French double Agents: a force-theoretic account of *de* and *par*

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1   Introduction

In French passives the Agent can be specified by both *de* 'from' and *par* 'by, via'. Which prepositions are allowed varies:

(1)   a.   *Le chien est lavé par/*de Marie.*   (Straub 1974b, 584)
           'The dog is washed by Mary.'

      b.   *La fenêtre a été brisée par/*de un rocher.*   (Straub 1974b, 584)
           'The window was broken by a rock.'

(2)   a.   *Le professeur était respecté par/de ses élèves.*   (Straub 1974b, 585)
           'The professor was respected by his students.'

      b.   *Le garçon est adoré {par le/du} grand-père.*   (Clédat 1900, 223)
           'The boy is loved by the grandfather.'

(3)   a.   *Le mois de février est précédé du/*par le mois de janvier.*   (Straub 1974b, 591)
           'February is preceded by January.'

      b.   *Le dernier chapitre est suivi d'/*par une table des matières.*
           'The last chapter is followed by a table of contents.'

The use of *de* has been related to register (Gougenheim 1938, 307) and Aktionsart (Zumthor and von Wartburg 1947, 297), but no satisfactory analysis has been given so far (Gaatone 1998).

Straub (1974b) provides the most complete descriptive generalisation so far:

(4) a. The Agent of a verb that brings about a change is always marked by *par* (cf. (1)).

b. Verbs denoting states with animate Agents can be marked by both *de* and *par* (cf. (2)).

c. Verbs denoting states with inanimate Agents always take *de* (cf. (3)).

But (4c) is too restrictive; there are cases where *par* is acceptable:

(5) a. *Ce premier chapitre est **suivi par** l'étude de la structure atomique et électronique des atomes.*[1]
'This first chapter [an introduction to chemistry] is **followed by** the study of the atomic and electronic structure of atoms.'

b. *... Reitnau, petit village situé au cœur de la Suisse et **surplombé par** une chaîne de montagne.*[2]
'... Reitnau, a small village located in the heart of Switzerland and **overlooked by** a mountain range.'

And (4b) is not restrictive enough, because *de* is not always allowed in this situation:

(6) a. *Les étudiantes sont accompagnées par/de leurs familles.*   (after Gaatone 1998, 200)
'The students are accompanied by their families.'

b. *Le détenu est accompagné par le/*du policier.*
'The prisoner is accompanied by the policeman.'

(7) a. *La rock star est toujours suivie d'/par une foule d'admirateurs.*   (Gaatone 1998, 203)
'The rock star is always followed by a crowd of admirers.'

b. *Le criminel a été suivi par le (#du) détective.*   (Straub 1974a, 25)
'The criminal was followed by the detective.'

We propose the following intuition to capture the data in (5–7):

(8) a. *De* selects DPs that name Agents that do not 'influence' the Patient.

b. *Par* selects DPs that name Agents. It is unmarked with respect to 'influence'.

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1. programmes.uliege.be/cocoon/20212022/cours/CHIM9275-1.html, retrieved December 8, 2021.

2. kueschall.ch/fr/Archiv_978.aspx, retrieved November 13, 2010 by http://web.archive.org.

The notion of 'influence' is formalized in the force-theoretic framework of Copley and Harley (2015, 2020).

1. Introduction force-theoretic semantics
2. *de = stay*
3. Fixing *stay*
4. Formalizing *de* and *par*
5. Adding a pragmatic dimension

## 2 Background: force dynamics and force-theoretic semantics

Idea: take 'forces' / 'inputs of energy' as primitives (Talmy 1976, a.o.). This can be used to capture the difference in Aktionsart between stative *be* and dynamic *stay* (9). The difference is that *stay* presupposes a counteracting force (Talmy 2000).

(9) a. *The door is open.*   (Copley and Harley 2015, 111)

   b. *The door stays open.*

De is like *stay*: there is a force, but no change; no 'influence'.

Copley and Harley (2015) formalize forces in semantic type theory:
- Event arguments in dynamic predicates become *force* arguments
- Event arguments in stative predicates become *situation* arguments
- Forces are functions from situations to situations
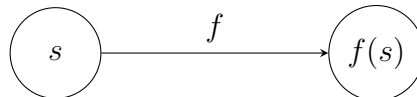
For example:

(10) $[\![v_{\text{STAY}}]\!] = \lambda p \lambda f.p(\text{final}(f))$ 'predicate p holds in the final situation of force f'

   presupposed: $p(\text{initial}(f))$ 'p holds in the initial situation of f'
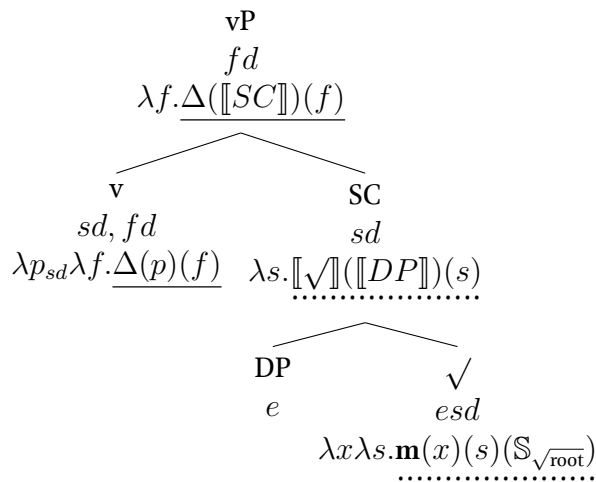
Copley and Harley (2020) propose a formalization with only one v head, reifying changes with *degrees*.

The hypothesized unified meaning of the verbal head is that an **input of energy** impels a (perhaps zero) **change** in a **degree** on a **scale**. (Copley and Harley 2020, 10, emphasis ours)

A simple example, change of state:

(11) *heat the soup*

$$vP$$
$$fd$$
$$\lambda f.\underline{\Delta(\llbracket SC \rrbracket)(f)}$$

v
$$sd, fd$$
$$\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$$

SC
$$sd$$
$$\lambda s.\llbracket \sqrt{} \rrbracket(\llbracket DP \rrbracket)(s)$$

DP
$$e$$

$$\sqrt{}$$
$$esd$$
$$\lambda x\lambda s.\mathbf{m}(x)(s)(\mathbb{S}_{\sqrt{\text{root}}})$$

where:

· $\mathbf{m}(x)(s)(\mathbb{S})$ measures the degree of entity x on scale $\mathbb{S}$ in situation s
· $\Delta(p_{sd})(f)$ is the difference qua d after f has been applied to s (i.e. $p(f(s)) - p(s)$)

and scales can be:

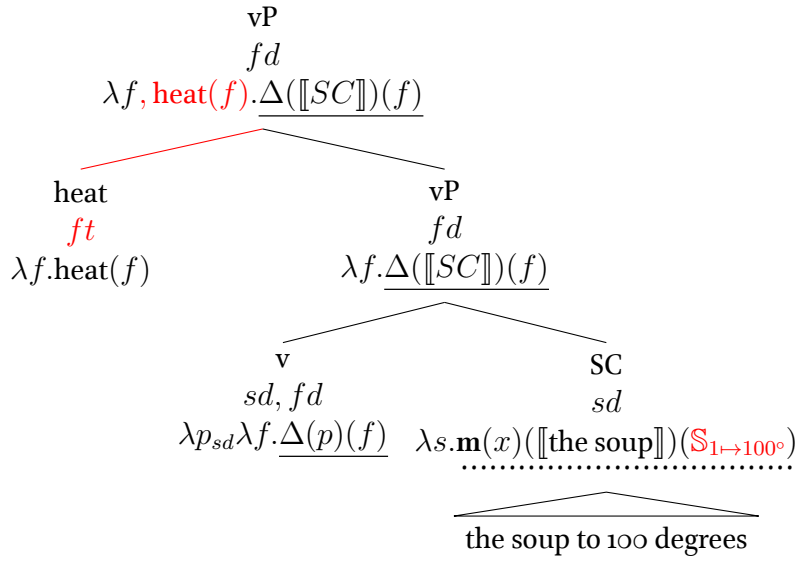|	Positive	Negative
Non-quantized	$\sqrt{\text{hot}} : \langle D_{\text{temperature}}, <_{[0,1]}\rangle$	$\sqrt{\text{cold}} : \langle D_{\text{temperature}}, >_{[0,-1]}\rangle$
Quantized	$\sqrt{\text{full}} : \langle D_{\text{fullness}}, <_{\{0,1\}}\rangle$	$\sqrt{\text{empty}} : \langle D_{\text{fullness}}, >_{\{0,-1\}}\rangle$

The vP contributes to a true sentence iff the Δ is defined, i.e. non-zero (Copley and Harley 2020, 22).

From atelicity to telicity:

(12) *heat the soup to 100 degrees*   (Copley and Harley 2020, 26)

$$\begin{array}{c}
\text{vP} \\
fd \\
\lambda f, \text{heat}(f).\underline{\Delta(\llbracket SC \rrbracket)(f)}
\end{array}$$

heat
ft
$\lambda f.\text{heat}(f)$

vP
fd
$\lambda f.\underline{\Delta(\llbracket SC \rrbracket)(f)}$

v
sd, fd
$\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$

SC
sd
$\lambda s.\mathbf{m}(x)(\llbracket \text{the soup} \rrbracket)(\mathbb{S}_{1\mapsto 100^\circ})$

the soup to 100 degrees

(13) Predicate Restriction: If a node α has as its daughters β of type η, t and γ of type η, θ, then $\llbracket \alpha \rrbracket = \lambda x, \llbracket \beta \rrbracket.\llbracket \gamma \rrbracket(x)$ (i.e., γ with the domain restricted by β).   (Copley and Harley 2020, 30)

Note that the scale $\mathbb{S}_{1\mapsto 100^\circ}$ can be used for both heating and chilling:

(14) a. *Chill the wine to 8 °C.*
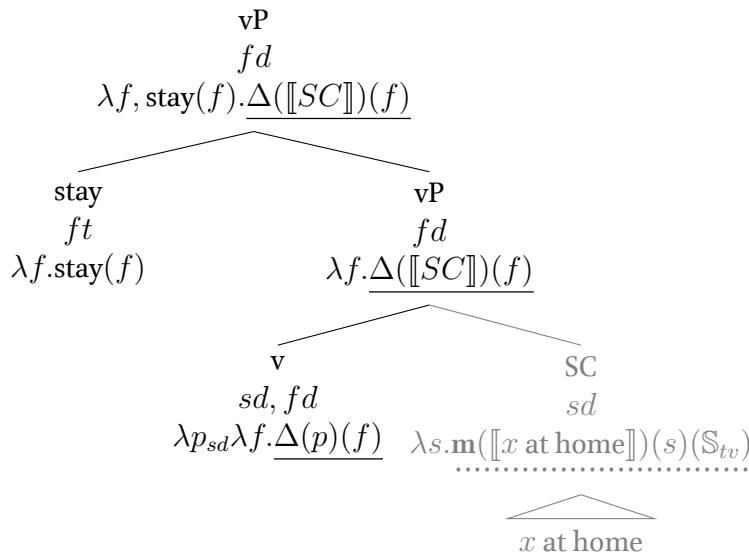
     b. *Heat the wine to 65 °C.*

   Therefore:
   · The PP contributes scale dimension (temperature) and quantization (e.g. 100 °C)
   · The root contributes polarity (positive for *heat*; negative for *chill*)

Back to verbs of maintaining: these can be seen as having zero polarity ($\mathrm{stay}(f)$ entails $\mathrm{polarity}(f) = 0$).
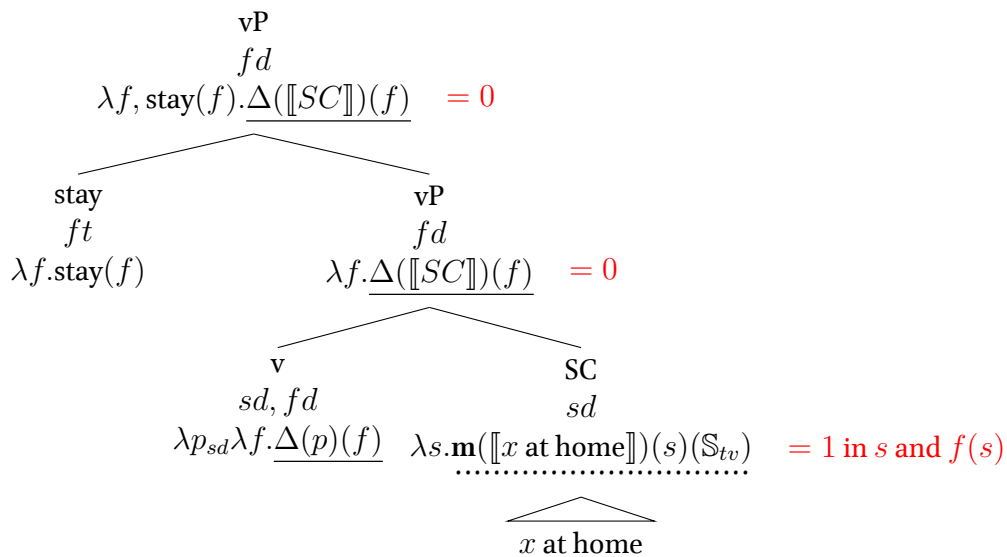
(15)   *stay at home*   (Copley and Harley 2020, 43)

$$\text{vP}$$
$$fd$$
$$\lambda f, \mathrm{stay}(f).\underline{\Delta(\llbracket SC \rrbracket)(f)}$$

- stay
  ft
  $\lambda f.\mathrm{stay}(f)$
- vP
  fd
  $\lambda f.\underline{\Delta(\llbracket SC \rrbracket)(f)}$
  - v
    sd, fd
    $\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$
  - SC
    sd
    $\lambda s.\mathbf{m}(\llbracket x \text{ at home} \rrbracket)(s)(\mathbb{S}_{tv})$
    - x at home

- $\mathbb{S}_{tv}$ is an unordered scale for truth values, i.e. $\{0, 1\}$
- $\mathrm{stay}(f)$ entails $\mathrm{polarity}(f) = 0$

But is this sentence true when it should?

(15')   *stay at home,* true case

$$\text{vP}$$
$$fd$$
$$\lambda f, \mathrm{stay}(f).\underline{\Delta(\llbracket SC \rrbracket)(f)} \quad = 0$$

- stay
  ft
  $\lambda f.\mathrm{stay}(f)$
- vP
  fd
  $\lambda f.\underline{\Delta(\llbracket SC \rrbracket)(f)} \quad = 0$
  - v
    sd, fd
    $\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$
  - SC
    sd
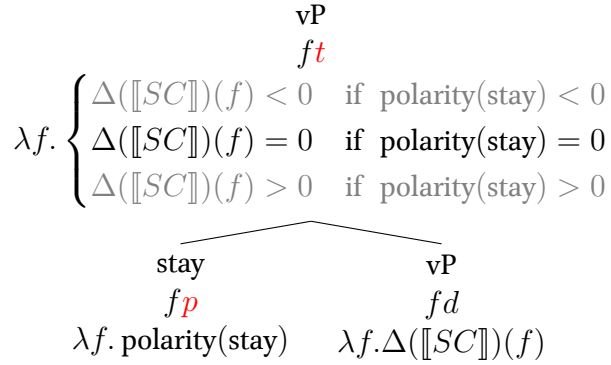 $\lambda s.\mathbf{m}(\llbracket x \text{ at home} \rrbracket)(s)(\mathbb{S}_{tv}) \quad = 1 \text{ in } s \text{ and } f(s)$
    - x at home

- The v head is built for cases where the impelled difference must be non-zero for truth
- Because *stay* uses Predicate Restriction $(\lambda f, \mathrm{stay}(f).\,\ldots\,)$ it can modify the domain but not the result
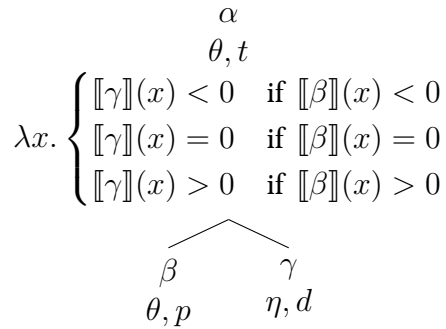
Proposal: use root polarity in place of Predicate Restriction:
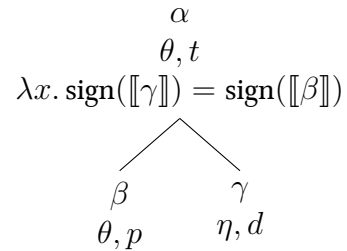
(16) Polarity Specification (*stay* case):

$$
\text{vP} \\
f\,t
$$

$$
\lambda f.\begin{cases} \Delta(\llbracket SC \rrbracket)(f) < 0 & \text{if } \text{polarity(stay)} < 0 \\ \Delta(\llbracket SC \rrbracket)(f) = 0 & \text{if } \text{polarity(stay)} = 0 \\ \Delta(\llbracket SC \rrbracket)(f) > 0 & \text{if } \text{polarity(stay)} > 0 \end{cases}
$$

stay   vP

$f\,p$ $f\,d$

$\lambda f.\,\text{polarity(stay)}$ $\lambda f.\Delta(\llbracket SC \rrbracket)(f)$

where p is a new type for polarity: $\{-1, 0, 1\}$.

(17) Polarity Specification (general case):

or:

$$
\alpha \\
\theta, t
$$

$$
\lambda x.\begin{cases} \llbracket \gamma \rrbracket(x) < 0 & \text{if } \llbracket \beta \rrbracket(x) < 0 \\ \llbracket \gamma \rrbracket(x) = 0 & \text{if } \llbracket \beta \rrbracket(x) = 0 \\ \llbracket \gamma \rrbracket(x) > 0 & \text{if } \llbracket \beta \rrbracket(x) > 0 \end{cases}
$$

β γ

θ, p η, d

$$
\alpha \\
\theta, t
$$

$$\lambda x.\,\text{sign}(\llbracket \gamma \rrbracket) = \text{sign}(\llbracket \beta \rrbracket)$$

β γ

θ, p η, d

(18) Polarity Specification (definition): If a node α has as its daughters β of type θ, p and γ of type η, d, with $\theta \subseteq \eta$, then $\llbracket \alpha \rrbracket = \lambda x.\,\text{sign}(\llbracket \gamma \rrbracket) = \text{sign}(\llbracket \beta \rrbracket)$, which is of type θ, t.

Note that we still need Predicate Restriction as well, to account for the lexical content of the root:

(19) *cook the pasta until al dente*

$$
\text{vP} \\
f\,t
$$

$$\lambda f, \text{cook}(f).\underline{\Delta(\llbracket DP \rrbracket)(f)} > 0$$

cook   vP

$f\,p$ $f\,d$

$\lambda f, \text{cook}(f).1$ $\lambda f.\underline{\Delta(\llbracket DP \rrbracket)(f)}$

v   SC

$sd, f\,d$ sd

$\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$ $\lambda s.\mathbf{m}(\llbracket \text{the pasta} \rrbracket)(s)(\mathbb{S}_{\text{al dente}})$

the pasta until al dente
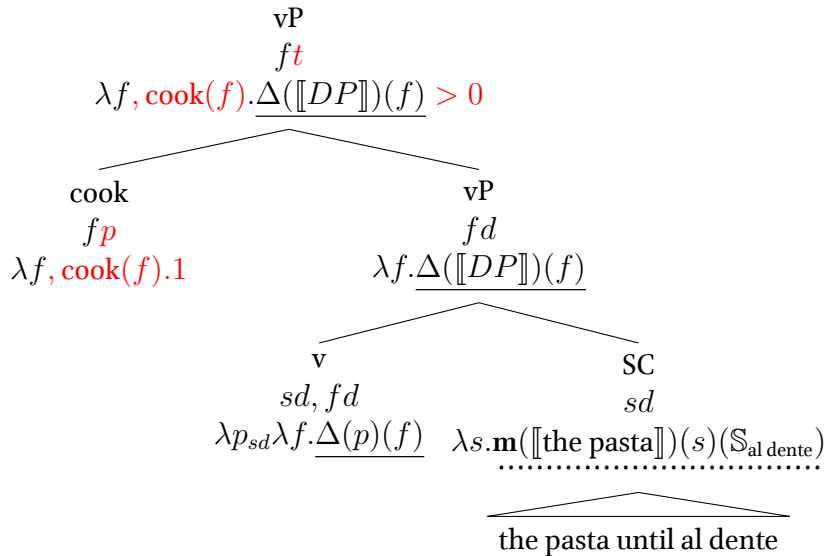
3   Formalizing *de* and *par*

Recall our intuition from (8):

(8)   a.   *De* selects DPs that name Agents that do not 'influence' the Patient.

     b.   *Par* selects DPs that name Agents. It is unmarked with respect to 'influence'.

We can now clarify what we mean with influence: influence is a *non-zero polarity*.
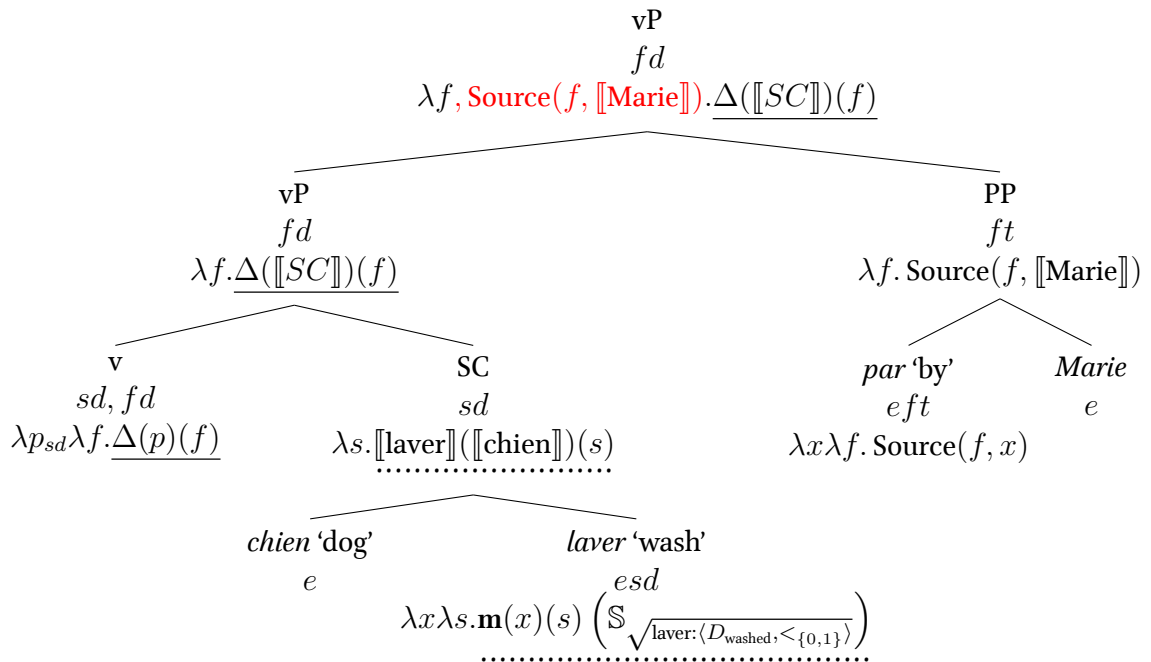
The *par* case is straightforward. It uses only Predicate Restriction because no polarity is specified:

(20) $[\![\text{par}]\!] = \lambda x \lambda f. \operatorname{Source}(f, x)$ (type eft)

(1a)   *Le chien est lavé par/*de Marie.*   (Straub 1974b, 584)

    'The dog is washed by Mary.'

(21)

vP
fd
$\lambda f, \operatorname{Source}(f, [\![\text{Marie}]\!]).\underline{\Delta([\![SC]\!])(f)}$

vP
fd
$\lambda f.\underline{\Delta([\![SC]\!])(f)}$

PP
ft
$\lambda f. \operatorname{Source}(f, [\![\text{Marie}]\!])$

v
sd, fd
$\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$

SC
sd
$\lambda s. [\![\text{laver}]\!]([\![\text{chien}]\!])(s)$

par 'by'
eft
$\lambda x \lambda f. \operatorname{Source}(f, x)$

Marie
e

chien 'dog'
e

laver 'wash'
esd
$\lambda x \lambda s. \mathbf{m}(x)(s) \left(\mathbb{S}_{\sqrt{\text{laver}: \langle D_{\text{washed}}, <_{\{0,1\}} \rangle}} \right)$

8

De does specify the polarity:

(20) $[\![\mathrm{par}]\!] = \lambda x \lambda f. \operatorname{Source}(f, x)$ (type eft)

(22) $[\![\mathrm{de}]\!] = \lambda x \lambda f, \operatorname{Source}(f, x).0$ (type efp)   (to be revised)

(6a) *Les étudiantes sont accompagnées par/de leurs familles.*   (after Gaatone 1998, 200)

   'The students are accompanied by their families.'
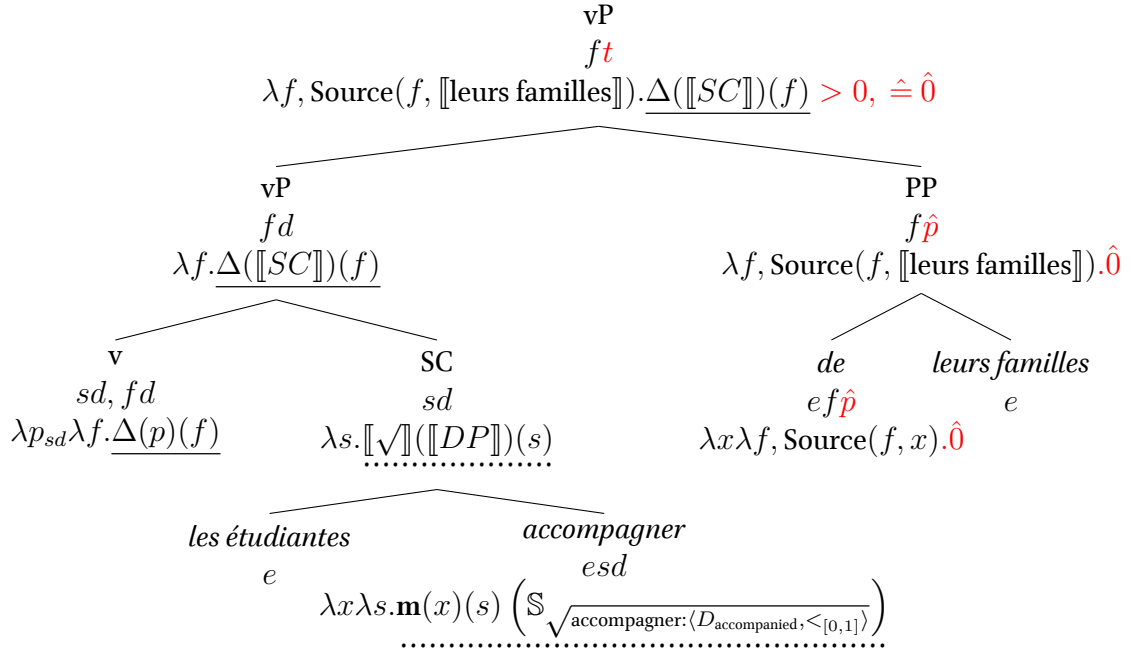
(23) (to be revised)
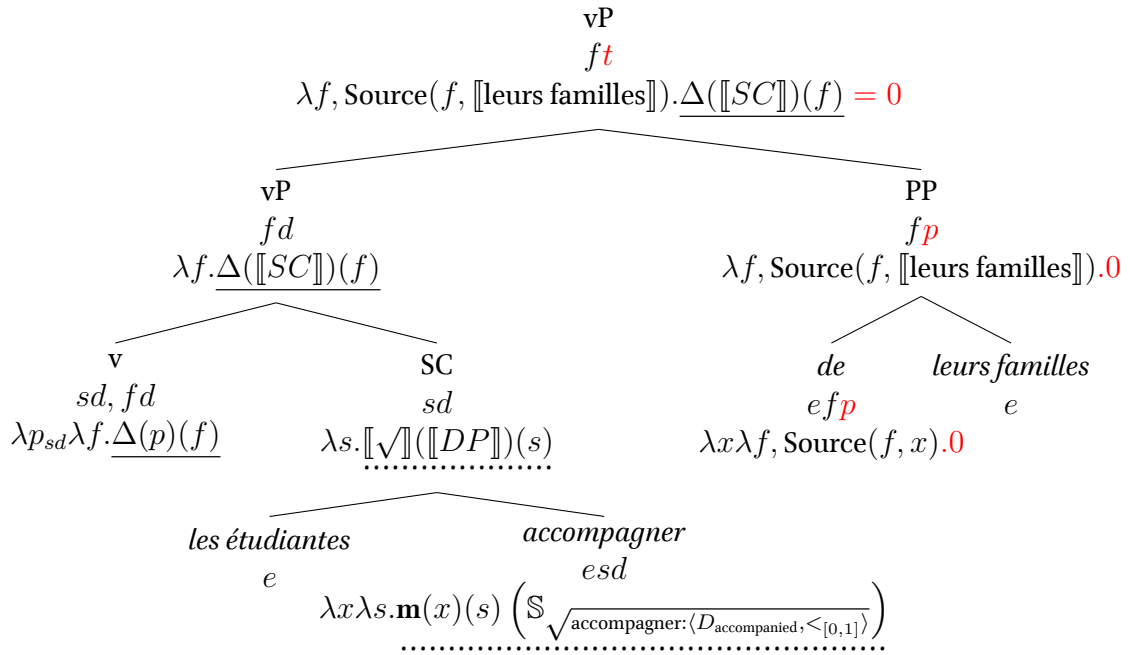
But this does not give the right meaning: this would be true if there is no change in the degree of accompaniment, i.e. if the students are not being accompanied!

What we need to say is that the students *are* being accompanied, but are *not influenced* by it.

We will say that influence is a *pragmatic notion*, which is *parasitic* on the semantic degrees.

(24) $[\![\mathrm{de}]\!] = \lambda x \lambda f, \operatorname{Source}(f, x).\hat{0}$ (type $ef\hat{p}$, where $\hat{p}$ is a pragmatic polarity)

(25)

$$\text{vP}$$
$$f\,\textcolor{red}{t}$$
$$\lambda f, \text{Source}(f, [\![\text{leurs familles}]\!]).\underline{\Delta([\![SC]\!])(f) > 0}, \,\hat{=}\,\hat{0}$$

$$\text{vP}$$
$$f\,d$$
$$\lambda f.\underline{\Delta([\![SC]\!])(f)}$$

$$\text{PP}$$
$$f\,\textcolor{red}{\hat{p}}$$
$$\lambda f, \text{Source}(f, [\![\text{leurs familles}]\!]).\textcolor{red}{\hat{0}}$$

$$\text{v}$$
$$sd, f\,d$$
$$\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$$

$$\text{SC}$$
$$sd$$
$$\lambda s.[\![\sqrt{}]\!]([\![DP]\!])(s)$$

$$de$$
$$ef\hat{p}$$
$$\lambda x\lambda f, \text{Source}(f, x).\textcolor{red}{\hat{0}}$$

$$\textit{leurs familles}$$
$$e$$

$$\textit{les étudiantes}$$
$$e$$

$$\textit{accompagner}$$
$$esd$$
$$\lambda x\lambda s.\mathbf{m}(x)(s)\left(\mathbb{S}\sqrt{\text{accompagner}:\langle D_{\text{accompanied}},<_{[0,1]}\rangle}\right)$$

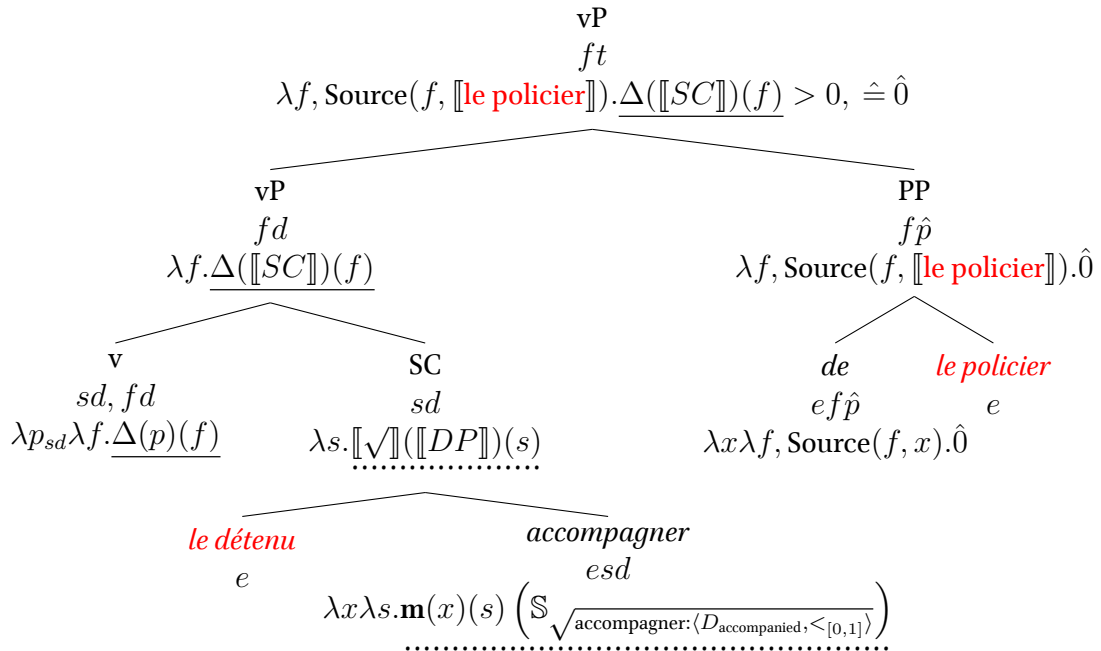We now have double-valued results in the tree:

- The d type is semantic and used for determining truth
- Pragmatic degrees and truth values can be parasitic on these semantic values

This means we can derive (6b) with *de*, too, but it crashes at pragmatics:

(6b)   *Le détenu est accompagné par le/*du policier.*

'The prisoner is accompanied by the policeman.'

(26)

$$\text{vP}$$
$$f\,t$$
$$\lambda f, \text{Source}(f, [\![\textcolor{red}{\text{le policier}}]\!]).\underline{\Delta([\![SC]\!])(f) > 0}, \,\hat{=}\,\hat{0}$$

$$\text{vP}$$
$$f\,d$$
$$\lambda f.\underline{\Delta([\![SC]\!])(f)}$$

$$\text{PP}$$
$$f\hat{p}$$
$$\lambda f, \text{Source}(f, [\![\textcolor{red}{\text{le policier}}]\!]).\hat{0}$$

$$\text{v}$$
$$sd, f\,d$$
$$\lambda p_{sd}\lambda f.\underline{\Delta(p)(f)}$$

$$\text{SC}$$
$$sd$$
$$\lambda s.[\![\sqrt{}]\!]([\![DP]\!])(s)$$

$$de$$
$$ef\hat{p}$$
$$\lambda x\lambda f, \text{Source}(f, x).\hat{0}$$

$$\textcolor{red}{\textit{le policier}}$$
$$e$$

$$\textcolor{red}{\textit{le détenu}}$$
$$e$$

$$\textit{accompagner}$$
$$esd$$
$$\lambda x\lambda s.\mathbf{m}(x)(s)\left(\mathbb{S}\sqrt{\text{accompagner}:\langle D_{\text{accompanied}},<_{[0,1]}\rangle}\right)$$

This solves our problem with (4b), but we still need to look at (4c):

(4) a. The Agent of a verb that brings about a change is always marked by *par* (cf. (1)).

b. Verbs denoting states with animate Agents can be marked by both *de* and *par* (cf. (2)).

c. Verbs denoting states with inanimate Agents always take *de* (cf. (3)).

(3a) *Le mois de février est précédé du/*par le mois de janvier.*   (Straub 1974b, 591)
'February is preceded by January.'

(5a) *Ce premier chapitre est **suivi par** l'étude de la structure atomique et électronique des atomes.*[3]
'This first chapter [an introduction to chemistry] is **followed by** the study of the atomic and elec-tronic structure of atoms.'

This is also a case of pragmatic influence: in (3a) the months are only related by their order; the relation is symmetric. In (5a), the first chapter is seen in the light of the next; this is an asymmetric relation. But we need pragmatics to understand this.

The information about the second chapter can be seen as a function modifying your understanding of the first chapter, just like a force is a function modifying a situation.

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3. programmes.uliege.be/cocoon/20212022/cours/CHIM9275-1.html, retrieved December 8, 2021.

4 Conclusions

We propose Polarity Specification for roots combining in high position, to capture *stay* correctly:

(16') Polarity Specification:

$$
\begin{array}{c}
\text{vP} \\
f\,t \\
\lambda f, \llbracket \surd \rrbracket(f).
\begin{cases}
\Delta(\llbracket SC \rrbracket)(f) < 0 & \text{if } \text{polarity}(\surd) < 0 \\
\Delta(\llbracket SC \rrbracket)(f) = 0 & \text{if } \text{polarity}(\surd) = 0 \\
\Delta(\llbracket SC \rrbracket)(f) > 0 & \text{if } \text{polarity}(\surd) > 0
\end{cases}
\end{array}
$$

$$
\begin{array}{cc}
\surd & \text{vP} \\
f\,p & f\,d \\
\lambda f, \llbracket \surd \rrbracket(f).\,\text{polarity}(\surd) & \lambda f.\Delta(\llbracket SC \rrbracket)(f)
\end{array}
$$

where p is a new type for polarity: $\{-1, 0, 1\}$.

Our analysis of *de* also specifies polarity, but interprets the degree pragmatically:

(8) a. *De* selects DPs that name Agents that do not 'influence' the Patient.

b. *Par* selects DPs that name Agents. It is unmarked with respect to 'influence'.

(20) $\llbracket \text{par} \rrbracket = \lambda x \lambda f.\,\text{Source}(f, x)$ (type eft)

(24) $\llbracket \text{de} \rrbracket = \lambda x \lambda f,\text{Source}(f, x).\hat{0}$ (type $ef\hat{p}$, where $\hat{p}$ is a pragmatic polarity)

Thanks!

You can find the handout at tinyurl.com/FrenchDoubleAgents.

5   More data

With *par*:

(27) a.   *... un sentier **surplombé par** des rochers de grès rose tout le long du parcours*[4]

'... a small path that winds **at the feet** of pink sandstone cliffs all along the way'

b.   *... un stade **surplombé par** un tremplin de saut à ski*[5]

'... a [soccer] stadium **overlooked by** a ski jump'

c.   *1° cas particulier: mars. Ce mois est **précédé par** le mois de février avec ses 28 jours (ou ses 29 jours les années bissextiles) donc pas de remontage le 30! ... Conclusion: un grand remontage le 1° mars convient très bien.*[6]

'1st special case: March. This month is **preceded by** February with its 28 days (or its 29 days in leap year) so there is no winding on the 30th! ... Conclusion: a large winding on March 1 fits very well.'

With *de*:

(28) a.   *... hauts plateaux désolés **surplombés de** sommets déchiquetés*[7]

'... desolate highlands **overlooked by** jagged mountain tops'

b.   *... un mur d'enceinte **surplombé de** barbelé*[8]

'... a compound wall **surmounted by** barbed wire'

c.   *... un escalier massif en pierre, **surplombé de** moulures de très belle facture*[9]

'... a massive stone stairway **surmounted by** exquisitely carved moulding'

d.   *... à l'intérieur d'un cercle **surplombé d'**une flèche dans toutes les formes de publicité*[10]

'... inside a circle **superimposed by** an arrow in all types of advertising'

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4. netrando.com/fr/direct/PHALDAB012.htm, captured by Linguee.com, retrieved December 8, 2021.

5. fr.fifa.com/tournaments/archive/tournament=102/edition=6946/news/newsid=88409.html, captured by Linguee.com, retrieved December 8, 2021.

6. slideplayer.fr/slide/1715871/, retrieved December 8, 2021.

7. lesdeuxvoyageurs.com/Inde/Ladakh2005/Accueil$_L$adakh/Accueil$_L$adakh2005.html, retrieved December 8, 2021.

8. haitiministries.com/www/nouvelles/, retrieved December 8, 2021.

9. goodwork.com/fr/locations.php, retrieved December 8, 2021.

10. hc-sc.gc.ca/hc-ps/consult/2004/rpiwta-prirsfept/draft-ebauche-fra.php, retrieved June 15, 2013 by http://web.archive.org.

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