The anaphoric semantics of partial control

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Semantics and Linguistic Theory
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The big picture

- Two mechanisms for handling dependencies between syntactic positions
  - identity – traditionally raising, unbounded dependencies, resumption
  - coindexation – traditionally control, binding
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- Two mechanisms for handling dependencies between syntactic positions
  - identity – traditionally raising, unbounded dependencies, resumption
  - coindexation – traditionally control, binding
- But uniform semantics using bound variables
Variable binding in the semantics

Sketch analyses

relativization: \( \lambda x. P(x) \land Q(x) \)  
(P = head noun, Q = relative clause)

binding: \( \exists/\forall/\lambda x. \Phi(x, x) \)  
(\( \Phi \) = some (complex) formula)

control: \( \lambda x. P(x, Q(x)) \)  
(P = control verb, Q = infinitive)
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control \( \lambda x. P(x, Q(x)) \) \((P = \text{control verb}, Q = \text{infinitive})\)

- Partial coreference is a potential problem:
  - correlatives: Which language a person speaks better, from that nation he is. (Ossetic)
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- Partial coreference is a potential problem:
  - correlatives: Which; language a person speaks better, from that; nation he is. (Ossetic)
  - binding: In every; room the; patient has someone visiting.
  - control: The; chair wants \( \Delta \); to gather at five.
Two strategies

Implicit material

Which language a person speaks better, from the nation (with that language) he is.
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- Which language a person speaks better, from the nation (with that language) he is.
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- Which language a person speaks better, from the nation (with that language) he is.
- In every room the patient (in the room) has someone visiting.
- The chair wants ∆ to gather (with the committee) at five.
Two strategies

Implicit material

- Which $i$ language a person speaks better, from the nation (with that $i$ language) he is.
- In every $i$ room the patient (in the $i$ room) has someone visiting.
- The $i$ chair wants $\Delta_i$ to gather (with the commitee) at five.
  or
- The $i$ chair wants $\Delta_i+_+$ to gather at five.
Two strategies

Implicit material

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- The chair wants \( \Delta \) to gather (with the committee) at five.
  or
- The chair wants \( \Delta^+ \) to gather at five.

Bridging

- Assimilate to bridging inferences *language* – *nation*, *room* – *patient*, *chair* – *committee*
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- Assimilate to bridging inferences language – nation, room – patient, chair – committee
- → Distinguish identity and coindexation in the semantics too
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Bridging

- Assimilate to bridging inferences language – nation, room – patient, chair – committee
- → Distinguish identity and coindexation in the semantics too
- I will argue against implicit material and for bridging in partial control
A caveat

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  - LFG has assumed a split syntactic analysis based on case behaviour since Bresnan (1982); Andrews (1982)

- Recent split analysis based on PC/EC distinction (Cinque, 2006; van Urk, 2010; Grano, 2012; Sheehan, to appear)
- Correlation of case and PC/EC (van Urk, 2010; Sheehan, to appear)

In line with this work, I assume that control is not unitary
- EC involves identity and therefore no case independence and no anaphoric semantics
- PC involves coindexation and therefore case independence and binding of a real (logophoric) pronoun
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The phenomenon

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   a. The chair wanted to gather at six.  
   b. The chair preferred to gather at six.  
   c. The chair agreed to gather at six.
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(1)   a. The chair wanted to gather at six.  
b. The chair preferred to gather at six.  
c. The chair agreed to gather at six.

(2)   a. *The chair tried to gather at six.  
b. *The chair began to gather at six.  
c. *The chair managed to gather at six.
Correlation with tense

This correlates with the ability to shift the time:

(3)  
  a. The chair wanted to hold the meeting tomorrow.  
  b. The chair preferred to hold the meeting tomorrow.  
  c. The chair agreed to hold the meeting tomorrow.
Correlation with tense

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(4) a. *The chair tried to hold the meeting tomorrow.
b. *The chair began to hold the meeting tomorrow.
c. *The chair managed to hold the meeting tomorrow.
Semantic plural, syntactic singular

No plural anaphor

(5) a. *The chair wanted to meet each other.
b. *The chair preferred to meet each other.
c. *The chair agreed to meet each other.
Obligatory *de se*

Mistaken identity (Pearson, 2013, p. 307)

(6) John is an amnesiac. He is watching footage of an Olympic figure skating competition in which he competed, although he has forgotten this fact, and does not even recognise himself on the screen. He says ‘I think that team is going to win the medal, look how well they work together.’
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a. #John expects to win the medal by working well together.
b. John\textsubscript{i} expects that they\textsubscript{i+} will win the medal by working well together.
White & Grano (2013)

Mean rating by verb and embedded predicate type

- Embedd predicate type
  - collective
  - noncollective

- Mean rating

- Dag Haug

Partial control

SALT, 31 May 2014
Semantics (Pearson, to appear)

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- Only one developed analysis, foundational paper, though ultimately problematic analysis
- Basic idea found already in Asudeh (2005):
  \[ \lambda x. \lambda P. \exists y. want(x, P(y) \land x \subseteq y) \]
- The control verb ‘shifts’ the interpretation of the controllee to a superset containing the controller
Centered worlds semantics

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- $c'$ extends $c$ iff
  - $c_W = c'_W$
  - $c_A \subseteq c'_A$
  - $c_T \subseteq c'_T$ or $c_T < c'_T$ or $c_T > c'_T$
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- So the shifting of the time and the individual coordinates is hardcoded in the lexical semantics of PC verbs.
Bundling the shifting of the time and individual coordinates seems attractive, but it is not clear that *extends* is a unified concept.
Problems

- Bundling the shifting of the time and individual coordinates seems attractive, but it is not clear that *extends* is a unified concept.
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Also, since the time and subject are both shifted in the semantics of the verb, we predict that the shifted times take the same, low scope.
(7) Everybody wanted to have lunch together.
Scope problems I: Quantification

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\( \forall x. \forall c \in \text{want}_{x,n,w} \) there is an extension \( c' \) of \( c \) such that the center of \( c' \) has lunch together in \( c' \)

For all \( x \), \( x \) wants that there is a plurality \( y \supseteq x \) such that \( y \) has lunch together
Previous work

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- Much easier to get a distribute reading of the time (… but they all had different time preferences)
(8) John is lonely. He wants to have lunch together.
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$$\forall c \in \text{want}_{j,n,w} \text{ there is an extension } c' \text{ of } c \text{ such that the center of } c' \text{ has lunch together in } c'$$

John wants that there is some plurality $y \supseteq john$ such that $y$ has lunch together
Scope problems II: Modality

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- This non-specific reading is not available
- Instead PRO refers to controller + discourse participants
(9) John is looking for a group of elves. He wants to have lunch together.

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- We get an intensional reading of PRO (but not the predicted one)
- All of these scope facts motivate an anaphoric approach, which predicts the context sensitivity of PC
The core idea

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Pronouns are generally fully covariant with their antecedents, but there is some limited leeway
So PC is essentially a repair strategy in cases where a singular interpretation does not make sense
This strategy is not available for EC verbs, which involve syntactic identity rather than coindexation and therefore no bound pronoun
On the other hand, we would expect PC to show variability according to context (including choice of matrix verb)
Pronouns in bridging (Nouwen, 2003; Geurts, 2011)

As far as DRT is concerned, pronouns are just semantically attenuated definite descriptions.

(10) We cannot use John's car. #All four of them are flat. (Nouwen, 2003, ex. 3.81)

But does not make it impossible:

(11) My next-door neighbours make a lot of noise. He plays the drums and she keeps on shouting at him.

(12) John kept on staring at the newly-wed couple. She resembled a childhood sweetheart of his.

(13) The priest was tortured for days. They wanted him to reveal where the insurgents were hiding out.

(14) When Little Johnny threw up, was there any pencil-eraser in it?
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- This overgenerates and leaves unexplained why PRO isn’t syntactically plural.
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- One way out is to assume a “plural PRO” referring to a plurality containing the attitude center (Stephenson, 2010)
- This overgenerates and leaves unexplained why PRO isn’t syntactically plural
- So we assume that PRO is bound to the matrix controller (Maier, 2011) and reflects the agreement features of its antecedent, although its reference can be affected by bridging
The reference of PRO

- Feature mismatch when necessary because bound pronoun (as in Pearson, to appear)

Uniqueness criterion for pronominal bridging (Nouwen, 2003) predicts the absence of "superset control" (Landau, 2000, p. 7):

*The i chair was glad the j commitee had agreed to PRO i ⊂ j wear a tie.

Salient plurality can be constructed by adding speaker/hearer Other predictions unclear at this stage (and so is the data), but the bridging theory is generally consistent with the variable judgement of the data in White & Grano (2013)

Parallel with complement anaphora (Nouwen, 2003, p. 79) This account, where complement anaphora are considered to be an extra-ordinary case of anaphora, might (at least partly) explain where this discomfort with pronominal reference to the complement set comes from
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- Uniqueness criterion for pronominal bridging (Nouwen, 2003) predicts the absence of “superset control” (Landau, 2000, 7):
  - *The\textsubscript{i} chair was glad the\textsubscript{j} commitee had agreed to PRO\textsubscript{i} \textsubscript{⊂} \textsubscript{j} wear a tie.
- Salient plurality can be constructed by adding speaker/hearer
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Parallel with complement anaphora (Nouwen, 2003, p. 79)

This account, where complement anaphora are considered to be an extraordinary case of anaphora, might (at least partly) explain where this discomfort with pronominal reference to the complement set comes from
Partial CDRT (Haug, 2013)

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- So we can talk about drefs and their reference in our logic
- Generally we only want to say “$x_1$ must have an accessible antecedent” and leave the actual resolution to the pragmatics
Sample discourse

John$_1$ hid Bill’s$_2$ key$_3$.

<table>
<thead>
<tr>
<th>$x_1$</th>
<th>$x_2$</th>
<th>$x_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$john(x_1)$</td>
<td>$bill(x_2)$</td>
<td>$key(x_3)$</td>
</tr>
<tr>
<td>$poss(x_2, x_3)$</td>
<td>$hide(x_1, x_3)$</td>
<td></td>
</tr>
</tbody>
</table>

$A = \{ \}$
Sample discourse

John\(_1\) hid Bill’s\(_2\) key\(_3\). He\(_4\) was drunk.

\[
\begin{array}{cccc}
  x_1 & x_2 & x_3 & \bar{x}_4 \\
  john(x_1) & bill(x_2) & key(x_3) & poss(x_2, x_3) & hide(x_1, x_3) & drunk(x_4)
\end{array}
\]

\[\mathcal{A} = \{ x_4 \mapsto x_1 \} \]
Sample discourse

John$_1$ hid Bill’s$_2$ key$_3$. He$_4$ was drunk. So he$_5$ shouldn’t drive.

<table>
<thead>
<tr>
<th>$x_1$</th>
<th>$x_2$</th>
<th>$x_3$</th>
<th>$\bar{x}_4$</th>
<th>$\bar{x}_5$</th>
</tr>
</thead>
<tbody>
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<td>\textit{john}(x$_1$)</td>
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$\mathcal{A} = \{ x_4 \mapsto x_1, x_4 \mapsto x_2, x_5 \mapsto x_4 \}$
John_1 hid Bill’s_2 key_3. He_4 was drunk. So he_5 shouldn’t drive.

<table>
<thead>
<tr>
<th>x₁</th>
<th>x₂</th>
<th>x₃</th>
<th>̄x₄</th>
<th>̄x₅</th>
</tr>
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<td>hide(x₁, x₃)</td>
</tr>
<tr>
<td>drunk(x₄)</td>
<td>shouldn’t drive(x₅)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ant(x₄)</td>
<td>ant(x₅)</td>
<td></td>
<td></td>
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\[ A = \{ x₄ \mapsto x₂, x₅ \mapsto x₄ \} \]
Anaphoric reference in PCDRT

- Separation of monotonic and non-monotonic content → clean account of anaphora
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Extending PCDRT with bridging

John entered the room.

\[
\begin{array}{c|c}
  x_1 & \bar{x}_2 \\
  \hline
  john(x_1) & \\
  \partial(room(x_2)) & \\
  enter(x_1, x_2) & \\
\end{array}
\]
Extending PCDRT with bridging

John entered the room. The chandelier sparkled brightly.

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<tr>
<td></td>
<td></td>
<td>(\text{spark.brightly}(x_3))</td>
</tr>
<tr>
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\[\llbracket K(i)(o) \rrbracket\] is true
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\[ x_1 \bar{x}_2 \bar{x}_3 \]

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- Following Maier (2009) I assume DRSs denote sets of centered worlds \( \langle a, w \rangle \) (so there is always a singleton predicate \textit{center} \)
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Compositional semantics

PRO: \[ \lambda P. \left[ \begin{array}{c} \bar{x}_2 \\ B(x_2)(x_2, A(x_2)) \\ center(A(x_2)) \end{array} \right]; P \]

- Logophor → dual semantics reflecting \textit{aboutness} and \textit{awareness}
Compositional semantics

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- The semantics of attitude verbs specify an attitude center
Compositional semantics

\[
\begin{array}{c|c}
\bar{x}_2 \\
\hline
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& \text{center}(A(x_2))
\end{array}
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- The semantics of attitude verbs specify an attitude center

the chair: \[ \lambda P. \bar{x}_1 ; P(x_1) \]

to gather at six: \[ \lambda x. \text{gather.at.six}(x) \]
## A worked example

**PRO to gather at six**

<table>
<thead>
<tr>
<th>$x_2$</th>
</tr>
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<tbody>
<tr>
<td>$B(x_2)(x_2, A(x_2))$</td>
</tr>
<tr>
<td>$\text{center}(A(x_2))$</td>
</tr>
<tr>
<td>$\text{gather.at.six}(x_2)$</td>
</tr>
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</table>
A worked example

\[ \lambda P. \lambda x. \text{want}(x, \frac{\text{center}(x)}{P}) \]

wants(\text{PRO to gather at six})

\[ \frac{x_2}{B(x_2)(x_2, A(x_2))} \]
\[ \frac{\text{center}(A(x_2))}{\text{gather.at.six}(x_2)} \]
A worked example

\[
\lambda x. \left( \text{want}(x, B(x_2)(x_2, A(x_2))) \right) \]

wants PRO to gather at six
A worked example

the chair wants PRO to gather at six

\[
\begin{array}{|c|}
\hline
\chi_1 \\
\hline
\text{chair}(\chi_1) \\
\hline
\chi_2 \\
\hline
\text{center}(\chi_1) \\
\mathcal{B}(\chi_2)(\chi_2, \mathcal{A}(\chi_2)) \\
\text{center}(\mathcal{A}(\chi_2)) \\
\text{gather.at.six}(\chi_2) \\
\hline
\end{array}
\]
A worked example

the chair wants PRO to gather at six

<table>
<thead>
<tr>
<th>$x_1$</th>
</tr>
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<tbody>
<tr>
<td>$chair(x_1)$</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>$x_2$</th>
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<tbody>
<tr>
<td>$center(x_1)$</td>
</tr>
<tr>
<td>$B(x_2)(x_2, A(x_2))$</td>
</tr>
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<td>$center(A(x_2))$</td>
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</table>

$B(x_2) = \lambda x.\lambda y.y \text{ chairs } x$
A worked example

\[
\begin{array}{|c|}
\hline
x_1 \\
\hline
\text{chair}(x_1) \\
\hline
x_2 \\
\hline
\text{want}(x_1, \\
\text{chairs}(A(x_2), x_2)) \\
\text{center}(A(x_2)) \\
\text{gather.at.six}(x_2) \\
\hline
\end{array}
\]
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\[
\begin{array}{|c|c|}
\hline
x_1 & \text{\textit{chair}}(x_1) \\
\hline
\text{\textit{want}}(x_1, x_2) & \begin{array}{c}
\text{\textit{center}}(x_1) \\
\text{\textit{chairs}}(x_1, x_2) \\
\text{\textit{center}}(x_1) \\
\text{\textit{gather.at.six}}(x_2)
\end{array} \\
\hline
\end{array}
\]

by uniqueness of \textit{center}
Conclusions

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- PC/EC predicate split follows from a syntactic difference, which now has a well-defined semantic correlate.
The missing part: distribution of PC/EC

- Landau’s PC classes (factives, propositionals, desideratives, interrogatives) suggest that PC ↔ attitude verb
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EC verbs could take “smaller” complements, e.g. properties
References I


References III


