Ann seems to buy more bagels than Sue seems cupcakes.

As observed by Arnold & Borsley (2008), auxiliaries can be stranded in certain non-restrictive relative clauses such as (88a), no such possibility is afforded to non-auxiliary verbs (88b)

(88)   a. Kim was singing, which Lee wasn't

b. *Kim tried to impress Lee, which Sandy didn't try.

Such an analysis captures a very wide range of facts, and expresses both generalizations and lexical idiosyncrasies.

6 Conclusion

Complements of raising and control verbs have been either analyzed as clauses (Chomsky 1981) or small clauses (Stowell 1981; Stowell 1983) in mainstream generative grammar. Like in LFG Bresnan (1982), raising and control predicates are analysed as taking non-clausal open complements in HPSG Pollard & Sag (1994). A rich hierarchy of lexical types enable verbs and adjectives taking non finite or predicative complements to inherit from a raising-type or a control-type. The Raising Principle prevents any other kind of non canonical linking between semantic argument and syntactic argument. A semantic based control theory predicts which predicates are subject-control and which object-control. The 'subject-raising' analysis has been successfully extended to auxiliary verbs, without the need for an Infl category.

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