A compositional account of contrastive topic in terms of non-cooperativity

Matthijs Westera

Institute for Logic, Language and Computation
University of Amsterdam

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**Main goal**: a compositional account of (1):

(1) Who had what for lunch?
   a. [John]_{CT} had [the beans]_{F}.
   b. [John]_{F} had [the beans]_{CT}.
Goal of this talk

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- **Focus**: (meaning of) nuclear pitch accent in a *falling* phrase.
  (‘congruence with QUD’?)
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- **Focus**: (meaning of) nuclear pitch accent in a *falling* phrase.  
  ('congruence with QUD'?)

- **Contrastive topic**: [...] accent in a (falling-) *rising* phrase.  
  ('existence of a strategy'?)
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(1) Who had what for lunch?
   b. [John]_{F} had [the beans]_{CT}.

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- Contrastive topic: [...] accent in a (falling-)rising phrase.
  (‘existence of a strategy’?)
Promising starting point

Pierrehumbert & Hirschberg (1990)
As streamlined by Hobbs (1990):

1. *: (meaning of) morpheme is important
2. H* vs. L*: new vs. given
3. H+L*: hearer thinks new, but in fact given;
4. L+H*: hearer thinks given, but in fact new.
5. +H / H%: open-endedness.

In the literature: CT \(\approx\) L*+H, or L*H% or L*+H H%

I assume * and +H/H% do the work relevant to us.

Main obstacle for a formal account
How should 'important' and 'open-ended' be formalized?
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How should ‘important’ and ‘open-ended’ be formalized?
Outline

1. The final rise
   Open-endedness = non-cooperativity
   A compositional account

2. Generalizing to the internal rise
   Local contexts
   The compositional account

3. Some predictions
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   Open-endedness = non-cooperativity
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3. Some predictions
1.1. The sentence-final rise

(2) Of John, Bill and Mary, who came to the party?
    John came ↗.
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   John came↗.
   \(\sim\) ...M or B too.
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(2) Of John, Bill and Mary, who came to the party?
    John came↗.
    ~ …M or B too.
    ~ …not sure about M or B.
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(2) Of John, Bill and Mary, who came to the party?
    John came↗.
    ↗ ...M or B too.
    ↗ ...not sure about M or B.
    ↗ ...but I’m not sure.
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(2) Of John, Bill and Mary, who came to the party?
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~ ...did I make myself clear?
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(2) Of John, Bill and Mary, who came to the party?
   John came $\uparrow^L$.
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(2) Of John, Bill and Mary, who came to the party?
John came $\rightarrow^L$.
$\sim \ldots$M or B too. (Quantity)
$\sim \ldots$not sure about M or B. (Relation)
John came $\rightarrow^H$.
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Proposal (Westera, 2013a)

1. The final rise marks the violation of a maxim.
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2. Its pitch conveys \textit{emotivity}. \hspace{1cm} \text{(e.g., Gussenhoven, 2004)}
1.1. The sentence-final rise

(2) Of John, Bill and Mary, who came to the party?
  John came $\nearrow^L$.
    $\leadsto$ ...M or B too. \hspace{2cm} (Quantity)
    $\leadsto$ ...not sure about M or B. \hspace{2cm} (Relation)
  John came $\nearrow^H$.
    $\leadsto$ ...but I’m not sure. \hspace{2cm} (Quality)
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3. This reflects the severity of the violation:
   $\nearrow^H$: Quality/Manner; \hspace{2cm} (cf. Ward & Hirschberg, 1992)
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This proposal is new in its generality, not in spirit.
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1.2. The Maxims of Quantity and Relation

I assume Roelofsen’s (2011) *attentive semantics*:
- Sentences provide *information*; and
- *draw attention to* possibilities (sets of worlds).
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(3) a. John was there. ~ attention only to John
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(3) a. John was there. \(\sim\) attention only to John
    b. John was there, or both J and M. \(\sim\) attention to J, M
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(3) a. John was there.  \[ \sim \text{attention only to John} \]
   b. John was there, or both J and M.  \[ \sim \text{attention to J, M} \]
   c. John was there, and maybe M too.  \[ \sim \text{attention to J, M} \]
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Let \(\mathcal{Q}\) be a set of possibilities, the commonly known QUD.
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**Maxim of Quantity** (cf. Van Rooij & Schulz, 2005)

Establish all \(q \in \mathcal{Q}\) (or \(\mathcal{Q}' \subseteq \mathcal{Q}\)) you know to be true.
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Draw attention to all \( q \in \mathcal{Q} \) compatible with your info state.
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Draw attention to all \(q \in \mathcal{Q}\) compatible with your info state.
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1.3. Predictions

(4) Of John, Bill and Mary, who came to the party?
   John came ↘.
   ~ I don’t know that also B or M did. (Quantity)
   ~ I know that B and M didn’t (Relation)
   " I don't know that also B or M did."
   " I know that B and M didn’t"

One last ingredient: (G&S 1984)

'Indirect compliance': relative to the hearer's information

(5) Was John at the party?
   It was raining

From these basic assumptions, the resulting theory reproduces existing accounts for each reading in isolation.

(see my AC/Semdial talk, Wednesday afternoon)
1.3. Predictions

(4) Of John, Bill and Mary, who came to the party?
John came↗.

∼ I know that also B or M did. (😊 Quantity)
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(4) Of John, Bill and Mary, who came to the party?
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\[ \sim I \text{ know that also } B \text{ or } M \text{ did.} \] (😆 Quantity)

\[ \sim I \text{ don’t know that } B \text{ and } M \text{ didn’t} \] (😭 Relation)
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(4) Of John, Bill and Mary, who came to the party?

John came ∴.

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(4) Of John, Bill and Mary, who came to the party?
John came ☑.

\[ \sim I \text{ don’t know that also } B \text{ or } M \text{ did.} \] (Quantity)

\[ \sim I \text{ don’t know that } B \text{ and } M \text{ didn’t} \] (😊 Relation)

(And likewise for Manner, Quality...)
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\[ \sim I \text{ don't know that } B \text{ and } M \text{ didn't} \quad \text{应急管理)\]}

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\[ \text{(G&S 1984)} \]

> ‘Indirect compliance’: *relative to the hearer’s information*
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   It was raining↘
   \[\sim therefore\ he\ wasn’t\ there\]
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One last ingredient:

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It was raining → ¬ perhaps therefore he wasn’t...

From these basic assumptions, the resulting theory reproduces existing accounts for each reading in isolation.
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1.4. Composing non-at-issue content

I assume intonational meaning is *non-at-issue content*. 
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Compositional 3D semantics: (Gutzmann, 2013)

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**Compositional 3D semantics:** (Gutzmann, 2013)

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\textbf{Compositional 3D semantics:} \hfill (Gutzmann, 2013)

1. Rheme (at-issue, asserted content).
2. Content \textit{active} for composing \textit{non-at-issue content}.
3. Satisfied \textit{non-at-issue content}.
1.5. Derivation: that damn John!

That damn John was at the party
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That damn John was at the party

\[
\begin{array}{c}
\lambda x. x \quad j \\
\lambda x. \text{dislike}(s, x) \quad j \\
\text{damn} \quad \text{John}
\end{array}
\]
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Satisfied non-at-issue content:
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First, an upgrade:

- For the Maxim of Relation, attentive semantics is needed.
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- The compositional semantics is ‘attentivized’ by:
  - Replacing $\langle s, t \rangle$ by $\langle \langle s, t \rangle, t \rangle$; and
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  - Letting \( \exists x, \lor, \land \), etc. abbreviate the set-theoretical objects that attentive semantics assigns to them.
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Finally, I assume:
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- I fetches an *issue* from the context (for now, \( \mathcal{Q} \)).
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  - Letting \( \exists x, \lor, \land \), etc. abbreviate the set-theoretical objects that attentive semantics assigns to them.

Finally, I assume:

- \( \mathcal{I} \) fetches an issue from the context (for now, \( \mathcal{Q} \)).
- In the second dimension:
  - \( \downarrow : \lambda p_{stt}. \circledast (\mathcal{I}, p) \); and
  - \( \uparrow : \lambda p_{stt}. \circledast (\mathcal{I}, p) \)
1.7. Derivation: The final rise

[That damn John was at the party] →

Satisfied non-at-issue content:

\text{dislike}(s,j)
1.7. Derivation: The final rise

[That damn John was at the party]↑

\[
\lambda p.\text{p} \quad \lambda p.\text{party}(j) \\
\lambda p.^{\text{dislike}}(\tilde{j}, p) \quad \text{party}(j) \\
\lambda x.\text{x} \quad \lambda x.\text{party}(x) \\
\lambda x.\text{dislike}(s, x) \quad \lambda x.\text{party}(x) \\
\text{dam} \quad \text{John} \quad \text{was at the party}
\]
1.7. Derivation: The final rise

[That damn John was at the party]↑

\[
\frac{\lambda p. p \party(j)}{\lambda p. \party(\party(j))} \leftarrow
\]

\[
\frac{\lambda p. \party(\party(j)) \party(j)}{\lambda x. \party(x)} \leftarrow
\]

\[
\frac{\lambda x. \party(x) \party(j)}{\party(j)} \leftarrow
\]

\[
\frac{\lambda x. \dislike(s, x) \party(j)}{\dislike(s, j)} \leftarrow
\]

\[
\frac{\text{damn} \leftarrow \text{John}}{\text{was at the party}}
\]
1.7. Derivation: The final rise

[That damn John was at the party]↑

\[ \text{Satisfied non-at-issue content:} \]
\[ \text{dislike}(s,j) \]
1.7. Derivation: The final rise

[That damn John was at the party]

\[
\lambda x.\text{dislike}(s, x)
\]

\[
\text{damn}
\]

\[
\text{John}
\]

Satisfied non-at-issue content:

\[
\text{dislike}(s, j)
\]
1.7. Derivation: The final rise

[That damn John was at the party]

\[
\lambda x. \text{dislike}(s, x) \quad j
\]
\[
\lambda x. \text{party}(x) \quad j
\]
\[
\text{was at the party}
\]

\[
\text{That damn John was at the party}
\]

\[
\lambda p. \text{dislike}(s, j)
\]
\[
\smile(\Omega, \text{party}(j))
\]
Outline

1. The final rise
   Open-endedness = non-cooperativity
   A compositional account

2. Generalizing to the internal rise
   Local contexts
   The compositional account

3. Some predictions
2.1. Two challenges

Pierrehumbert & Hirschberg (1990), Hobbs (1990):

1. *: (meaning of) morpheme is \textit{important};
2. \( +H / H\% \): open-endedness.

Isn't cooperativity a property of complete utterances only?

Relative to what context is a constituent (non-)cooperative?

Hobbs: every morpheme expresses a complete proposition.

\begin{equation}
\begin{align*}
\text{John} & \uparrow \\
\text{invited} & \downarrow \\
\text{Bob} & \downarrow
\end{align*}
\end{equation}

\( \exists e \exists x \exists y \left( \text{John} (x) \land \text{invite} (e, x, y) \land \text{Bob} (y) \right) \sim (I, \exists x. \text{John} (x)) \)

This is clearly insufficient.
2.1. Two challenges

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1. *: (meaning of) morpheme is important;
4. +H / H%: non-cooperativity.
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- Relative to what *context* is a constituent (non-)cooperative?
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(6) John ↗ invited Bob ↘

\[ \exists e \exists x \exists y. \text{John}(x) \land \text{invite}(e, x, y) \land \text{Bob}(y) \]
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\(\neg\) (maybe) more people exist

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\(\odot(\exists, \exists x. \text{John}(x))\)
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$\sim$ (maybe) more people exist who invited someone

$\exists e \exists x \exists y. John(x) \land invite(e, x, y) \land Bob(y)$

$\mathbb{I}(\exists x. John(x))$
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Hobbs: every morpheme expresses a complete proposition.

(6) \(\downarrow \) John ↗ invited Bob ↘

\[ \sim (\text{maybe}) \text{ more people exist who invited someone} \]
\[ \exists e \exists x \exists y. \text{John}(x) \land \text{invite}(e, x, y) \land \text{Bob}(y) \]
\[ \sim(\land, \exists x. \text{John}(x)) \]

This is clearly insufficient.
2.2. ‘Importance’

A meaning is ‘important’ iff another could have taken its place.
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That’s what sentence-internal rise/fall is for!
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- The local context is the compositionally computed *theme*. 
2.3. The compositional intonational semantics

I extend the 3D system with a *theme* dimension (cf. Balogh, 2009)
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**Compositional 4D semantics:**

1. Rheme (at-issue, asserted content).

3. Content active for composing **non-at-issue content**.

4. Satisfied **non-at-issue content**.
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Compositional ±4D semantics:

1. Rheme (at-issue, asserted content).
2. Theme (issue behind it).
3. Content active for composing non-at-issue content.
4. Satisfied non-at-issue content.

Now, in the third dimension:

\[
\downarrow \cdot \lambda B_{(\alpha, stt)} \lambda A_\alpha. \bigcirc (I, B(A))
\]

\[
\uparrow \cdot \lambda B_{(\alpha, stt)} \lambda A_\alpha. \bigotimes (I, B(A))
\]
2.3. The compositional intonational semantics

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Compositional ±4D semantics:

1. Rheme (at-issue, asserted content).
2. Theme (issue behind it).
3. Content active for composing non-at-issue content.
4. Satisfied non-at-issue content.

Now, in the third dimension:

\[ \leftarrow:: \lambda B_{\langle \alpha, stt \rangle} \lambda A_{\alpha} \cdot \circledast (\bar{I}, B(A)) \]
\[ \rightarrow:: \lambda B_{\langle \alpha, stt \rangle} \lambda A_{\alpha} \cdot \circledast (\bar{I}, B(A)) \]

Finally:

- When invoked in IP, \( \bar{I} \) looks in the global context: \( \Omega \).
- When invoked in iP, \( \bar{I} \) looks in the local context: the theme.
2.4. Derivation

[[[John]_] \rightarrow [had [the beans]_] \downarrow \downarrow

Satisfied non-at-issue content:
2.4. Derivation

\[
[[[\text{John}]*] \rightarrow [\text{had} [\text{the beans}]*] ]\rightarrow ]\rightarrow
\]

Satisfied non-at-issue content:

\[
\lambda P. Pb \\
\lambda P. \exists y. Py \\
\lambda P. Pb
\]

\[
\lambda z \lambda P. Pz \quad b \\
\lambda z \lambda P. \exists y. Py \quad b \\
\lambda z \lambda P. Pz \quad b
\]

* the beans
2.4. Derivation

\[
[[[\text{John}]*] \rightarrow \text{[had [the beans]*]}] \downarrow \downarrow
\]

\[
\begin{array}{c}
x \text{ have } b \\
\exists y. x \text{ have } y \\
x \text{ have } b \\
\lambda y. x \text{ have } y \\
\lambda y. x \text{ have } y \\
\lambda y. x \text{ have } y \\
\lambda P. Pb \\
\lambda P. \exists y. Py \\
\lambda P. Pb \\
\lambda z \lambda P. Pz \\
\lambda z \lambda P. \exists y. Py \\
\lambda z \lambda P. Pz \\
\ast \\
\text{the beans}
\end{array}
\]
2.4. Derivation

\[
\begin{align*}
[[[\text{John}]]] & \rightarrow [\text{had [the beans]}] \\
x & \text{have } b \\
\exists y. x & \text{ have } y \\
\circ(\mathcal{I}, x & \text{ have } b)
\end{align*}
\]

\[
\begin{align*}
\lambda p. p \quad x & \text{ have } b \\
\lambda p. p \quad \exists y. x & \text{ have } y \\
\lambda p. \circ(\mathcal{I}, p) \quad x & \text{ have } b \\
\lambda y. x & \text{ have } y \\
\lambda y. x & \text{ have } y \\
\lambda y. x & \text{ have } y \\
t_1 & \text{ have }
\end{align*}
\]

\[
\begin{align*}
\lambda P. Pb \\
\lambda P. \exists y. Py \\
\lambda P. Pb \\
\lambda z \lambda P. Pz \\
\lambda z \lambda P. \exists y. Py \\
\lambda z \lambda P. Pz \\
\ast \\
\text{the beans}
\end{align*}
\]
### 2.4. Derivation

\[
[[[\text{John}]]] \rightarrow [[[\text{had [the beans]}]]] \downarrow \\
\ x \ \text{have} \ b \\
\ \exists y. x \ \text{have} \ y \\
\ \bigcirc((\exists y. x \ \text{have} \ y, x \ \text{have} \ b))
\]

\[
\begin{array}{c}
\lambda p. p \\
\lambda p. p \\
\lambda p. \bigcirc(I, p) \\
\lambda y. x \ \text{have} \ y \\
\lambda y. x \ \text{have} \ y \\
\lambda y. x \ \text{have} \ y \\
t_1 \ \text{have} \\
\lambda z \lambda P. Pz \\
\lambda z \lambda P. \exists y. Py \\
\lambda z \lambda P. Pz \\
\ast \\
\text{the beans}
\end{array}
\]

Satisfied non-at-issue content:

\[
[[[\text{John}]]] \rightarrow [[[\text{had [the beans]}]]] \downarrow \\
\ x \ \text{have} \ b \\
\ \exists y. x \ \text{have} \ y \\
\ \bigcirc((\exists y. x \ \text{have} \ y, x \ \text{have} \ b))
\]

\[
\begin{array}{c}
\lambda p. p \\
\lambda p. p \\
\lambda p. \bigcirc(I, p) \\
\lambda y. x \ \text{have} \ y \\
\lambda y. x \ \text{have} \ y \\
\lambda y. x \ \text{have} \ y \\
t_1 \ \text{have} \\
\lambda z \lambda P. Pz \\
\lambda z \lambda P. \exists y. Py \\
\lambda z \lambda P. Pz \\
\ast \\
\text{the beans}
\end{array}
\]
2.4. Derivation

\[ [[[[\text{John}]]] \rightarrow [\text{had } [\text{the beans}]]] \rightarrow x \text{ have } b \]
\[ \exists y. x \text{ have } y \]
\[ \text{\(\bigcirc\)} (\exists y. x \text{ have } y, x \text{ have } b) \]
\[ [t_1 \text{ have } [\text{the beans}]] \rightarrow \]

Satisfied non-at-issue content:
2.4. Derivation

\[
[[[\text{John}]]] \rightarrow [[\text{had [the beans]}}]]
\]
2.4. Derivation

\[ \lambda x. x \text{ have } b \]
\[ \lambda x. \exists y. x \text{ have } y \]
\[ \lambda x. \exists y. x \text{ have } y, x \text{ have } b \]
\[ \vdash [\text{have [the beans]}] \]

Satisfied non-at-issue content:

[[[John].] \rightarrow [had [the beans].] \]

\[
\begin{align*}
\lambda x. & \text{ have } b \\
\lambda x. & \exists y. x \text{ have } y \\
\lambda x. & \exists y. (\exists y. x \text{ have } y, x \text{ have } b) \\
\vdash & [\text{have [the beans]}]
\end{align*}
\]
2.4. Derivation

\[ [[[[\text{John}^*]]] \rightarrow [\text{had [the beans]}^*]] \downarrow \downarrow \]

Satisfied non-at-issue content:

\[ \lambda x. x \text{ have } b \]
\[ \lambda x. \exists y. x \text{ have } y \]
\[ \lambda x. \exists y. x \text{ have } y, x \text{ have } b \]
\[ [\text{have [the beans]}^*] \rightarrow \]

\[
\lambda P. \exists x. P x \\
\lambda P. \not\exists (j, P j) \\
\lambda Q \lambda P. Q (P) \quad \lambda P. P j \\
\lambda Q \lambda P. Q (P) \quad \lambda P. \exists x. P x \\
\lambda Q \lambda P. \not\exists (j, Q (P)) \quad \lambda P. P j \\
\lambda Q \lambda P. \not\exists (j, P) \quad \lambda P. P j \\
\rightarrow \quad [\text{John}_1]^* \]

\[
\rightarrow \quad [\text{had [the beans]}^*] \downarrow \downarrow \]
2.4. Derivation

\[
\begin{array}{c}
\lambda P. Pj \\
\lambda P. \exists x. Px \\
\lambda P. Pj \\
\lambda P. \exists (J, Pj) \\
\lambda Q \lambda P. Q(P) \\
\lambda Q \lambda P. Q(P) \\
\lambda Q \lambda P. \exists (J, Q(P)) \\
\end{array}
\]

Satisfied non-at-issue content:

[[[John] \rightleftharpoons [had [the beans]]]]
2.4. Derivation

\[ \lambda P. P \%
\]

\[ x \exists y. x \text{ have } y \]

\[ \bigcirc (\exists y. j \text{ have } y, j \text{ have } b) \]

\[ \bigcirc (\bigcirc, j \text{ have } b) \]

\[ \lambda P. (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda x. x \text{ have } b \]

\[ \lambda P. (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda x. x \text{ have } b \]

\[ \lambda P. \bigcirc (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda P. \exists x. P x \]

\[ \lambda P. P j \]

\[ \lambda Q \lambda P. Q(P) \]

\[ \lambda Q \lambda P. (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda P. \bigcirc (\bigcirc, Q(P)) \]

\[ \lambda Q \lambda P. \exists x. P x \]

\[ \lambda Q \lambda P. (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ [\text{have [the beans]}] \]

\[ \text{Satisfied non-at-issue content:} \]

\[ [[[\text{John}]]] \rightarrow [\text{had [the beans]}] \]

\[ \rightarrow \]

\[ \text{[John1]} \]
2.4. Derivation

[John] have [the beans]

\[ \lambda P. \text{had } P \]

\[ \lambda P. \exists x. x \text{ have } y \]

\[ \lambda P. \text{had } P \]

\[ \lambda P. \text{had } (\exists y. \text{have } y) \]

\[ \text{Satisfied non-at-issue content:} \]

\[ \text{had [the beans]} \]
2.4. Derivation

[[[John]*] \rightarrow [had [the beans]*] \downarrow \downarrow}

\[ j \text{ have } b \]
\[ \exists x \exists y. x \text{ have } y \]
\[ j \text{ have } b \]
\[ \smiley(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]

\[ \lambda P. \smiley(J, Pj) \]
\[ \lambda P. Pj \]
\[ \lambda P. \exists x. Px \]
\[ \lambda Q \lambda P. \smiley(J, Q(P)) \]
\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. \smiley(J, Q(P)) \]
\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. \smiley(J, Q(P)) \]
\[ \lambda P. Pj \]
\[ \lambda P. Pj \]
\[ \lambda x. x \text{ have } b \]
\[ \lambda x. \exists y. x \text{ have } y \]
\[ \lambda x. \smiley(\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda x. x \text{ have } b \]

\[ \lambda \ Q \lambda P. \smiley(J, Q(P)) \]
\[ \lambda P. Pj \]
\[ \lambda P. \exists x. Px \]
\[ \lambda Q \lambda P. \smiley(J, Q(P)) \]
\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. \smiley(J, Q(P)) \]

Satisfied non-at-issue content:

\[ \smiley(\exists y. j \text{ have } y, j \text{ have } b) \]
2.4. Derivation

\[
[[[\text{John}]*]} \xrightarrow{\cdot} [[\text{had [the beans]}]*]_{\downarrow}]_{\downarrow}
\]

\[
\lambda P \cdot P j \\
\lambda P \cdot \exists x . P x \\
\lambda P \cdot P j \\
\lambda P \cdot (\lambda (I, P j))
\]

\[
\lambda x . x \text{ have } b \quad \lambda x . \exists y . x \text{ have } y \\
\lambda x . \lambda Q \cdot (\exists y . x \text{ have } y, x \text{ have } b) \\
\lambda x . \lambda Q \cdot (\lambda P . (Q(P))) \\
\lambda Q \lambda P . (Q(P)) \\
\lambda Q \lambda P . (Q(P)) \\
\lambda Q \lambda P . (\lambda (I, Q(P))) \\
\lambda P . P j \\
\lambda P . P j \\
\lambda P . \exists x . P x \\
\lambda Q \lambda P . (\lambda (I, Q(P))) \\
\lambda P . P j \\
\lambda P . P j
\]

\[
\text{Satisfied non-at-issue content:} \\
\lambda (\exists y . j \text{ have } y, j \text{ have } b) \\
\lambda (\exists x \exists y . x \text{ have } y, j \text{ have } b)
\]

\[
\lambda (\lambda (I, P j))_{\downarrow}
\]

\[
\lambda (\lambda (I, Q(P)))_{\downarrow}
\]

\[
[\text{John}_1]^*_\downarrow
\]
2.4. Derivation

\[ \exists x \exists y. x \text{ have } y \]

\[ j \text{ have } b \]

\[ \lambda x. x \text{ have } b \]

\[ \lambda x. \exists y. x \text{ have } y \]

\[ \lambda x. \exists y. x \text{ have } y, x \text{ have } b \]

\[ \lambda x. x \text{ have } b \]

\[ \lambda P. Pj \]

\[ \lambda P. \exists x. Px \]

\[ \lambda P. Pj \]

\[ \lambda P. \exists (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda Q. \lambda P. Q(P) \]

\[ \lambda Q. \lambda P. Q(P) \]

\[ \lambda Q. \lambda P. \exists (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda Q. \lambda P. Q(P) \]

\[ \lambda Q. \lambda P. \exists (\exists y. x \text{ have } y, x \text{ have } b) \]

\[ \lambda Q. \lambda P. Q(P) \]

\[ [\text{John}_1] \]

Satisfied non-at-issue content:

\[ \exists (\exists y. j \text{ have } y, j \text{ have } b) \]

\[ \exists (\exists x \exists y. x \text{ have } y, j \text{ have } b) \]
2.4. Derivation

\[ [[[\text{John}]]] \rightarrow [[\text{had [the beans]}]] \]

\textbf{Satisfied non-at-issue content:}

\[ \smiley(\exists y. j \text{ have } y, j \text{ have } b) \]
\[ \smiley(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]
2.4. Derivation

\[ [[\text{John}]] \rightarrow \text{[had [the beans]]} \]

\[ j \text{ have } b \]
\[ \exists x \exists y. x \text{ have } y \]
\[ \smile(j, j \text{ have } b) \]

\[ \lambda p. p \]
\[ \lambda p. p \]
\[ \lambda p. \smile(j, p) \]
\[ j \text{ have } b \]
\[ \exists x \exists y. x \text{ have } y \]
\[ \smile(j, j \text{ have } b) \]

\[ \lambda P. Pj \]
\[ \lambda P. \exists x. Px \]
\[ \lambda P. Pj \]
\[ \lambda P. \smile(j, Pj) \]
\[ [\text{have [the beans]}] \]

\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. \smile(j, Q(P)) \]
\[ \lambda P. Pj \]

\[ \lambda x. x \text{ have } b \]
\[ \lambda x. \exists y. x \text{ have } y \]
\[ \lambda x. \smile(\exists y. x \text{ have } y, x \text{ have } b) \]
\[ \lambda x. x \text{ have } b \]

\[ [\text{had [the beans]}] \]

\[ \smile(\exists y. j \text{ have } y, j \text{ have } b) \]
\[ \smile(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]

\[ \rightarrow \]

\[ \rightarrow \]
2.4. Derivation

\[
[[(\text{John})_*] \rightarrow [\text{had [the beans]}_*]] \downarrow
\]

\[ j \text{ have } b \]
\[ \exists x \exists y. x \text{ have } y \]
\[ \smiley(\exists y. j \text{ have } b) \]

\[
\begin{align*}
\lambda p & . p \\
\lambda p & . p \\
\lambda p & . \smiley(J, p) \\
\lambda P & . \smiley(J, P) \\
\lambda P & . Pj \\
\lambda P & . \exists x. Px \\
\lambda P & . Pj \\
\lambda P & . \smiley(J, Pj) \\
\lambda Q & . \lambda P. \smiley(Q(P)) \\
\lambda Q & . \lambda P. \smiley(Q(P)) \\
\lambda Q & . \lambda P. \smiley(J, Q(P)) \\
\lambda P & . Pj \\
\end{align*}
\]

\[ \lambda x. x \text{ have } b \]
\[ \lambda x. \exists y. x \text{ have } y \]
\[ \lambda x. \smiley(\exists y. x \text{ have } y, x \text{ have } b) \]
\[ \lambda x. x \text{ have } b \]
\[ \| \text{have [the beans]}_* \| \downarrow \]

\[ \smiley(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]

Satisfied non-at-issue content:

\[ \smiley(\exists y. j \text{ have } y, j \text{ have } b) \]
\[ \smiley(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]
2.4. Derivation

\[ [[[[\text{John}]]] \rightarrow [\text{had [the beans]}]] \]

\[ j \text{ have } b \]
\[ \exists x \exists y. x \text{ have } y \]
\[ j \text{ have } b \]

\[ \lambda p. p \]
\[ \lambda p. p \]
\[ \lambda p. \circled{f}(\text{John}, p) \]

\[ \rightarrow \]

\[ \lambda P. P j \]
\[ \lambda P. \exists x. P x \]
\[ \lambda P. P j \]
\[ \lambda P. \circled{f}(\text{John}, P j) \]

\[ \rightarrow \]

\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. Q(P) \]
\[ \lambda Q \lambda P. \circled{f}(\text{John}, Q(P)) \]
\[ \lambda P. P j \]

\[ \rightarrow \]

\[ [\text{John}_1] \]

\[ \text{Satisfied non-at-issue content:} \]
\[ \circled{f}(\exists y. j \text{ have } y, j \text{ have } b) \]
\[ \circled{f}(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]
\[ \circled{f}(Q, j \text{ have } b) \]
Outline

1. The final rise
   Open-endedness = non-cooperativity
   A compositional account

2. Generalizing to the internal rise
   Local contexts
   The compositional account

3. Some predictions
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↗ had the beans ↘ ↘

- 😊(∃y. j have y, j have b)
- 😊(∃x∃y. x have y, j have b)
- 😊(∈, j have b)

Hence, (a) is non-standard on lists:

(9) a. ? John ↗ had the beans ↘ ↘. Sue ↗ had the pasta ↘ ↘...

b. John ↘ had the beans ↗ ↗. Sue ↘ had the pasta ↗ ↗...
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↗ had the beans ↘

- 😊(∃y.j have y, j have b)
- 😞(∃x∃y.x have y, j have b)
- 😊(∃y.j have y, j have b)
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↗ had the beans ↘ ↘

- ☻(∃y.j have y, j have b)
- ☹(∃x∃y.x have y, j have b)
- ☻(∃y.j have y, j have b)

~ Others are also relevant

Hence, (a) is non-standard on lists:

(9) a. ? John ↗ had the beans ↘↘. Sue ↗ had the pasta ↘↘...

b. John ↘ had the beans ↗↗. Sue ↘ had the pasta ↗↗...
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↗ had the beans ↘ ↘
  • 😊(∃y. j have y, j have b)
  • 😊(∃x∃y. x have y, j have b)
  • 😊(∃y. j have y, j have b)

~ Others are also relevant

(8) Who had what?
  a. John ↗ had the beans ↘ ↘
     • 😊(∃y. j have y, j have b)
     • 😊(∃x∃y. x have y, j have b)
     • 😊(∃y. j have y, j have b)
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↘ had the beans ↘

- 😊(∃y. j have y, j have b)
- 😊(∃x∃y. x have y, j have b)
- 😊(∃y. j have y, j have b)

~ Others are also relevant

(8) Who had what?
a. John ↗ had the beans ↘

- 😊(∃y. j have y, j have b)
- 😊(∃x∃y. x have y, j have b)
- 😊(∃x∃y. x have y, j have b)
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↘ had the beans ↘ ↘
- 😊(∃y. j have y, j have b)
- 😔(∃x∃y. x have y, j have b)
- 😋(∃y. j have y, j have b)

∼ Others are also relevant

(8) Who had what?
  a. John ↗ had the beans ↗ ↗
- 😊(∃y. j have y, j have b)
- 😔(∃x∃y. x have y, j have b)
- # 😋(∃x∃y. x have y, j have b)
3.1. QUD vs. theme

(7) What did John have for lunch?
John ↗ had the beans ↘
- ☻ (∃y.j have y, j have b)
- ☻ (∃x∃y.x have y, j have b)
- ☻ (∃y.j have y, j have b)

~ Others are also relevant

(8) Who had what?

a. John ↗ had the beans ↘
- ☻ (∃y.j have y, j have b)
- ☻ (∃x∃y.x have y, j have b)
- # ☻ (∃x∃y.x have y, j have b)

~ don’t care about others
3.1. QUD vs. theme

(7) What did John have for lunch?
   John ↗ had the beans ↘ ↘ ~ Others are also relevant
   • ☺(∃y.j have y, j have b)
   • ☺(∃x∃y.x have y, j have b)
   • ☺(∃y.j have y, j have b)

(8) Who (among John, Bill and Mary) had what?
   a. John ↗ had the beans ↘ ↘ ~ don’t care about others
      • ☺(∃y.j have y, j have b)
      • ☺(∃x∃y.x have y, j have b)
      • # ☺(∃x∃y.x have y, j have b)
3.1. QUD vs. theme

(7) What did John have for lunch?
   John ↗ had the beans ↘ ↘ ~ Others are also relevant
   - ☺(∃y.j have y, j have b)
   - ☺(∃x∃y.x have y, j have b)
   - ☺(∃y.j have y, j have b)

(8) Who (among John, Bill and Mary) had what?
   a. ? John ↗ had the beans ↘ ↘ ~ don’t care about others
      - ☺(∃y.j have y, j have b)
      - ☺(∃x∃y.x have y, j have b)
      - # ☺(∃x∃y.x have y, j have b)
      - ☺(∃x∃y.x have y, j have b)
3.1. QUD vs. theme

(7) What did John have for lunch?
   John ↗ had the beans ↘ ↘  ∼ Others are also relevant
   ▶ ☺(∃y. j have y, j have b)
   ▶ ☺(∃x∃y. x have y, j have b)
   ▶ ☺(∃y. j have y, j have b)

(8) Who (among John, Bill and Mary) had what?
   a. ? John ↗ had the beans ↘ ↘  ∼ don’t care about others
      ▶ ☺(∃y. j have y, j have b)
      ▶ ☺(∃x∃y. x have y, j have b)
      ▶ # ☺(∃x∃y. x have y, j have b)
   b. John ↘ had the beans ↗ ↗

   Hence, (a) is non-standard on lists:
   (9) a. ? John ↗ had the beans ↘ ↘. Sue ↗ had the pasta ↘ ↘...
3.1. QUD vs. theme

(7) What did John have for lunch?
   John ↗ had the beans ↘ ↘
   ~ Others are also relevant
   • ☺(∃y. j have y, j have b)
   • ☺(∃x∃y. x have y, j have b)
   • ☺(∃y. j have y, j have b)

(8) Who (among John, Bill and Mary) had what?
   a. ? John ↗ had the beans ↘ ↘
      ~ don’t care about others
      • ☺(∃y. j have y, j have b)
      • ☺(∃x∃y. x have y, j have b)
      • # ☺(∃x∃y. x have y, j have b)
   b. John ↘ had the beans ↗ ↗
      (inv. scope only)
3.1. QUD vs. theme

(7) What did John have for lunch?
   John ↩ had the beans ↘
   
   • 😊(∃y.j have y, j have b)
   • 😊(∃x∃y.x have y, j have b)
   • 😊(∃y.j have y, j have b)

   \sim Others are also relevant

(8) Who (among John, Bill and Mary) had what?
   a. ? John ↩ had the beans ↘
      
      • 😊(∃y.j have y, j have b)
      • 😊(∃x∃y.x have y, j have b)
      • # 😊(∃x∃y.x have y, j have b)

      \sim don't care about others

   b. John ↘ had the beans ↩
      (inv. scope only)

   c. John ↩ had the beans ↩
3.1. QUD vs. theme

(7) What did John have for lunch?
   John ↗ had the beans ↘↘          ∼ Others are also relevant
   - ☺(∃y.j have y, j have b)
   - ☺(∃x∃y.x have y, j have b)
   - ☺(∃y.j have y, j have b)

(8) Who (among John, Bill and Mary) had what?
   a. ? John ↗ had the beans ↘↘          ∼ don’t care about others
      - ☺(∃y.j have y, j have b)
      - ☺(∃x∃y.x have y, j have b)
      - # ☺(∃x∃y.x have y, j have b)
   b. John ↘ had the beans ↗↗
   c. John ↗ had the beans ↗↗

Hence, (a) is non-standard on lists:

(9) a. ? John ↗ had the beans ↘↘. Sue ↗ had the pasta ↘↘...
   b. John ↘ had the beans ↗↗. Sue ↘ had the pasta ↗↗...
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?

a. John ↗ had the beans ↘ ↘ ('the beans' > 'John')
   ▶ ☺(∃x.x have b, j have b)
   ▶ ☺(∃x∃y.x have y, j have b)
   ▶ ☺(∃x∃y.x have y, j have b)

Indeed, 'CT must scope over Focus': (Büring 1997; Wagner 2012)

Predictions for English:

(12) a. All buildings ↗ were inspected by three guards ↘ ↘
    \slash.left the same three guards.
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?
    a. John ↗ had the beans ↘↘ ('the beans' > 'John')
       ▷ # (\exists x. x have b, j have b)
       ▷ ☺(\exists x\exists y. x have y, j have b)
       ▷ ☻(\exists x\exists y. x have y, j have b)
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?
   a. # John ↗ had the beans ↘ ↘ (‘the beans’ > ‘John’)
      • # 😊(∃x. x have b, j have b)
      • 😊(∃x∃y. x have y, j have b)
      • 😊(∃x∃y. x have y, j have b)
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?

a. # John ↗ had the beans ↘↘ ('the beans' > 'John')
   - # ⊕(∃x.x have b, j have b)
   - ⊕(∃x∃y.x have y, j have b)
   - ⊕(∃x∃y.x have y, j have b)

b. John ↘ had the beans ↗↗ ('the beans' > 'John')

Indeed, 'CT must scope over Focus': (B¨ uring 1997; Wagner 2012)

(11) German: # John ↘ hat die Bohnen gegessen ↗↗ ('the beans' > 'John')

Predictions for English:

(12) a. All buildings ↘ were inspected by three guards ↗↗

   the same three guards.

   slash.left
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?

a.  # John ↗ had the beans ↘ ↘           (‘the beans’ > ‘John’)

   ▶  # 😊(∃x.x have b, j have b)

   ▶  😊(∃x∃y.x have y, j have b)

   ▶  😊(∃x∃y.x have y, j have b)

b. John ↗ had the beans ↘ ↘           (‘the beans’ > ‘John’)

c.  # John ↗ had the beans ↘ ↘           (‘John’ > ‘the beans’)
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?

a. \( \# \text{John} \uparrow \text{had the beans} \downarrow \downarrow \) (‘the beans’ > ‘John’)
   \begin{itemize}
   \item \( \# (\exists x. x \text{ have } b, j \text{ have } b) \)
   \item \( (\exists x \exists y. x \text{ have } y, j \text{ have } b) \)
   \item \( (\exists x \exists y. x \text{ have } y, j \text{ have } b) \)
   \end{itemize}

b. \( \text{John} \downarrow \text{had the beans} \uparrow \uparrow \) (‘the beans’ > ‘John’)

c. \( \# \text{John} \downarrow \text{had the beans} \uparrow \uparrow \) (‘John’ > ‘the beans’)

Indeed, ‘CT must scope over Focus’: (Büring 1997; Wagner 2012)
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?
   a. \# John ↗ had the beans \↘ \↘ ('the beans' > 'John')
   b. John \↘ had the beans ↗ ↗ ('the beans' > 'John')
   c. \# John \↘ had the beans \↗ \↗ ('John' > 'the beans')

Indeed, 'CT must scope over Focus': (Büring 1997; Wagner 2012)

(11) German: \# John \↘ hat die Bohnen gegessen \↗ \↗
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?
   a. # John ↗ had the beans ↘ (‘the beans’ > ‘John’)
      ▷ # (∃x.x have b, j have b)
      ▷ (∃x∃y.x have y, j have b)
      ▷ (∃x∃y.x have y, j have b)
   b. John ↘ had the beans ↗ (‘the beans’ > ‘John’)
   c. # John ↘ had the beans ↗ (‘John’ > ‘the beans’)

Indeed, ‘CT must scope over Focus’: (Büring 1997; Wagner 2012)

(11) German: # John ↘ hat die Bohnen gegessen ↗

Predictions for English:

(12) a. All buildings ↘ were inspected by three guards ↗
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?
   a. # John ↗ had the beans ↘↘ ('the beans' > 'John')
      ▶ # ☺(∃x. x have b, j have b)
      ▶ ☺(∃x∃y.x have y, j have b)
      ▶ ☺(∃x∃y.x have y, j have b)
   b. John ↘ had the beans ↗↗ ('the beans' > 'John')
   c. # John ↘ had the beans ↗↗ ('John' > 'the beans')

Indeed, ‘CT must scope over Focus’: (B¨uring 1997; Wagner 2012)

(11) German: # John ↘ hat die Bohnen gegessen ↗↗

Predictions for English:

(12) a. All buildings ↘ were inspected by three guards ↗↗
    ~⇒ the same three guards.
3.2. Scope

Same as (8), but with inverse scope:

(10) Of John, Bill and Mary, who had what?

a. \( \# \text{John} \bowtie \) had the beans \( \downarrow \downarrow \) (‘the beans’ > ‘John’)
   \[ \#(\exists x. x \text{ have } b, j \text{ have } b) \]
   \[ \varnothing(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]
   \[ \varnothing(\exists x \exists y. x \text{ have } y, j \text{ have } b) \]

b. John \( \downarrow \) had the beans \( \uparrow \uparrow \) (‘the beans’ > ‘John’)

b. John \( \downarrow \) had the beans \( \uparrow \uparrow \) (‘the beans’ > ‘John’)

Indeed, ‘CT must scope over Focus’: (Büring 1997; Wagner 2012)

(11) German: \( \# \text{John} \downarrow \) hat die Bohnen gegessen \( \uparrow \uparrow \)

Predictions for English:

(12) a. All buildings \( \downarrow \) were inspected by three guards \( \uparrow \uparrow \)
   \[ \sim \) the same three guards.

b. All buildings \( \uparrow \) were inspected by three guards \( \downarrow \downarrow \)
   \[ \sim \) the same three guards.
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John↗ had an umbrella↘↘
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?

a. John ↗ had an umbrella ↘ ↘ ∼ that resolves it
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ → that resolves it
   b. John ↘ had an umbrella ↗ ↗ (preferred)

Under a plausible account of negation, we get:

(14) a. \[\text{[All} \neg\text{my friends} \text{didn’t come.}] \rightarrow \text{that resolves it}\]

b. \[\text{[All} \exists\text{my friends} \text{didn’t come.}] \rightarrow \text{that resolves it}\]

Hence, fall-rise can disambiguate. (cf. Constant, 2012)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↦ had an umbrella ↘↘ \( \sim \) *that resolves it*
   b. John ↘ had an umbrella ↦ ↦ \( \sim \) *and maybe more*

Hence, fall-rise can disambiguate. (cf. Constant, 2012)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ \( \sim \) that resolves it
   b. John ↘ had an umbrella ↗ ↗ \( \sim \) and maybe more
   c. John ↘ had an umbrella ↘ ↗
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ ~ that resolves it
   b. John ↘ had an umbrella ↗ ↗ ~ and maybe more
   c. John ↘ had an umbrella ↘ ↗ (preferred)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ ↗ that resolves it
   b. John ↘ had an umbrella ↘ ↘ ↗ and maybe more
   c. John ↘ had an umbrella ↘ ↘ (preferred)

Under a plausible account of negation, we get:

(14) a. [[[All] ar my friends] ↘ didn’t come.] ↗ (‘not’ > ‘all’)
   ▶ ☺ (?∀x. Cx, ¬∀x. Cx)
   ▶ ☺ (?Q, ¬∀x. Cx)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ ~ that resolves it
   b. John ↘ had an umbrella ↗ ↗ ~ and maybe more
   c. John ↘ had an umbrella ↘ ↗ (preferred)

Under a plausible account of negation, we get:

(14) a. [[[All]∗ my friends]↘ didn’t come.]↗  (‘not’ > ‘all’)
    ▶ 🙂(∀x.Cx, ¬∀x.Cx)
    ▶ 🙂(∃x.Cx, ¬∀x.Cx)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘  \sim that resolves it
   b. John ↘ had an umbrella ↗ ↗  \sim and maybe more
   c. John ↘ had an umbrella ↘ ↗  (preferred)

Under a plausible account of negation, we get:

(14) a. [[[All] ∗ my friends] ↘ didn’t come.] ↗  (∼ ‘not’ > ‘all’)
   ▶ 🙃(?∀x.Cx, ¬∀x.Cx)
   ▶ 🙃(∃x.Cx, ¬∀x.Cx)

b. [[[All] ∗ my friends] ↘ didn’t come.] ↗  (∼ ‘all’ > ‘not’)
   ▶ 🙃(∃x.¬Cx, ∀x.¬Cx)
   ▶ 🙃(\exists, ∀x.¬Cx)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ ~ that resolves it
   b. John ↘ had an umbrella ↗ ↗ ~ and maybe more
   c. John ↘ had an umbrella ↘ ↗ (preferred)

Under a plausible account of negation, we get:

(14) a. [[[All]∗ my friends]↘ didn’t come.]↗ (‘not’ > ‘all’)
   ▶ ☺(∃x.¬Cx, ∀x.¬Cx)
   ▶ ☺(∃x.¬Cx, ∀x.¬Cx)
   b. [[[All]∗ my friends]↘ didn’t come.]↗ (‘all’ > ‘not’)
   ▶ ☺(∃x.¬Cx, ∀x.¬Cx)
   ▶ ☹(?Q, ∀x.¬Cx)

Hence, fall-rise can disambiguate. (cf. Constant, 2012)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ \(\sim\) \textit{that resolves it}
   b. John ↘ had an umbrella ↗ ↗ \(\sim\) \textit{and maybe more}
   c. John ↘ had an umbrella ↘ ↗ (preferred)

Under a plausible account of negation, we get:

(14) a. \[\[[\text{All}]_\ast \text{ my friends} \] \downarrow \text{ didn’t come.}\] \(\Rightarrow\) (‘not’ > ‘all’)
   \(\Rightarrow\) \(\smiley(\forall x. Cx, \neg \forall x. Cx)\)
   \(\Rightarrow\) \(\smiley(\exists x. Cx, \neg \forall x. Cx)\)
   b. \[? [[\text{All}]_\ast \text{ my friends} \] \downarrow \text{ didn’t come.}\] \(\Rightarrow\) (‘all’ > ‘not’)
   \(\Rightarrow\) \(\smiley(\exists x. \neg Cx, \forall x. \neg Cx)\)
   \(\Rightarrow\) \(? \smiley(\forall, \forall x. \neg Cx)\)
3.3. ‘Fall-rise’

An indirect answer:

(13) Was it raining?
   a. John ↗ had an umbrella ↘ ↘ ~ that resolves it
   b. John ↘ had an umbrella ↗ ↗ ~ and maybe more
   c. John ↘ had an umbrella ↘ ↗ (preferred)

Under a plausible account of negation, we get:

(14) a. [[[All]∗ my friends]↘ didn’t come.]↗ (‘not’ > ‘all’)
    ▶ ☺(?∀x. Cx, −∀x. Cx)
    ▶ ☺(∃x. Cx, −∀x. Cx)

   b. ? [[[All]∗ my friends]↘ didn’t come.]↗ (‘all’ > ‘not’)
    ▶ ☺(∃x. ¬Cx, ∀x. ¬Cx)
    ▶ ? ☺(Ø, ∀x. ¬Cx)

Hence, fall-rise can disambiguate. (cf. Constant, 2012)
3.4. ‘D-trees’? ‘Strategies’?

(15) What did the stars wear?
   a. # The female stars wore [caftans]^↓↓
   b. The [female]^↑ stars ↑ wore [caftans]^↓↓

In Büring’s (2003) approach:

Hence, Büring: ‘newness of female in (15) must be marked’.

Instead, I take this to suggest:

Utterances presuppose only a direct QUD

D-trees simply reflect local contexts (themes) at various levels

(Pitch accents reveal only what the speaker finds important)
3.4. ‘D-trees’? ‘Strategies’?

(15) What did the stars wear?
   a. # The female stars wore [caftans]_{*} \rightarrow \rightarrow
   b. The [female]_{*} stars \rightarrow wore [caftans]_{*} \rightarrow \rightarrow

(16) What did the stars wear? What did the female stars wear?
   a. The female stars wore [caftans]_{*} \rightarrow \rightarrow
   b. The [female]_{*} stars \rightarrow wore [caftans]_{*} \rightarrow \rightarrow
3.4. ‘D-trees’? ‘Strategies’?

(15) What did the stars wear?
   a. # The female stars wore [caftans] ↘↘
   b. The [female] ↗ stars ↗ wore [caftans] ↘↘

(16) What did the stars wear? What did the female stars wear?
   a. The female stars wore [caftans] ↘↘
   b. The [female] ↗ stars ↗ wore [caftans] ↘↘

In Büring’s (2003) approach:
   ▶ (15) and (16) presuppose the same D-trees;
3.4. ‘D-trees’? ‘Strategies’?

(15) What did the stars wear?
   a. # The female stars wore [caftans] ↘↘
   b. The [female]*) stars ↑ wore [caftans] ↘↘

(16) What did the stars wear? What did the female stars wear?
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3.4. ‘D-trees’? ‘Strategies’?

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(16) What did the stars wear? What did the female stars wear?
   a. The female stars wore [caftans] 
   b. The [female] stars wore [caftans]

In Büring’s (2003) approach:
   ▶ (15) and (16) presuppose the same D-trees;
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Instead, I take this to suggest:
   ▶ Utterances presuppose only a direct QUD
   ▶ D-trees simply reflect local contexts (themes) at various levels
   ▶ (Pitch accents reveal only what the speaker finds important)
3.5. Quality readings

- Quality violations are theme/QUD independent;

However:

- Quality violations can convey surprise;

Surprise is theme/QUD-dependent!

(18) So anyway, John ate the beans.
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- Quality violations are theme/QUD independent;
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(17) Who ate what?
   a. John ↘ ate the beans ↙ ↙ .  \(\sim\) not sure
   b. John ↙ ↙ ate the beans ↘ ↘ .  \(\nearrow\) not sure
   c. John ↙ ↙ ate the beans ↙ ↙ .  \(\nearrow\) not sure
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- Quality violations are theme/QUD independent;
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   a. John ↘ ate the beans ↗ ↗.  
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   b. John ↗ ate the beans ↘ ↘.  
      \( \not\sim \) not sure
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      \( \sim \) not sure

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    John ↗ ate the beans ↗, with his mother ↗ ↗.
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- Quality violations can convey surprise;
- Surprise *is* theme/QUD-dependent!

(18) So anyway, John ate the beans.
   John ↖ ate the beans ↖, with his mother ↖, naked ↖ ↖.
We obtained a compositional intonational semantics, by:
Conclusion

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- A very minimal discourse context: $\mathcal{Q}$.
- No ‘D-trees’, ‘strategies’. (a mapping is work in progress)
Thank you!

Papers (see staff.science.uva.nl/~westera/)

- *Exhaustivity through the Maxim of Relation*  
  (*LENLS* proceedings)
- ‘*Attention, I’m violating a maxim!*’  
  (*SemDial* proceedings; talk on Wednesday)

Thanks to the *Netherlands Organisation for Scientific Research* (NWO) for financial support; to F. Roelofsen, J. Groenendijk for valuable comments.
Motivating the Maxim of Relation: exhaustivity

(19) Of John, Bill and Mary, who came to the party?
    - John came.  \sim Mary and Bill didn’t.  \text{(exhaustivity)}
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Conversational implicature (Grice, 1975)

An implicature, the supposition of which is necessary for maintaining the assumption that the speaker is cooperative.
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An implicature, the supposition of which is necessary for maintaining the assumption that the speaker is cooperative.

1. Had sp. believed Mary or Bill came, she should have said so.
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   \( \ldots \)
3. She believes that they didn’t come.
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“[the epistemic] step does not follow from Gricean maxims and logic alone.” - Chierchia, et al. (2008)
Existing ‘Gricean’ approaches

Most existing work (since Mill, 1867):
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Most existing work (since Mill, 1867):

1. The sp. is competent as to whether Mary came (Context)

   not all

Of course, this is not very surprising: Speaker’s competence is her ability to give an exh. answer. Hence no exh. if the context negates competence.

What about a context negating only the competence assumption?
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Geurts, 2011: ‘one of the main virtues of [this approach] is that it distinguishes between weak and strong implicatures, and connects them via the Competence Assumption.’ (20) (Uttered when speaker is known not to be competent)

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What about a context negating only the competence assumption?
Against the competence *assumption*

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(21) Prob. asking the wrong person, but - of J, B, M - who came?  
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Maxim of Relation \(\text{ (cf. Westera, 2013)}\)

Draw attention to all \(q \in \mathcal{Q}\) compatible with your info state.
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(e.g., if possible, say ‘John and maybe Mary’ rather than ‘John’).
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Draw attention to all \( q \in \mathcal{Q} \) compatible with your info state.
(e.g., if possible, say ‘John and maybe Mary’ rather than ‘John’)
(speaker says ‘John’ because she doesn’t consider ‘Mary’ possible.)
References (i)

- Geurts (2010). Quantity implicatures.
- Gussenhoven (2004). ***


