Examples of Accessibility Constraint Modelling

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Calligramme

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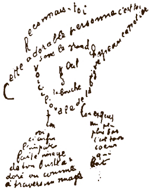

Accessibility
Anaphoric pronouns and their antecedents

Example (Existentials, proper nouns, and negation)

- John owns a car.

Accessibility

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Example (Existentials, proper nouns, and negation)

- John owns a car.
- $\exists x\, \mathbf{car}\, x \wedge \mathbf{own}\, \mathbf{j}\, x$

Accessibility

Anaphoric pronouns and their antecedents

Example (Existentials, proper nouns, and negation)

- John owns a car. It is red.
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- John owns a car. It is red.
- $\exists x\, \mathbf{car}\, x \wedge \mathbf{own}\, \mathbf{j}\, x \wedge \mathbf{red}\, x$
- John doesn't own a car.

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- John owns a car. It is red.
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- $\neg(\exists x\, \mathbf{car}\, x \wedge \mathbf{own}\, \mathbf{j}\, x)$

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- John doesn't own a car. He is ecology-minded.
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What we've learned from DRT:

- Indefinite noun phrases (existentials) introduce discourse referents
- Negation limits the accessibility of discourse referents (existentials $\neq$ proper nouns)

Accessibility

Anaphoric Pronouns and Their Antecedents

Example (Hierarchical structure of the discourse [Busquets et al.(2001)])

- Jean est à
  l'hôpital.

Accessibility

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Example (Hierarchical structure of the discourse [Busquets et al.(2001)])

- Jean est à l'hôpital.
- Marie lui a cassé le nez.

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Example (Hierarchical structure of the discourse [Busquets et al.(2001)])

- Jean est à l'hôpital.
- Marie lui a cassé le nez.
- Pierre lui a cassé le bras..

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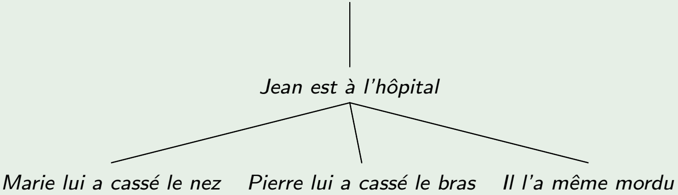

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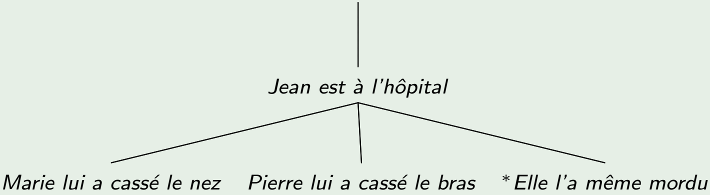

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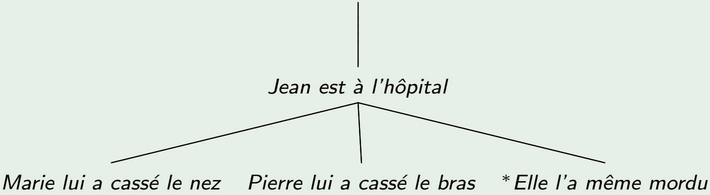

What we've learned from theories on rhetorical structure

- Segments of the discourse stand in relation to each other
- Depending on the relation (*coordinating*, *subordinating*), discourse markers are accessible or not

Formal framework
Motivations

Requirement: Standard notions of interpretation

- Unlike DRT/DPL:
  - Dynamic scoping
  - Destructive assignment
- SDRT: idem

Requirement: Declarative approach to accessibility constraints

- Accessibility defined on the representation language, not on a meta-level.

Aims

Adapting [de Groote(2006)]

- Management of proper nouns
- Negation and accessibility of discourse referents

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Modelling of other theories

We do not commit ourselves with any specific theory. Consequently, our approach is independent of the target logic that is used to express the meaning of the expressions. [de Groote(2006)]

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Adapting [de Groote(2006)]

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- Negation and accessibility of discourse referents

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Modelling the RFC

Outline

Accessibility

The Context (Accessible Discourse Referents) as an Argument

Interpretation of sentences

$$[\![s]\!] = \gamma \rightarrow (\gamma \rightarrow t) \rightarrow t$$

$$\underbrace{\overbrace{\qquad\qquad}^{e:\gamma}\; S \;\overbrace{\qquad\qquad}^{\phi:\gamma\rightarrow t}}_{t}$$

Composition of sentences

$$[\![S_1 . S_2]\!] = \lambda e \phi . [\![S_1]\!]\, e\, (\lambda e' . [\![S_2]\!]\, e'\, \phi)$$

$$\overbrace{\qquad\qquad}^{e::\gamma}\; S_1 . \underbrace{S_2 \;\overbrace{\qquad\qquad}^{\phi:\gamma\rightarrow t}}_{\lambda e' . [\![S_2]\!]\, e'\, \phi:\gamma\rightarrow t}$$

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$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\, (\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

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$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\, (\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

John owns a car

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Composition of sentences

$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\,(\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

John owns a car

j y
car y
own **j** y

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Composition of sentences

$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\,(\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

John owns a car

j y
car y
own j y

$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own\, j}\, y \wedge \phi\,(y :: e)$

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Example

John owns a car	**j** y / **car** y / **own j** y	$\lambda e\phi.\exists y.\mathbf{car}\ y \wedge \mathbf{own\ j}\ y \wedge \phi\,(y :: e)$
it		

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$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\, (\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

John owns a car	$\mathbf{j}$ y / $\mathbf{car}\ y$, $\mathbf{own}\ \mathbf{j}\ y$	$\lambda e\phi.\exists y.\mathbf{car}\ y \wedge \mathbf{own}\ \mathbf{j}\ y \wedge \phi\,(y :: e)$
it	z=?	

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$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\, (\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

John owns a car	**j** y / **car** y / **own j** y	$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own}\,\mathbf{j}\, y \wedge \phi\,(y :: e)$
it	z=?	$\lambda P e\phi.P\,(\mathtt{sel}\ e)\, e\, \phi$

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$$[\![S_1.S_2]\!] = \lambda e\phi.[\![S_1]\!]\, e\,(\lambda e'.[\![S_2]\!]\, e'\, \phi)$$

Example

John owns a car	$\begin{array}{\|c\|}\hline \mathbf{j} \quad y \\ \hline \mathbf{car}\, y \\ \mathbf{own}\, \mathbf{j}\, y \\ \hline \end{array}$	$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own}\, \mathbf{j}\, y \wedge \phi\,(y :: e)$
it	z=?	$\lambda P e\phi.P\,(\mathtt{sel}\ e)\, e\, \phi$
it is red		

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Example

John owns a car	[j y | **car** y, **own j** y]	$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own\, j}\, y \wedge \phi\,(y :: e)$
it	z=?	$\lambda Pe\phi.P\,(\mathtt{sel}\ e)\, e\, \phi$
it is red	[z | **red** z, z =?]	

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it	z=?	$\lambda P e \phi.P\, (\mathtt{sel}\ e)\, e\, \phi$
it is red	$\begin{array}{|c|}\hline z \\ \hline \mathbf{red}\ z \\ z = ? \\ \hline \end{array}$	$\lambda e \phi.\mathbf{red}(\mathtt{sel}\ e) \wedge \phi\, e$

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Example

John owns a car	$\mathbf{j}\ \ y$ $\mathbf{car}\, y$ $\mathbf{own}\,\mathbf{j}\, y$	$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own}\,\mathbf{j}\, y \wedge \phi\, (y :: e)$
it	z=?	$\lambda P e\phi.P\, (\mathtt{sel}\ e)\, e\, \phi$
it is red	z $\mathbf{red}\, z$ $z = ?$	$\lambda e\phi.\mathbf{red}(\mathtt{sel}\ e) \wedge \phi\, e$

John owns a car
it is red

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John owns a car	$\begin{array}{\|c\|}\hline \mathbf{j}\quad y \\ \hline \mathbf{car}\, y \\ \mathbf{own}\, \mathbf{j}\, y \\ \hline \end{array}$	$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own}\, \mathbf{j}\, y \wedge \phi\, (y :: e)$
it	$z=?$	$\lambda Pe\phi.P\, (\mathtt{sel}\, e)\, e\, \phi$
it is red	$\begin{array}{\|c\|}\hline z \\ \hline \mathbf{red}\, z \\ z = ? \\ \hline \end{array}$	$\lambda e\phi.\mathbf{red}(\mathtt{sel}\, e) \wedge \phi\, e$
John owns a car *it is red*	$\begin{array}{\|c\|}\hline \mathbf{j}\quad y\quad z \\ \hline \mathbf{car}\, y \\ \mathbf{own}\, \mathbf{j}\, y \\ \mathbf{red}\, z \\ z = y \\ \hline \end{array}$	

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Example

John owns a car

$$\begin{array}{|c|}\hline \mathbf{j} \quad y \\ \hline \mathbf{car}\, y \\ \mathbf{own}\, \mathbf{j}\, y \\ \hline \end{array}$$

$$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own}\, \mathbf{j}\, y \wedge \phi\, (y :: e)$$

it

z=?

$$\lambda P e\phi.P\, (\mathtt{sel}\, e)\, e\, \phi$$

it is red

$$\begin{array}{|c|}\hline z \\ \hline \mathbf{red}\, z \\ z = ? \\ \hline \end{array}$$

$$\lambda e\phi.\mathbf{red}(\mathtt{sel}\, e) \wedge \phi\, e$$

John owns a car
it is red

$$\begin{array}{|c|}\hline \mathbf{j} \quad y \quad z \\ \hline \mathbf{car}\, y \\ \mathbf{own}\, \mathbf{j}\, y \\ \mathbf{red}\, z \\ z = y \\ \hline \end{array}$$

$$\lambda e\phi.\exists y.\mathbf{car}\, y \wedge \mathbf{own}\, \mathbf{j}\, y \wedge \mathbf{red}(\mathtt{sel}\, y :: e) \wedge \phi\, (y :: e)$$

Lexical Semantics

Lexicon

$$
\begin{aligned}
[\![John]\!] &= \lambda P e \phi . P\, \mathbf{j}\, e\, \phi \\
[\![owns]\!] &= \lambda O S . S(\lambda x . O(\lambda y e' \phi' . \mathbf{own}\, x\, y \wedge \phi'\, e')) \\
[\![a]\!] &= \lambda P Q e \phi . \exists y . P\, y\, (y :: e)\, \phi \wedge Q\, y\, (y :: e)\, \phi \\
[\![car]\!] &= \lambda x e \phi . \mathbf{car}\, x
\end{aligned}
$$

Lexical Semantics

Lexicon

$$
\begin{aligned}
[\![John]\!] &= \lambda Pe\phi.P\,\mathbf{j}\,e\,\phi \\
[\![owns]\!] &= \lambda OS.S(\lambda x.O(\lambda ye'\phi'.\mathbf{own}\,x\,y \wedge \phi'\,e')) \\
[\![a]\!] &= \lambda PQe\phi.\exists y.P\,y\,(y :: e)\,\phi \wedge Q\,y\,(y :: e)\,\phi \\
[\![car]\!] &= \lambda xe\phi.\mathbf{car}\,x
\end{aligned}
$$

Example

$$
\begin{aligned}
[\![a]\!]\,[\![car]\!] &= \lambda Qe\phi.\exists y.\mathbf{car}\,y \wedge Q\,y\,(y :: e)\,\phi \\
[\![owns]\!]([\![a]\!]\,[\![car]\!]) &= \lambda S.S(\lambda x.(\lambda Qe\phi.\exists y.\mathbf{car}\,y \wedge Q\,y\,(y :: e)\,\phi) \\
&\qquad (\lambda ye'\phi'.\mathbf{own}\,x\,y \wedge \phi'\,e')) \\
&= \lambda S.S(\lambda x.(\lambda e\phi.\exists y.\mathbf{car}\,y \wedge (\lambda ye'\phi'.\mathbf{own}\,x\,y \wedge \phi'\,e')\,y\,(y :: e)\,\phi)) \\
&= \lambda S.S(\lambda x.(\lambda e\phi.\exists y.\mathbf{car}\,y \wedge (\mathbf{own}\,x\,y \wedge \phi\,(y :: e)))) \\
[\![owns]\!]([\![a]\!]\,[\![car]\!])[\![John]\!] &= (\lambda Pe\phi.P\,\mathbf{j}\,e\,\phi)(\lambda x.(\lambda e\phi.\exists y.\mathbf{car}\,y \wedge (\mathbf{own}\,x\,y \wedge \phi\,(y :: e)))) \\
&= (\lambda e\phi.(\lambda x.(\lambda e\phi.\exists y.\mathbf{car}\,y \wedge (\mathbf{own}\,x\,y \wedge \phi\,(y :: e))))\,\mathbf{j}\,e\,\phi) \\
&= \lambda e\phi.\exists y.\mathbf{car}\,y \wedge (\mathbf{own}\,\mathbf{j}\,y \wedge \phi\,(y :: e))
\end{aligned}
$$

Existentials and negation [de Groote(2007)]

Existential quantification

$$\Sigma x.Px \triangleq \lambda e\phi.\exists x.P\,x\,(x :: e)\,\phi$$

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$$\tilde{}A \triangleq \lambda e\phi.\neg(A\,e\,(\lambda e.\top)) \wedge \phi\,e$$

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$$\tilde{\ }A \triangleq \lambda e\phi.\neg(A\,e\,(\lambda e.\top)) \wedge \phi\,e$$

Problems with the negation

- No new discourse referent is added to the environment given to the continuation
- But proper nouns should be added

The Negation Revisited

Reminder: Negation

$$\tilde{~}A \triangleq \lambda e\phi.\neg(A\,e\,(\lambda e.\top)) \wedge \phi\,e$$

The Negation Revisited

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$$\sim A \triangleq \lambda e\phi.\neg(A\, e\, (\lambda e.\top)) \wedge \phi\, e$$

Alternative proposals

$$\sim A \quad \triangleq \lambda e\phi.\neg(A\, e\, (\lambda e'.\phi\, e))$$

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Alternative proposals

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\tilde{}A &\triangleq \lambda e\phi.\neg(A\,e\,(\lambda e'.\phi\,e))\\
\tilde{}A &\triangleq \lambda e\phi.\neg(A\,e\,(\lambda e'.\neg(\phi\,e)))\\
\tilde{}A &\triangleq \lambda e_1 e_2\phi.\neg(A e_1 e_2(\lambda e_1' e_2'.\neg(\phi e_1' e_2)))\\
[\![owns]\!] &= \lambda OS.S(\lambda x.O(\lambda y e'\phi'.\mathbf{own}\,x\,y \wedge \phi'\,e'))
\end{aligned}$$

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\end{aligned}$$

Our proposal

$$\begin{aligned}
[\![s]\!] &\triangleq \kappa \rightarrow \gamma \rightarrow \gamma \rightarrow (\kappa \rightarrow \gamma \rightarrow \gamma \rightarrow o) \rightarrow o \qquad (\kappa \triangleq o \rightarrow o \rightarrow o)\\
\tilde{\ }A &\triangleq \lambda c e_1 e_2\phi.\neg(A\,(\neg c)\,e_1\,e_2(\lambda c' e_1' e_2'.\neg(\phi c' e_1' e_2)))
\end{aligned}$$

The Negation Revisited

Reminder: Negation

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Alternative proposals

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\tilde{}A &\triangleq \lambda e\phi.\neg(A\,e\,(\lambda e'.\neg(\phi\,e))) \\
\tilde{}A &\triangleq \lambda e_1 e_2\phi.\neg(A e_1 e_2(\lambda e'_1 e'_2.\neg(\phi e'_1 e_2))) \\
[\![owns]\!] &= \lambda OS.S(\lambda x.O(\lambda y e'\phi'.\mathbf{own}\,x\,y \wedge \phi'\,e'))
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$$\begin{aligned}
[\![s]\!] &\triangleq \kappa \rightarrow \gamma \rightarrow \gamma \rightarrow (\kappa \rightarrow \gamma \rightarrow \gamma \rightarrow o) \rightarrow o \qquad (\kappa \triangleq o \rightarrow o \rightarrow o) \\
\tilde{}A &\triangleq \lambda c e_1 e_2\phi.\neg(A\,(\neg c)\,e_1\,e_2(\lambda c' e'_1 e'_2.\neg(\phi c' e'_1 e_2))) \\
[\![s_1.s_2]\!] &= \lambda c e_1 e_2\phi.[\![s_1]\!]\,c\,e_1\,e_2(\lambda c' e'_1 e'_2.[\![s_2]\!] c' e'_1 e'_2\phi)
\end{aligned}$$

Example

Lexicon

$$
\begin{aligned}
[\![John]\!] &= \lambda P c e_1 e_2 \phi . P\, \mathbf{j}\, c\, (\mathbf{j} :: e_1)\, e_2\, \phi \\
[\![doesn't]\!] &= \lambda V S c e_1 e_2 \phi . \neg((V\ S)\, (\neg c)\, e_1\, e_2 (\lambda c' e'_1 e'_2 . \neg(\phi\, c'\, e'_1\, e_2))) \\
[\![owns]\!] &= \lambda O S . S(\lambda x . O(\lambda y c' e'_1 e'_2 \phi' . c' (\mathbf{own}\, x\, y)(\phi'\, c'\, e'_1\, e'_2))) \\
[\![a]\!] &= \lambda P Q c e_1 e_2 \phi . \exists x . [\lambda \phi' . (P\, x\ \ c\, e_1\, e_2\, \phi') \wedge (Q\, x\, c\, e_1\, e_2\, \phi')](\lambda c' e'_1 e'_2 . \phi c e'_1 (x :: e'_2)) \\
[\![car]\!] &= \lambda x c e_1 e_2 \phi . c(\mathbf{car}\, x)(\phi\, c\, e_1\, e_2) \\
[\![he]\!] &= \lambda P c e_1 e_2 \phi . P\, (\mathtt{sel}\ e_1 \cup e_2) \\
[\![it]\!] &= \lambda P c e_1 e_2 \phi . P\, (\mathtt{sel}\ e_1 \cup e_2) \\
[\![is]\!] &= \lambda A S . S(\lambda x c' e'_1 e'_2 \phi' . c'(A(\lambda y c'' e''_1 e''_2 \phi'' . \top) x\, c'\, e'_1\, e'_2\, \phi')(\phi'\, c'\, e'_1\, e'_2)) \\
[\![red]\!] &= \lambda P x c e_1 e_2 \phi . (P\, x\, c\, e_1\, e_2\, \phi) \wedge (\mathbf{red}\, x)
\end{aligned}
$$

Example

Lexicon

$$
\begin{array}{ll}
[\![John]\!] & = \lambda P c e_1 e_2 \phi . P\, \mathbf{j}\, c\, (\mathbf{j} :: e_1)\, e_2\, \phi \\
[\![doesn't]\!] & = \lambda V S c e_1 e_2 \phi . \neg((V\ S)\ (\neg c)\ e_1\ e_2 (\lambda c' e_1' e_2' . \neg(\phi\ c'\ e_1'\ e_2))) \\
[\![owns]\!] & = \lambda O S . S(\lambda x . O(\lambda y c' e_1' e_2' \phi' . c' (\mathbf{own}\ x\ y)(\phi'\ c'\ e_1'\ e_2'))) \\
[\![a]\!] & = \lambda P Q c e_1 e_2 \phi . \exists x . [\lambda \phi' . (P\ x\ \ c\ e_1\ e_2\ \phi') \wedge (Q\ x\ c\ e_1\ e_2\ \phi')](\lambda c' e_1' e_2' . \phi c e_1' (x :: e_2')) \\
[\![car]\!] & = \lambda x c e_1 e_2 \phi . c (\mathbf{car}\ x)(\phi\ c\ e_1\ e_2) \\
[\![he]\!] & = \lambda P c e_1 e_2 \phi . P\ (\mathtt{sel}\ e_1 \cup e_2) \\
[\![it]\!] & = \lambda P c e_1 e_2 \phi . P\ (\mathtt{sel}\ e_1 \cup e_2) \\
[\![is]\!] & = \lambda A S . S(\lambda x c' e_1' e_2' \phi' . c' (A(\lambda y c'' e_1'' e_2'' \phi'' . \top) x\ c'\ e_1'\ e_2'\ \phi')(\phi'\ c'\ e_1'\ e_2')) \\
[\![red]\!] & = \lambda P x c e_1 e_2 \phi . (P\ x\ c\ e_1\ e_2\ \phi) \wedge (\mathbf{red}\ x)
\end{array}
$$

Example (d=*John doesn't own a car. *It is red*)

$$[\![d]\!]\ (\wedge)\ \mathtt{nil}\ \mathtt{nil}\ \phi_e = (\neg \exists y . (\mathbf{car}\ y \wedge \mathbf{owe}\ \mathbf{j}\ y)) \wedge \mathbf{red}(\mathtt{sel}\ (\mathbf{j} :: \mathtt{nil}))$$

with $\phi_e = \lambda c e_1 e_2 . \neg(c \top \bot)$

Example

Lexicon

$$
\begin{aligned}
[\![John]\!] &= \lambda P c e_1 e_2 \phi . P\,\mathbf{j}\,c\,(\mathbf{j} :: e_1)\,e_2\,\phi \\
[\![doesn't]\!] &= \lambda V S c e_1 e_2 \phi . \neg((V\,S)\,(\neg c)\,e_1\,e_2(\lambda c' e_1' e_2' . \neg(\phi\,c'\,e_1'\,e_2))) \\
[\![owns]\!] &= \lambda O S . S(\lambda x . O(\lambda y c' e_1' e_2' \phi' . c'(\mathbf{own}\,x\,y)(\phi'\,c'\,e_1'\,e_2'))) \\
[\![a]\!] &= \lambda P Q c e_1 e_2 \phi . \exists x . [\lambda \phi' . (P\,x\;\;c\,e_1\,e_2\,\phi') \wedge (Q\,x\,c\,e_1\,e_2\,\phi')](\lambda c' e_1' e_2' . \phi c e_1' (x :: e_2')) \\
[\![car]\!] &= \lambda x c e_1 e_2 \phi . c(\mathbf{car}\,x)(\phi\,c\,e_1\,e_2) \\
[\![he]\!] &= \lambda P c e_1 e_2 \phi . P\,(\mathtt{sel}\;e_1 \cup e_2) \\
[\![it]\!] &= \lambda P c e_1 e_2 \phi . P\,(\mathtt{sel}\;e_1 \cup e_2) \\
[\![is]\!] &= \lambda A S . S(\lambda x c' e_1' e_2' \phi' . c'(A(\lambda y c'' e_1'' e_2'' \phi'' . \top) x\,c'\,e_1'\,e_2'\,\phi')(\phi'\,c'\,e_1'\,e_2')) \\
[\![red]\!] &= \lambda P x c e_1 e_2 \phi . (P\,x\,c\,e_1\,e_2\,\phi) \wedge (\mathbf{red}\,x)
\end{aligned}
$$

Example (d=*John doesn't own a car. He is ecology-minded*)

$$[\![d]\!]\,(\wedge)\,\mathtt{nil}\,\mathtt{nil}\,\phi_e = (\neg\exists y . (\mathbf{car}\,y \wedge \mathbf{owe}\,\mathbf{j}\,y)) \wedge \mathbf{ecolo}(\mathtt{sel}(\mathbf{j} :: \mathtt{nil}))$$

with $\phi_e = \lambda c e_1 e_2 . \neg(c\,\top\bot)$

The RFC

Its modelling

Jean est à l'hôpital

Marie lui a cassé le nez

Pierre lui a cassé le bras

Il l'a même mordu / Elle l'a même mordu

The RFC
Its modelling

Jean est à l'hôpital

Marie lui a cassé le nez | *Pierre lui a cassé le bras* | *Il l'a même mordu / Elle l'a même mordu*

Coordinating and Subordinating Sentence Composition

- Two compositions: $- ._{\mathbf{c}} -$ and $- ._{\mathbf{s}} -$
- $\kappa \triangleq \gamma \rightarrow \gamma \rightarrow \gamma$
- $[\![s]\!] \triangleq \kappa \rightarrow \gamma \rightarrow \gamma \rightarrow (\kappa \rightarrow \gamma \rightarrow \gamma \rightarrow t) \rightarrow t$
- $\mathbf{Coord} = \lambda l_{ast} d_{om}.d_{om}$ and $\mathbf{Sub} = \lambda l_{ast} d_{om}.l_{ast} \cup d_{om}$

$$[\![s_1 ._{\mathbf{s}} s_2]\!] = \lambda c l_{ast} d_{om} \phi.[\![s_1]\!]\ c\ l_{ast}\ d_{om} (\lambda c' l_{ast1} d_{om2}.[\![s_2]\!]\ \mathbf{Sub}\ l_{ast1}\ (c\ l_{ast}\ d_{om})\ \phi)$$
$$[\![s_1 ._{\mathbf{c}} s_2]\!] = \lambda c l_{ast} d_{om} \phi.[\![s_1]\!]\ c\ l_{ast}\ d_{om} (\lambda c' l_{ast1} d_{om2}.[\![s_2]\!]\ \mathbf{Coord}\ l_{ast1}\ (c\ l_{ast}\ d_{om})\ \phi)$$

The RFC

Its modelling

Jean est à l'hôpital

Marie lui a cassé le nez *Pierre lui a cassé le bras* *Il l'a même mordu/Elle l'a même mordu*

Coordinating and Subordinating Sentence Composition

- Two compositions: $-._{\mathbf{c}}-$ and $-._{\mathbf{s}}-$
- $\kappa \triangleq \gamma \rightarrow \gamma \rightarrow \gamma$
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- $\mathbf{Coord} = \lambda l_{ast} d_{om}.d_{om}$ and $\mathbf{Sub} = \lambda l_{ast} d_{om}.l_{ast} \cup d_{om}$

$$[\![s_1 ._{\mathbf{s}} s_2]\!] = \lambda c l_{ast} d_{om} \phi.[\![s_1]\!]\ c\ l_{ast}\ d_{om} (\lambda c' l_{ast\,1} d_{om\,2}.[\![s_2]\!]\ \mathbf{Sub}\ l_{ast\,1}\ (c\ l_{ast}\ d_{om})\ \phi)$$
$$[\![s_1 ._{\mathbf{c}} s_2]\!] = \lambda c l_{ast} d_{om} \phi.[\![s_1]\!]\ c\ l_{ast}\ d_{om} (\lambda c' l_{ast\,1} d_{om\,2}.[\![s_2]\!]\ \mathbf{Coord}\ l_{ast\,1}\ (c\ l_{ast}\ d_{om})\ \phi)$$

Hypothesis:
John est à l'hôpital$._{\mathbf{s}}$(*Marie lui a cassé le nez*$._{\mathbf{c}}$*Pierre lui a cassé le bras*$._{\mathbf{c}}$*Il l'a même mordu*)

Subordinating and coordinating composition

$$\textbf{Coord} = \lambda l_{ast} d_{om} . d_{om} \text{ and } \textbf{Sub} = \lambda l_{ast} d_{om} . l_{ast} \cup d_{om}$$

$$[\![s_1 ._{s} s_2]\!] = \lambda c\, l_{ast}\, d_{om} \phi . [\![s_1]\!]\ c\ l_{ast}\ d_{om} (\lambda c'\, l_{ast\,1}\, d_{om\,2} . [\![s_2]\!]\ \textbf{Sub}\ l_{ast\,1}\ (c\ l_{ast}\ d_{om})\ \phi)$$

s_1

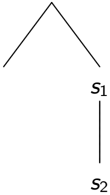
s_2

$$[\![s_1 ._{s} s_2]\!]\textbf{Sub} = \lambda l_{ast}\, d_{om} \phi . [\![s_1]\!]\ \textbf{Sub}\ l_{ast}\ d_{om} (\lambda c'\, l_{ast\,1}\, d_{om\,2} . [\![s_2]\!]\ \textbf{Sub}\ l_{ast\,1}\ (l_{ast} \cup d_{om})\ \phi)$$

Subordinating and coordinating composition

$$\mathbf{Coord} = \lambda l_{ast}\, d_{om}.d_{om} \text{ and } \mathbf{Sub} = \lambda l_{ast}\, d_{om}.l_{ast} \cup d_{om}$$

$$[\![s_1 ._{s} s_2]\!] = \lambda c\, l_{ast}\, d_{om} \phi . [\![s_1]\!]\; c\; l_{ast}\; d_{om} (\lambda c'\, l_{ast1}\, d_{om2} . [\![s_2]\!]\; \mathbf{Sub}\; l_{ast1}\; (c\; l_{ast}\; d_{om})\; \phi)$$

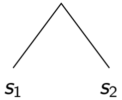


$$[\![s_1 ._{s} s_2]\!] \mathbf{Coord} = \lambda l_{ast}\, d_{om} \phi . [\![s_1]\!]\; \mathbf{Coord}\; l_{ast}\; d_{om} (\lambda c'\, l_{ast1}\, d_{om2} . [\![s_2]\!]\; \mathbf{Sub}\; l_{ast1}\; (d_{om})\; \phi)$$

Subordinating and coordinating composition

$$\textbf{Coord} = \lambda l_{ast}\, d_{om} . d_{om} \text{ and } \textbf{Sub} = \lambda l_{ast}\, d_{om} . l_{ast} \cup d_{om}$$

$$[\![s_1 ._{\mathbf{c}} s_2]\!] \quad = \lambda c\, l_{ast}\, d_{om} \phi . [\![s_1]\!]\; c\; l_{ast}\; d_{om} (\lambda c'\, l_{ast\,1}\, d_{om\,2} . [\![s_2]\!]\; \textbf{Coord}\; l_{ast\,1}\; (c\; l_{ast}\; d_{om})\; \phi)$$

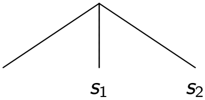


$$[\![s_1 ._{\mathbf{c}} s_2]\!] \textbf{Sub} = \lambda l_{ast}\, d_{om} \phi . [\![s_1]\!]\; \textbf{Sub}\; l_{ast}\; d_{om} (\lambda c'\, l_{ast\,1}\, d_{om\,2} . [\![s_2]\!]\; \textbf{Coord}\; l_{ast\,1}\; (l_{ast} \cup d_{om})\; \phi)$$

Subordinating and coordinating composition

$$\mathbf{Coord} = \lambda l_{ast} d_{om}.d_{om} \text{ and } \mathbf{Sub} = \lambda l_{ast} d_{om}.l_{ast} \cup d_{om}$$

$$[\![s_1 ._{\mathbf{c}} s_2]\!] \quad = \lambda c\, l_{ast}\, d_{om} \phi . [\![s_1]\!]\; c\; l_{ast}\; d_{om} (\lambda c'\, l_{ast\,1}\, d_{om\,2} . [\![s_2]\!]\; \mathbf{Coord}\; l_{ast\,1}\; (c\; l_{ast}\; d_{om})\; \phi)$$



$$[\![s_1 ._{\mathbf{c}} s_2]\!] \mathbf{Coord} = \lambda c\, l_{ast}\, d_{om} \phi . [\![s_1]\!]\; \mathbf{Coord}\; l_{ast}\; d_{om} (\lambda c'\, l_{ast\,1}\, d_{om\,2} . [\![s_2]\!]\; \mathbf{Coord}\; l_{ast\,1}\; (d_{om})\; \phi)$$

Conclusion

Summary

- Extension of [de Groote(2006)]'s modelling of negation
- Different contexts according to their accessibility properties
- Account of the RFC

Perspectives

- Negation?
- Anaphora hierarchy
- Complex discourse structures (Discourse pops, DAG rhetorical structures)
- Interaction with lexical semantics (cf. *contrast*, *parallel*)/salience feature

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