Exhaustivity without the competence assumption

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1.1. Goal of this talk

(1) Of John, Bill and Mary, who came to the party?
   - John came.  \( \sim \text{Mary and Bill didn’t.} \) (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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3. She believes that they didn’t come.
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3. She believes that they didn’t come.
   “[the epistemic] step does not follow from Gricean maxims and logic alone.” - Chierchia, et al. (2008)
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“[the epistemic] step does not follow from Gricean maxims and logic alone.” - Chierchia, et al. (2008)

Wrong, it does!
1.2. Existing ‘Gricean’ approaches

Most existing work (since Mill, 1867):

1. The speaker is opinionated about whether Mary came (Context)
2. She lacks the belief that Mary came (Quantity)
3. She believes that Mary didn’t come

A recent quote: ‘one of the main virtues of [this approach] is that it distinguishes between weak and strong implicatures, and connects them via the Competence Assumption.’

(2) (Uttered when speaker is known not to be competent)

Bonnie stole some of the pears.

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

What about a context negating only the competence assumption?
1.2. Existing ‘Gricean’ approaches

Most existing work (since Mill, 1867):

1. The sp. is *opinionated* about whether Mary came \[(\text{Context})\]
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What about a context negating only the competence assumption?
1.3. Against the competence assumption

A context that negates the competence assumption:


(4) Not sure about Mary, but - of J, B, M - John and Bill came.
1.3. Against the competence *assumption*

A context that negates the competence *assumption*:

(3) Prob. asking the wrong person, but - of J, B, M - who came?
    - John and Bill came.

Further evidence:

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- Competence must be something conveyed by the speaker.
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Further evidence:

(4) # Not sure about Mary, but - of J, B, M - John and Bill came.
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    Bonnie stole \([\text{some}]_F\) of the pears. \( \not\sim \) not all
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- Competence must be something *conveyed by the speaker.*

Further evidence:

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Further evidence:

(4) # Not sure about Mary, but - of J, B, M - John and Bill came.
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Part I: Exhaustivity is a conversational implicature.

Part II: Intonation and exhaustivity
Part I: Exhaustivity is a conversational implicature.
  ▶ No competence assumption necessary.

Part II: Intonation and exhaustivity
Part I: Exhaustivity is a conversational implicature.

- No competence assumption necessary.

Part II: Intonation and exhaustivity

- How to enforce exhaustivity.
Part I: Exhaustivity is a conversational implicature.

- No competence assumption necessary.

Part II: Intonation and exhaustivity

- How to enforce exhaustivity.
- ...and how to prevent it.
Part I: Exhaustivity is a conversational implicature.

2. Diagnosis
3. Theory
4. Results
2. Diagnosis

(5) a. Of John, Bill and Mary, who came to the party?
    b. John came. \( \sim \) Mary didn’t come
2. Diagnosis

(5) a. Of John, Bill and Mary, who came to the party?
   b. John came.  \[\sim \text{Mary didn’t come}\]
   c. John came, or Mary and John.  \[\not\sim \text{Mary didn’t come}\]
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(5) a. Of John, Bill and Mary, who came to the party?
   b. John came. ~ Mary didn’t come
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Intuition
(5b) and (5c) differ in their attentive content.
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   b. John came.  \[\sim \text{Mary didn’t come}\]
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(5b) and (5c) differ in their \textit{attentive content}.

\quad \bullet (5c) draws attention to the poss. that Mary came too.
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(5) a. Of John, Bill and Mary, who came to the party?
   b. John came.                           \textit{\sim} Mary didn’t come
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- (5c) draws attention to the poss. that Mary came too.
- (And so does (5a).)
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\begin{itemize}
  \item (5c) draws attention to the poss. that Mary came too.
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  \item (5b) doesn’t; it leaves the possibility \textit{unattended}.\end{itemize}
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Apparently, pragmatic reasoning is sensitive to this.
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(5b) and (5c) differ in their *attentive content*.  
- (5c) draws attention to the poss. that Mary came too.  
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- (5b) doesn’t; it leaves the possibility *unattended*.

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3. Theory

3.1. Translation into logic
3.2. Semantics
3.3. Pragmatics
3.1. Translation into logic

(6) a. Of John, Bill and Mary, who came to the party?
   b. John came. \(\sim \text{Mary didn’t come}\)
   c. John came, or Mary and John. \(\not\in \text{Mary didn’t come}\)
3.1. Translation into logic

(6) a. Of John and Mary, who came to the party?
    b. John came.          \[ \sim Mary \text{ didn’t come} \]
    c. John came, or Mary and John.  \[ \neg Mary \text{ didn’t come} \]
3.1. Translation into logic

(6) a. Of John and Mary, some came to the party.
    b. John came.                      \textit{\sim} Mary didn’t come
    c. John came, or Mary and John.    \textit{\nabla} Mary didn’t come
3.1. Translation into logic

(6) a. John came, or Mary, or John and Mary.
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3.1. Translation into logic

(6) a. John came, or Mary, or John and Mary.
    b. John came.
    c. John came, or Mary and John.
(6) a. John came, or Mary, or John and Mary. \[ p \lor q \lor (p \land q) \]
b. John came. \[ p \]
c. John came, or Mary and John. \[ p \lor (p \land q) \]
3.2. Semantics (Roelofsen, 2011)

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- **Possibility**: a set of worlds \((a, b)\)
- **Proposition**: a set of possibilities \((A, B, [\varphi])\)
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- *Possibility*: a set of worlds \((a, b)\)
- *Proposition*: a set of possibilities \((A, B, [\varphi])\)
- *Informative content*: \(|\varphi| := \bigcup[\varphi]\)
3.2. Semantics (Roelofsen, 2011)

- **Possibility**: a set of worlds \((a, b)\)
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\begin{align*}
(6a) \ [p \lor q \lor (p \land q)] & \quad (6b) \ [p] & \quad (6c) \ [p \lor (p \land q)]
\end{align*}
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3.2. Semantics (Roelofsen, 2011)

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\end{align*}
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**Entailment**

\(A \text{ entails } B, A \models B, \text{ iff }\\
(i) \quad \bigcup A \subseteq \bigcup B; \text{ and }\\
(ii) \quad \text{for all } b \in B, \text{ if } b \cap \bigcup A \neq \emptyset, b \cap \bigcup A \in A \)
3.2. Semantics (Roelofsen, 2011)

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Entailment

\(A \text{ entails } B, A \vdash B\), iff

(i) \(\cup A \subseteq \cup B\); and

(ii) for all \(b \in B\), if \(b \cap \cup A \neq \emptyset\), \(b \cap \cup A \in A\)

\[\text{(6a)} \quad [p \lor q \lor (p \land q)]\]
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\(A\) entails \(B\), \(A \models B\), iff

(i) \(\bigcup A \subseteq \bigcup B\); and

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\[\rightarrow \text{at least as informative}\]

\[\rightarrow \text{at least as attentive}\]
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\(A\) entails \(B\), \(A \models B\), iff

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Now, \((6c) \models (6a)\), but \((6b) \not\models (6a).\)
The relevant maxims

1. **Quality:**
2. **Quantity:**
3. **Relation:**
3.3. Pragmatics

The relevant maxims

For a cooperative speaker with information $s$, responding $R$ to $Q$:

1. **Quality:**
2. **Quantity:**
3. **Relation:**

(7) Did John go to the party?
It was raining.

If it rained, John \{went / didn’t go\}.
3.3. Pragmatics

The relevant maxims
For a cooperative speaker with information \( s \), responding \( R \) to \( Q \):

1. **Quality**: \( s \subseteq \bigcup R \).
2. **Quantity**:
3. **Relation**: (7) Did John go to the party? It was raining. If it rained, John {went / didn't go}. 
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The relevant maxims
For a cooperative speaker with information $s$, responding $R$ to $Q$:

1. **Quality**: $s \subseteq \bigcup R$.
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1. **Quality**: $s \subseteq \bigcup R$.
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1. **Quality**: \( s \subseteq \bigcup R \).
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(7) Did John go to the party?
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The relevant maxims
For a cooperative speaker with information $s$, responding $R$ to $Q$:

1. **Quality**: $s \subseteq \bigcup R$.
2. **Quantity**: For all $Q' \subseteq Q$, if $s \subseteq \bigcup Q'$ then $\bigcup R \subseteq \bigcup Q'$.
3. **Relation**: $\{ r \cap s \mid r \in R \} = Q$.

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The relevant maxims
For a cooperative speaker with information $s$, responding $R$ to $Q$:

1. **Quality**: $s \subseteq \bigcup R$.
2. **Quantity**: For all $Q' \subseteq Q$, if $s \subseteq \bigcup Q'$ then $\bigcup R \subseteq \bigcup Q'$.
3. **Relation**: $\{r \cap s \mid r \in R\} \models Q$.

(7) Did John go to the party?
It was raining.
3.3. Pragmatics

The relevant maxims

For a cooperative speaker with information $s$, responding $R$ to $Q$:

1. **Quality**: $s \subseteq \bigcup R$.
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3. **Relation**: $\{ r \cap s \mid r \in R \} \supseteq Q$.

(7) Did John go to the party?
It was raining. $\sim$ If it rained, John \{went / didn’t go\}.
3.3. Pragmatics
(cf. Grice '75; Groenendijk & Stokhof '84; Roberts '96; v.Rooij & Schulz '04)

The relevant maxims
For a cooperative speaker with information \(s\), responding \(R\) to \(Q\):

1. **Quality**: \(s \subseteq \bigcup R\).
2. **Quantity**: For all \(Q' \subseteq Q\), if \(s \subseteq \bigcup Q'\) then \(\bigcup R \subseteq \bigcup Q'\).
3. **Relation**: \(\{r \cap s \mid r \in R\} \models Q\).
4. Results

4.1. Examples
4.2. What’s happening
4.3. ‘Alternatives’?
4.4. Main conclusion
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

c. John came, or Mary and John. \((p \lor (p \land q))\)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)|\) (Quality)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\)  \(\text{(Quality)}\)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \vee q \vee (p \land q))\)

b. John came. \((p)\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \vee (p \land q)| = |p|\) \hspace{1cm} (Quality)
2. \(s \not\subseteq |q|\) \hspace{1cm} (Quantity)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\) (Quality)
2. \(s \not\subseteq |q|\) (Quantity)

\[ p \lor (p \land q) \models p \lor q \lor (p \land q) \]
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\) \hfill \text{(Quality)}
2. \(s \not\subseteq |q|\) \hfill \text{(Quantity)}
3. \(p \lor (p \land q) \supseteq p \lor q \lor (p \land q)\) \hfill \text{(Relation)}
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)
   1. \(s \subseteq |p|\) (Quality)

---

c. John came, or Mary and John. \((p \lor (p \land q))\)
   1. \(s \subseteq |p \lor (p \land q)| = |p|\) (Quality)
   2. \(s \nsubseteq |q|\) (Quantity)
   3. \(- \quad p \lor (p \land q) \models p \lor q \lor (p \land q)\) (Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)
   1. \(s \subseteq |p|\) \hspace{1cm} (Quality)
   2. \(s \not\subseteq |q|\) \hspace{1cm} (Quantity)

c. John came, or Mary and John. \((p \lor (p \land q))\)
   1. \(s \subseteq |p \lor (p \land q)| = |p|\) \hspace{1cm} (Quality)
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   3. \(p \lor (p \land q) \models p \lor q \lor (p \land q)\) \hspace{1cm} (Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

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1. \(s \subseteq |p|\)
2. \(s \not\subseteq |q|\)

\[ p \not\subseteq p \lor q \lor (p \land q) \]

(Quality)

(Quantity)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\)
2. \(s \not\subseteq |q|\)
3. - \(p \lor (p \land q) \nsubseteq p \lor q \lor (p \land q)\)

(Quality)

(Quantity)

(Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p ∨ q ∨ (p ∧ q))\)

b. John came. \((p)\)

1. \(s \subseteq |p|\)
2. \(s \not\subseteq |q|\)

\(!!!\)

\(p \not\subseteq p ∨ q ∨ (p ∧ q)\)

(Quantity)

(6) c. John came, or Mary and John. \((p ∨ (p ∧ q))\)

1. \(s \subseteq |p ∨ (p ∧ q)| = |p|\)
2. \(s \not\subseteq |q|\)
3. - \(p ∨ (p ∧ q) ⊆ p ∨ q ∨ (p ∧ q)\)

(Quality)

(Quantity)

(Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

1. \(s \subseteq |p|\)
2. \(s \not\subseteq |q|\)

![Diagram](image)

\[p \nRightarrow p \lor q \lor (p \land q)\]

(Quality)

(Quantity)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\)
2. \(s \not\subseteq |q|\)
3. - \([p \lor (p \land q)] \not\subseteq p \lor q \lor (p \land q)\]

(Quality)

(Quantity)

(Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

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1. \(s \subseteq |p|\)
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\[ p \not\subseteq p \lor q \lor (p \land q) \]

\((\text{Quality})\)

\((\text{Quantity})\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\)
2. \(s \not\subseteq |q|\)
3. - \(p \lor (p \land q) \not\subseteq p \lor q \lor (p \land q)\)

\((\text{Quality})\)

\((\text{Quantity})\)

\((\text{Relation})\)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

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1. \(s \subseteq |p|\)
2. \(s \notin |q|\)

\[p \nLeftarrow p \lor q \lor (p \land q)\]

\(\text{(Quality)}\)
\(\text{(Quantity)}\)

\[\text{(Relation)}\]

\[\text{(Relation)}\]

c. John came, or Mary and John. \((p \lor (p \land q))\)
1. \(s \subseteq |p \lor (p \land q)| = |p|\)
2. \(s \notin |q|\)
3. - \(p \lor (p \land q) \supset p \lor q \lor (p \land q)\)

\(\text{(Quality)}\)
\(\text{(Quantity)}\)
\(\text{(Relation)}\)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

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1. \(s \subseteq |p|\)
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\[
p \nvDash p \lor q \lor (p \land q) \quad \text{(Quality)}
\]
\[
(\text{Quantity})
\]

![Diagram of set operations and logical operations]

\[
\begin{align*}
\text{(Relation)}
\end{align*}
\]

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\)
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3. \(p \lor (p \land q) \models p \lor q \lor (p \land q)\)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)
   1. \(s \subseteq |p|\)  
   2. \(s \not\subseteq |q|\) \(\quad \models p \nvdash p \lor q \lor (p \land q)\)  
   3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq |p| \cup |q|\)  

   \(\text{(Quality)}\)  
   \(\text{(Quantity)}\)  
   \(\text{(Relation)}\)

c. John came, or Mary and John. \((p \lor (p \land q))\)
   1. \(s \subseteq |p \lor (p \land q)| = |p|\)  
   2. \(s \not\subseteq |q|\)  
   3. \(p \lor (p \land q) \models p \lor q \lor (p \land q)\)  

   \(\text{(Quality)}\)  
   \(\text{(Quantity)}\)  
   \(\text{(Relation)}\)
4.1. Examples

(6) a. John came, Mary came, or both came $(p \lor q \lor (p \land q))$

b. John came. $(p)$

1. $s \subseteq |p|$
2. $s \not\subseteq |q|$
3. $s \subseteq |p| \cup |q|$ or $s \subseteq |p| \cup |q|$


c. John came, or Mary and John. $(p \lor (p \land q))$

1. $s \subseteq |p \lor (p \land q)| = |p|$
2. $s \not\subseteq |q|$
3. - $p \lor (p \land q) \implies p \lor q \lor (p \land q)$

(Quality)  (Quantity)  (Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

1. \(s \subseteq |p|\) \hspace{2cm} \(p \nRightarrow p \lor q \lor (p \land q)\) \hspace{2cm} (Quality)
2. \(s \not\subseteq |q|\) \hspace{2cm} (Quantity)
3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq |p| \cup |q|\) \hspace{2cm} (Relation)
4. \(s \subseteq |q|\)

c. John came, or Mary and John. \((p \lor (p \land q))\)

1. \(s \subseteq |p \lor (p \land q)| = |p|\) \hspace{2cm} (Quality)
2. \(s \not\subseteq |q|\) \hspace{2cm} (Quantity)
3. - \hspace{2cm} \(p \lor (p \land q) \Rightarrow p \lor q \lor (p \land q)\) \hspace{2cm} (Relation)
4.1. Examples

(6) a. John came, Mary came, or both came \((p \lor q \lor (p \land q))\)

b. John came. \((p)\)

1. \(s \subseteq |p|\)
2. \(s \not\subseteq |q|\)
3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq \overline{|p| \cup |q|}\)

\[\text{exhaustivity!}\]

4. \(s \subseteq |q|\)

\[(\text{Quality})\]
\[(\text{Quantity})\]
\[(\text{Relation})\]

c. John came, or Mary and John. \((p \lor (p \land q))\)

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\[(\text{Quality})\]
\[(\text{Quantity})\]
\[(\text{Relation})\]
4.2. What’s happening?

More generally:
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- Together with Quality, this implies *competence*.
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More generally:

- The maxim of Relation requires that: for each possibility the speaker *leaves unattended*, the speaker knows how it depends on the information she provided.
- Together with Quality, this implies *competence*.
- Together with Quantity, this in turn yields exhaustivity.
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Crucially:

- Competence is not entailed by cooperativity.
More generally:

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- Together with Quality, this implies *competence*.
- Together with Quantity, this in turn yields exhaustivity.

Crucially:

- Competence is not entailed by cooperativity.
- It is merely entailed by cooperativity *plus what is said*. 
4.3. ‘Alternatives’

Existing approaches (since forever):

- ‘Why did the speaker not say “p ∧ q”?’
4.3. ‘Alternatives’

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My approach:
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- Hence something stronger is implied: exhaustivity.
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  - ‘Why did the speaker not say “p \lor (p \land q)”?’
  - *Ignorance is no excuse.*
  - Hence something stronger is implied: exhaustivity.

Beware:
  - Speakers need not reason in terms of alternatives.
Main conclusion:

- If pragmatic reasoning is sensitive to *attentive content*
4.4. Main conclusion

Main conclusion:

- If pragmatic reasoning is sensitive to *attentive content* (which it must be, to distinguish between (5b) and (5c));
Main conclusion:

- If pragmatic reasoning is sensitive to *attentive content* (which it must be, to distinguish between (5b) and (5c));
- then *exhaustivity is a conversational implicature*. 
End of Part I
Part II: Intonation and exhaustivity

5. Focus

6. The final rise
5. Focus

5.1. Prerequisites for exhaustivity
5.2. Domain restriction
5.3. Focus
5.4. Hungarian vs. English focus
5.5. Some more predictions
5.6. But... experiments!
5.1. Prerequisites for exhaustivity

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- In particular, the QUD must be mutually known, i.e.:
  - The *kind* of question.
  - The *domain* of relevant alternatives.

\[
(8) \text{Who came to the party?} \\
\text{[John] came to the party. / # John came to the [party].}
\]

\[
(9) \text{Of John, Bill and Mary, who came?} \\
\text{[John] came. / # not Bill, Mary}
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\begin{align*}
(8) \text{Who came to the party?} & \quad \text{[John]} \text{ came to the party. / } \# \text{ John came to the party.} \\
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\end{align*}
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(8) Who came to the party?

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5.2. Domain restriction

- The domain restriction is often implicit:

(10) Ah, everyone is here.
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In each case, context and \textit{world knowledge} must fill the gap.
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In each case, context and *world knowledge* must fill the gap.

To be absolutely sure, the *speaker* must make the domain explicit:

(12) Of John, Bill and Mary, [John] \_F came. \~ not Bill, not Mary.
5.3. Focus

The basics:

- Focus is the semantic correlate of intonational stress.
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Focus need not and does not:

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The latter is what an explicit domain restriction or world knowledge is for.
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(cf. Bob’s work on typicality.)
Hungarian focus is *more* exhaustive (Szabolcsi, 1981):

(13) \([\text{Amy and Ben}]_F \text{ saw Cleo.} \equiv [\text{Amy}]_F \text{ saw Cleo.}\)
5.4. Hungarian vs. English focus

Hungarian focus is *more* exhaustive (Szabolcsi, 1981):

(13) [Amy and Ben]$_F$ saw Cleo. $\equiv$ [Amy]$_F$ saw Cleo.

(14) [Amy és Ben]$_F$ látta Cleot. $\not\equiv$ [Amy]$_F$ látta Cleot.
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The only possible (kind of) explanation:
5.4. Hungarian vs. English focus

Hungarian focus is *more* exhaustive (Szabolcsi, 1981):

(13) [Amy and Ben]$_F$ saw Cleo. $\equiv$ [Amy]$_F$ saw Cleo.

(14) [Amy és Ben]$_F$ látta Cleot. $\not\equiv$ [Amy]$_F$ látta Cleot.

The only possible (kind of) explanation:

- Hungarians are more conservative w.r.t. domain restrictions (either focus-specific, or also with regard to quantifiers).
5.4. Hungarian vs. English focus

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The only possible (kind of) explanation:

- Hungarians are more conservative w.r.t. domain restrictions (either focus-specific, or also with regard to quantifiers).
- Prediction: no difference when domain is explicit.

(15) Of Amy, Ben, and John, [Amy and Ben]$_F$ saw Cleo.

\(\not\equiv\) Of Amy, Ben, and John, [Amy]$_F$ saw Cleo.
5.5. Some more predictions

- Exhaustivity implicatures are only defeasible to the extent that the assumption of cooperativity is (i.e., not really):
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\[(16)\text{ Of Amy, Ben, and John, } [\text{Amy}]_F \text{ saw Cleo. } \# \text{ Indeed, } [\text{Amy and Ben}]_F \text{ saw Cleo. }\]

(that is not to say it isn’t ‘cancellable’)
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5.5. Some more predictions

- Exhaustivity implicatures are only defeasible to the extent that the assumption of cooperativity is (i.e., not really):

(16) Of Amy, Ben, and John, \([Amy]_F\) saw Cleo. \# Indeed, \([Amy\ and\ Ben]_F\) saw Cleo.

(that is not to say it isn’t ‘cancellable’)

- ‘Mention-some’ effects due to an implicit domain restriction:

(17) Where can I find an Italian newspaper?
   In the kiosk around the corner. \(\not\exists\) nowhere else.
5.5. Some more predictions

- Exhaustivity implicatures are only defeasible to the extent that the assumption of cooperativity is (i.e., not really):

(16) Of Amy, Ben, and John, [Amy]$_F$ saw Cleo. # Indeed, [Amy and Ben]$_F$ saw Cleo.

(that is not to say it isn’t ‘cancellable’)

- ‘Mention-some’ effects due to an implicit domain restriction:

(17) Where can I find an Italian newspaper?
   In the kiosk around the corner. $\n$ nowhere else.
   $\n$ nowhere else that’s easy to remember/find.
5.5. Some more predictions

- Exhaustivity implicatures are only defeasible to the extent that the assumption of cooperativity is (i.e., not really):

(16) Of Amy, Ben, and John, [Amy]_F saw Cleo. # Indeed, [Amy and Ben]_F saw Cleo.

(that is not to say it isn’t ‘cancellable’)

- ‘Mention-some’ effects due to an implicit domain restriction:

(17) Where can I find an Italian newspaper?
    In the kiosk around the corner. ↛ nowhere else.
    ⇒ nowhere else that’s easy to remember/find.

And finally:

(4) # Not sure about Mary, but - of J, B, M - John and Bill came.
(2) (Uttered when speaker is known not to be competent)
    # Bonnie stole [some]_F of the pears.
5.6. But... experiments!

Why do experiments show such mixed results?
5.6. But... experiments!

Why do experiments show such mixed results?
  ▶ QUD and focus are left implicit;
5.6. But... experiments!

Why do experiments show such mixed results?
  ▸ QUD and focus are left implicit;
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Why do experiments show such mixed results?

- QUD and focus are left implicit;
  (or the wrong foci are compared (Zondervan, 2010))
- Domain restriction is left implicit;
5.6. But... experiments!

Why do experiments show such mixed results?

- QUD and focus are left implicit;
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- Domain restriction is left implicit;
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(coming up next)
6. The final rise

6.1. The sentence-final rise
6.2. Deriving the readings
6.3. General results
6.4. Contrastive topic (work in progress)
6.5. The bigger picture
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
John came↘.  ~ Mary and Bill didn’t.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?

John came↗.

ʃ Mary and Bill didn’t.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
    John came↗.                                    ↘  Mary and Bill didn’t.
    ↾  ...wait, there’s more.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?

John came↑.                           ↗ Mary and Bill didn’t.

~ ...wait, there’s more.

~ ...perhaps that implies sth. about M&B?
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
John came ≥.  Mary and Bill didn’t.

海尔, wait, there’s more.
海尔, ...perhaps that implies sth. about M&B?
海尔, ...but I’m not sure.

Proposal
1. The final rise marks the violation of a maxim.
2. Its pitch conveys emotivity. (Banziger & Scherer, 2005)
3. This reflects the severity of the violation:
   ≥ H: Quality/Manner; (cf. Ward & Hirschberg, 1992)
   ≥ L: Quantity/Relation.
This proposal is new in its generality, not in spirit.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
    John came↗.
   ↗  Mary and Bill didn’t.
   ↘  ...wait, there’s more.
   ↘  ...perhaps that implies sth. about M&B?
   ↘  ...but I’m not sure.
   ↘  ...did I make myself clear?
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
   John came $\rightarrow^L$.                          $\nach$ Mary and Bill didn’t.
   $\rightsquigarrow$ ...wait, there’s more.
   $\rightsquigarrow$ ...perhaps that implies sth. about M&B?
   c. John came $\rightarrow^H$.
   $\rightsquigarrow$ ...but I’m not sure.
   $\rightsquigarrow$ ...did I make myself clear?
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
John came $\nearrow^L$. Mary and Bill didn’t.
~ ...wait, there’s more. (Quantity)
~ ...perhaps that implies sth. about M&B?

\(c\). John came $\nearrow^H$.
~ ...but I’m not sure.
~ ...did I make myself clear?
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
    John came $\uparrow^L$. $\nleftrightarrow$ Mary and Bill didn’t.
    $\sim$ ...wait, there’s more. (Quantity)
    $\sim$ ...perhaps that implies sth. about M&B? (Relation)
    c. John came $\uparrow^H$.
    $\sim$ ...but I’m not sure.
    $\sim$ ...did I make myself clear?
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?

John came $\Rightarrow^L$. $\not\Rightarrow$ Mary and Bill didn’t.
~ ...wait, there’s more. (Quantity)
~ ...perhaps that implies sth. about M&B? (Relation)
c. John came $\Rightarrow^H$.
~ ...but I’m not sure.
~ ...did I make myself clear?

Proposal

1. The final rise marks the violation of a maxim.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
   John came \( \rightarrow^L \). \( \not\rightarrow \) Mary and Bill didn’t.
   \( \leadsto \) ...wait, there’s more. \( \text{(Quantity)} \)
   \( \leadsto \) ...perhaps that implies sth. about M&B? \( \text{(Relation)} \)
   c. John came \( \rightarrow^H \).
      \( \leadsto \) ...but I’m not sure. \( \text{(Quality)} \)
      \( \leadsto \) ...did I make myself clear?

Proposal

1. The final rise marks the violation of a maxim.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
    John came\(\rightarrow L\). \(\not\rightleftharpoons\) Mary and Bill didn’t.
    \(\sim\) ...wait, there’s more. \(\sim\) ...perhaps that implies sth. about M&B? \(\sim\)
    c. John came\(\rightarrow H\).
    \(\sim\) ...but I’m not sure. \(\sim\) ...did I make myself clear?

Proposal

1. The final rise marks the violation of a maxim.
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(17) Of John, Bill and Mary, who came to the party?
John came $\uparrow^L$. Mary and Bill didn’t.

$\sim$ ...wait, there’s more. (Quantity)
$\sim$ ...perhaps that implies sth. about M&B? (Relation)

c. John came $\uparrow^H$.
$\sim$ ...but I’m not sure. (Quality)
$\sim$ ...did I make myself clear? (Manner)

Proposal

1. The final rise marks the violation of a maxim.
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6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?

John came $\nearrow^L$. $\nearrow$ Mary and Bill didn’t.

$\leadsto$ ...wait, there’s more. (Quantity)

$\leadsto$ ...perhaps that implies sth. about M&B? (Relation)

c. John came $\nearrow^H$.

$\leadsto$ ...but I’m not sure. (Quality)

$\leadsto$ ...did I make myself clear? (Manner)

Proposal

1. The final rise marks the violation of a maxim.
2. Its pitch conveys emotivity. (Banziger & Scherer, 2005)
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   $\nearrow^H$: Quality/Manner; (cf. Ward & Hirschberg, 1992)
   $\nearrow^L$: Quantity/Relation.
6.1. The sentence-final rise

(17) Of John, Bill and Mary, who came to the party?
    John came $\nearrow^L$.  $\nrightarrow$  Mary and Bill didn’t.
    $\nrightarrow$  ...wait, there’s more.  (Quantity)
    $\nrightarrow$  ...perhaps that implies sth. about M&B?  (Relation)
    c. John came $\nearrow^H$.
        $\nrightarrow$  ...but I’m not sure.  (Quality)
        $\nrightarrow$  ...did I make myself clear?  (Manner)

Proposal

1. The final rise marks the violation of a maxim.
2. Its pitch conveys *emotivity*.  (Banziger & Scherer, 2005)
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   $\nearrow^H$: Quality/Manner;  (cf. Ward & Hirschberg, 1992)
   $\nearrow^L$: Quantity/Relation.

*This proposal is new in its generality, not in spirit.*
6.2. Deriving the readings

(18) Of J and M, who came to the party? (p ∨ q ∨ (p ∧ q))

John came ↘.

1. \( s \subseteq p \) (Quality)
2. \( s \slash \subseteq q \) (Quantity)
3. \( s \subseteq p \cup q \) or \( s \subseteq p \cup q \) (Relation)
4. The speaker thinks she is clear, concise, etc. (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)
    John came \( \rightarrow \).

Readings

...wait, there’s more. \( (\text{Quantity}) \)
...perhaps that implies sth. about Mary? \( (\text{Relation}) \)
...but I’m not sure. \( (\text{Quality}) \)
...did I make myself clear? \( (\text{Manner}) \)
6.2. Deriving the readings

(18) Of J and M, who came to the party?  
   John came ↗.

   1. \( s \subseteq |p| \)  
   2. \( s \notin |q| \)  
   3. \( s \subseteq |p| \cup |q| \) or \( s \subseteq |p| \cup \overline{|q|} \)

Readings

...wait, there’s more.  
...perhaps that implies sth. about Mary?  
...but I’m not sure.  
...did I make myself clear?
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)

John came \( \rightarrow \).

1. \( s \subseteq |p| \) \hspace{1cm} (Quality)
2. \( s \not\subseteq |q| \) \hspace{1cm} (Quantity)
3. \( s \subseteq \overline{|p| \cup |q|} \) or \( s \subseteq \overline{|p| \cup \overline{|q|}} \) \hspace{1cm} (Relation)
4. The speaker thinks she is clear, concise, etc. \hspace{1cm} (Manner)

**Readings**

...wait, there’s more. \hspace{1cm} (Quantity)
...perhaps that implies sth. about Mary? \hspace{1cm} (Relation)
...but I’m not sure. \hspace{1cm} (Quality)
...did I make myself clear? \hspace{1cm} (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)
John came ↗ .

1. \( s \notin |p| \)
2. \( s \notin |q| \)
3. \( s \subseteq \overline{p} \cup \overline{q} \) or \( s \subseteq \overline{p} \cup \overline{q} \)
4. The speaker thinks she is clear, concise, etc.

Readings

...wait, there’s more. (Quantity)
...perhaps that implies sth. about Mary? (Relation)
...but I’m not sure. (Quality)
...did I make myself clear? (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \((p \lor q \lor (p \land q))\)

John came \(\uparrow\).

1. \(s \notin |p|\)
2. \(s \notin |q|\)
3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq |p| \cup |q|\)
4. The speaker thinks she is clear, concise, etc.

Readings

...wait, there’s more. \((\text{Quantity})\)

...perhaps that implies sth. about Mary? \((\text{Relation})\)

✓ ...but I’m not sure. \((\text{Quality})\)

...did I make myself clear? \((\text{Manner})\)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)
    John came ∆.
    1. \( s \subseteq |p| \)  
    2. \( s \nsubseteq |q| \)  
    3. \( s \subseteq |p| \cup |q| \) or \( s \subseteq |p| \cup |q| \)  
    4. The speaker thinks she is clear, concise, etc. 

Readings

...wait, there’s more. (Quantity)
...perhaps that implies sth. about Mary? (Relation)
✓ ...but I’m not sure. (Quality)
✓ ...did I make myself clear? (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)

John came \( \uparrow \).

1. \( s \subseteq |p| \)
2. \( s \subseteq |q| \)
3. \( s \subseteq \overline{|p| \lor |q|} \) or \( s \subseteq \overline{|p| \lor |q|} \)
4. The speaker thinks she is clear, concise, etc.

Readings

...wait, there’s more. \( (\text{Quantity}) \)

...perhaps that implies sth. about Mary? \( (\text{Relation}) \)

✓ ...but I’m not sure. \( (\text{Quality}) \)

...did I make myself clear? \( (\text{Manner}) \)
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(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)

John came \( \uparrow \).

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✓ ...wait, there’s more.

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✓ ...but I’m not sure.

...did I make myself clear?
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(18) Of J and M, who came to the party? \((p \lor q \lor (p \land q))\)

John came \(\uparrow\).

1. \(s \subseteq |p|\)  
   (Quality)
2. \(s \not\subseteq |q|\)  
   (Quantity)
3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq |p| \cup \overline{|q|}\)  
   (Relation)
4. The speaker thinks she is clear, concise, etc.  
   (Manner)

Readings

✓ ...wait, there’s more.  
   ...perhaps that implies sth. about Mary?  
   (Quantity)

✓ ...but I’m not sure.  
   ...did I make myself clear?
   (Relation)

✓ (Quality)
   (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)

John came ↗.

1. \( s \subseteq \lvert p \rvert \) (Quality)
2. \( s \not\subseteq \lvert q \rvert \) (Quantity)
3. \( s \not\subseteq \overline{\lvert p \rvert} \lor \lvert q \rvert \) and \( s \not\subseteq \overline{\lvert p \rvert} \lor \overline{\lvert q \rvert} \) (↑)
4. The speaker thinks she is clear, concise, etc. (Manner)

Readings

✓ ...wait, there’s more. (Quantity)
   ...perhaps that implies sth. about Mary? (Relation)
✓ ...but I’m not sure. (Quality)
   ...did I make myself clear? (Manner)
6.2. Deriving the readings

\[(18)\] Of J and M, who came to the party? \((p \lor q \lor (p \land q))\)

John came \(\uparrow\).

1. \(s \subseteq |p|\)
2. \(s \not\subseteq |q|\)
3. \(s \not\subseteq |p| \cup |q|\) and \(s \not\subseteq \overline{|p|} \cup \overline{|q|}\)
4. The speaker thinks she is clear, concise, etc.

Readings

✓ ...wait, there’s more. \((\text{Quantity})\)
✓ ...perhaps that implies sth. about Mary? \((\text{Relation})\)
✓ ...but I’m not sure. \((\text{Quality})\)
   ...did I make myself clear? \((\text{Manner})\)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \((p \lor q \lor (p \land q))\)

John came ↑.

1. \(s \subseteq |p|\)  
   (Quality)
2. \(s \not\subseteq |q|\)  
   (Quantity)
3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq \overline{|p| \cup |q|}\)  
   (Relation)
4. The speaker thinks she is clear, concise, etc.  
   (Manner)

Readings

✓ ...wait, there’s more.  
   (Quantity)
✓ ...perhaps that implies sth. about Mary?  
   (Relation)
✓ ...but I’m not sure.  
   (Quality)
   ...did I make myself clear?  
   (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)

John came \( \uparrow \).

1. \( s \subseteq |p| \)  
2. \( s \not\subseteq |q| \)  
3. \( s \subseteq |p| \cup |q| \) or \( s \subseteq |p| \cup |q| \)  
4. The speaker doesn’t think she’s clear, concise, etc.  

Readings

✓ ...wait, there’s more.  
✓ ...perhaps that implies sth. about Mary?  
✓ ...but I’m not sure.  
   ...did I make myself clear?
6.2. Deriving the readings

(18) Of J and M, who came to the party? \( (p \lor q \lor (p \land q)) \)  
John came \( \uparrow \) .

1. \( s \subseteq |p| \)  
2. \( s \notin |q| \)  
3. \( s \subseteq |p| \cup |q| \) or \( s \subseteq |p| \cup |q| \)  
4. The speaker doesn’t think she’s clear, concise, etc. \( \uparrow \) 

Readings

✓ ...wait, there’s more. \( \) (Quantity)  
✓ ...perhaps that implies sth. about Mary? \( \) (Relation)  
✓ ...but I’m not sure. \( \) (Quality)  
✓ ...did I make myself clear? \( \) (Manner)
6.2. Deriving the readings

(18) Of J and M, who came to the party? \((p \lor q \lor (p \land q))\)

John came ↗.

1. \(s \subseteq |p|\)  
   (Quality)

2. \(s \notin |q|\)  
   (Quantity)

3. \(s \subseteq |p| \cup |q|\) or \(s \subseteq |p| \cup |q|\)  
   (Relation)

4. The speaker doesn’t think she’s clear, concise, etc.  
   (↑)

Readings

✓ ...wait, there’s more.  
   (Quantity)

✓ ...perhaps that implies sth. about Mary?  
   (Relation)

✓ ...but I’m not sure.  
   (Quality)

✓ ...did I make myself clear?  
   (Manner)
6.3. General results

My approach unifies existing approaches:

- Quality: 'lack of belief in proposition expressed' (Truckenbrodt, 2006)
- Relation: 'uncertain relevance'/'scalar uncertainty' (Ward & Hirschberg, 1985)
- Relation: 'rise-fall-rise quantifies over focus alternatives' (Constant, 2012)
- Quantity: 'unfinishedness' (Bolinger, 1982)
- Manner reading (many; e.g., Gussenhoven, 2004)

Noteworthy:

For the Relation readings, attentive content is crucial.

In all but the last reading, exhaustivity is absent.
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  (many; e.g., Gussenhoven, 2004)

**Noteworthy:**

- For the Relation readings, *attentive content* is crucial.
6.3. General results

My approach unifies existing approaches:

- Quality: ‘lack of belief in proposition expressed’
  (Truckenbrodt, 2006)
- Relation: ‘uncertain relevance’/‘scalar uncertainty’
  (Ward & Hirschberg, 1985)
- Relation: ‘rise-fall-rise quantifies over focus alternatives’
  (Constant, 2012)
- Quantity: ‘unfinishedness’
  (Bolinger, 1982)
- Manner reading
  (many; e.g., Gussenhoven, 2004)

Noteworthy:

- For the Relation readings, *attentive content* is crucial.
- In all but the last reading, exhaustivity is absent.
6.4. Contrastive topic

Work in progress

- **Focus**: the function of nuclear stress in a *falling* phrase.
6.4. Contrastive topic

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- **Focus**: the function of nuclear stress in a *falling* phrase.
- **Contrastive topic**: ~ in a *rising* phrase.

To say: 'I'm only answering a subquestion' (Büring, 2003)

(19) Who had what for lunch?

- [John] had the [beans].
- only John had something.

- John had only beans;

- only John had the beans.

A compositional account in terms of the final rise:

- Construct QUD and assertion in parallel.
- Nuclear stress influences how the QUD is built up.
- Rise indicates a maxim violation for the assertion relative to the QUD at that point in the derivation.
6.4. Contrastive topic

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(19) Who had what for lunch?
  a. [John]_{CT} had the [beans]_F. ~ John had only beans; ¬ only John had something.
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(19) Who had what for lunch?

a. $[\text{John}]_{CT}$ had the $[\text{beans}]_{F}$. $\rightsquigarrow$ John had only beans; $\not\rightsquigarrow$ only John had something.

b. $[\text{John}]_{F}$ had the $[\text{beans}]_{CT}$. $\not\rightsquigarrow$ John had only beans; $\rightsquigarrow$ only John had the beans.
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- **Focus**: the function of nuclear stress in a *falling* phrase.
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(19) Who had what for lunch?
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- Construct QUD and assertion in parallel.
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a. \([\text{John}] \uparrow \text{had the } [\text{beans}] \downarrow.\)  
   \(\sim\) John had only beans; \(\uparrow\) only John had something.

b. \([\text{John}] \downarrow \text{had the } [\text{beans}] \uparrow.\)  
   \(\uparrow\) John had only beans; \(\sim\) only John had the beans.

A compositional account in terms of the final rise:

- Construct QUD and assertion in parallel.
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Work in progress

- **Focus**: the function of nuclear stress in a *falling* phrase.
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To say: ‘I’m only answering a subquestion’ \(\quad\) (Büring, 2003)

(19) Who had what for lunch?

a. [John] ↗ had the [beans] \(\downarrow\). \(\sim\) John had only beans;
   \(\not\wedge\) only John had something.

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A compositional account in terms of the final rise:

- Construct QUD and assertion in parallel.
- Nuclear stress influences how the QUD is built up.
- Rise indicates a maxim violation for the assertion relative to the QUD at that point in the derivation.
In English (and related languages)
Primarily, intonation situates an utterance in the discourse.
6.5. The bigger picture

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- Nuclear stress (focus) reveals what the QUD is.
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Of course, intonation is not alone.
- Discourse particles (‘well’, ‘actually’, ‘by the way’)
- Facial expressions, gestures, . . .
End of Part II
7. Main conclusions

Part I: Exhaustivity is a conversational implicature

If pragmatic reasoning is sensitive to attentive content, then exhaustivity is a conversational implicature.

Part II: Intonation and exhaustivity

Focus enables us to make strong predictions. Beware of implicit domain restrictions and intonation.
7. Main conclusions

Part I: Exhaustivity is a conversational implicature

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7. Main conclusions

Part I: Exhaustivity is a conversational implicature

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Part I: Exhaustivity is a conversational implicature

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7. Main conclusions

Part I: Exhaustivity is a conversational implicature

- If pragmatic reasoning is sensitive to \textit{attentive content}
- then \textit{exhaustivity is a conversational implicature}.

Part II: Intonation and exhaustivity

- Focus enables us to make strong predictions.
- Beware of implicit domain restrictions and intonation.
The End

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

- *Exhaustivity through the maxim of Relation*  
  (*LENLS* proceedings)
- ‘*Attention, I’m violating a maxim!*’  
  (*SemDial* proceedings, Amsterdam, next month)
- *Contrastive topic and non-cooperativity*  
  (To be presented at *QID*, Amsterdam, next month)

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A putative conversational implicature that \( p \) is explicitly cancellable if [...] it is admissible to add “but not \( p \)”, or “I do not mean to imply that \( p \)” [...].

(Grice, 1975, p. 44.)
Grice on cancellability

A putative conversational implicature that $p$ is explicitly cancellable if [...] it is admissible to add “but not $p$”, or “I do not mean to imply that $p$” [...].

(Grice, 1975, p. 44.)

[...] since it is possible to opt out of the observation of [the Cooperative Principle], it follows that a conversational implicature can be cancelled in a particular case. (p.57)
Textbook examples

Some typical examples of cancellation:

(10) On an unrelated note, it was raining.

(11) John, or Mary, or both.

(12) Will one of your parents be home?

(13) How many people will be home?

Sure, one of them will be home. Indeed, both will be home.

(14) John or Mary. Oh, but I did not mean to imply not both.

(15) It is raining. Oh, but it has stopped!

The speaker is changing her mind...
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CI are computed *globally*...

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In (12), the CI wasn’t there to begin with... (cf. Geurts, 2010)

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The speaker is changing her mind...
Non-cancellable by definition

- Surely CI are cancellable in a way that is *not* prevention, disambiguation or correction?

CIs are considered 'defeasible', 'less robust', 'voluntary'.

Implicature cancellation (strict version)

For a consistent speaker to make a conversational implicature and subsequently cancel it. However...

CIs in the sense of Grice (1975) cannot be cancelled in this sense:

1. CI is necessary for maintaining the cooperativity assumption.
2. The mutual assumption of cooperativity is necessary for CI.
3. Hence, cancelling CI requires the sp. to retroactively:
   (i) revoke the cooperativity assumption; or
   (ii) revise what counted as cooperative.
4. The speaker would be either uncooperative, or inconsistent.
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Exhaustivity

In sum:

- Grice’s choice of the word “cancel” is unfortunate.
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In sum:

- Grice’s choice of the word “cancel” is unfortunate.
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- A really defeasible ‘CI’ is not a CI; it’s an inference.
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Now, if I’m correct:

- Exhaustivity is a conversational implicature.
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- (Previously, the competence assumption made it defeasible).
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This makes the Gricean story much more generative...
‘Embedded’ exhaustivity

E.g., Chierchia, *et al.*, (2008++):
‘Embedded’ exhaustivity

E.g., Chierchia, et al., (2008++):

(8) John, Mary or Bob came.
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(9) Each of the students read Othello or King Lear.
    \[\sim \text{Each of the students didn’t read both.}\]
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The problem

The problem has never been the Gricean approach as such, but rather how to find the right ‘alternatives’.
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E.g., Chierchia, et al., (2008+++):

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In my account:

- Attentively, conjunction and disjunction denote union.
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In my account:

- Attentively, conjunction and disjunction denote union.
- Hence, embedding simply accumulates attentive content.
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The problem has never been the Gricean approach as such, but rather *how to find the right ‘alternatives’*.

In my account:

- *Attentively*, conjunction and disjunction denote *union*.
- Hence, embedding simply *accumulates* attentive content.
- E.g., for each of the students, there is attentive content...
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- E.g., for each of the students, there is attentive content...

Many ‘embedded’ implicatures are in fact predicted.
‘Mention-some’ contexts

Contexts where, supposedly, exhaustivity is absent:

(16) Where can I buy an Italian newspaper?
   In the kiosk around the corner. \(\n\) Nowhere else.
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But is it really absent?
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But is it really absent?

- We get exhaustivity as usual, but on a restricted domain.
- No ‘mention-some’ when the domain is explicit:
‘Mention-some’ contexts

Contexts where, supposedly, exhaustivity is absent:

(16) Where can I buy an Italian newspaper?
   In the kiosk around the corner. \(\not\rightarrow\) Nowhere else.
   \(\sim\) Nowhere else that is nearby, easy to explain, . . .

But is it really absent?

- We get exhaustivity as usual, but on a restricted domain.
- No ‘mention-some’ when the domain is explicit:

(17) Of the three nearby kiosks, where can I buy an IN?
   In the kiosk around the corner. \(\sim\) Not in the other kiosks.
‘Mention-some’ contexts

Contexts where, supposedly, exhaustivity is absent:

(16) Where can I buy an Italian newspaper?
   In the kiosk around the corner. \(\neg\) Nowhere else.
   \(\neg\) Nowhere else that is nearby, easy to explain, . . .

But is it really absent?
   ▶ We get exhaustivity as usual, but on a restricted domain.
   ▶ No ‘mention-some’ when the domain is explicit:

(17) Of the three nearby kiosks, where can I buy an IN?
   In the kiosk around the corner. \(\neg\) Not in the other kiosks.

(Alternatively, use a final rise...)


Semantics

Restriction

A restricted to b, \( A_b := \{ a \cap b \mid a \in A, a \cap b \neq \emptyset \} \)

Semantics (Roelofsen, 2011)

1. \([p] = \{ \{ w \in \textbf{Worlds} \mid w(p) = \text{true} \} \}\)
2. \([-\varphi] = \{ \bigcup[\varphi] \} \text{ if } \bigcup[\varphi] \text{ is nonempty; } \emptyset \text{ otherwise.} \)
3. \([\varphi \lor \psi] = (([\varphi] \cup [\psi])|_{\varphi \lor \psi} = [\varphi] \cup [\psi])\]
4. \([\varphi \land \psi] = (([\varphi] \cup [\psi])|_{\varphi \land \psi})\]
Semantics

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A restricted to $b$, $A_b := \{ a \cap b \mid a \in A, a \cap b \neq \emptyset \}$

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1. $[p] = \{ \{ w \in \textbf{Worlds} \mid w(p) = \text{true} \} \}$
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4. $[\varphi \land \psi] = (\bigcup[\varphi] \cup \bigcup[\psi])|_{\varphi \land \psi}$

Attentive semantics is not the only suitable semantics:

- *Unrestricted Inquisitive Sem.* (Ciardelli, 2009; Westera, 2012)
Semantics

Restriction

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Attentive semantics is not the only suitable semantics:

- \textit{Unrestricted Inquisitive Sem.} (Ciardelli, 2009; Westera, 2012)

Minimally, the semantics must lack the \textit{absorption laws}:

- Absorption: \( p \lor (p \land q) \equiv p \equiv p \land (p \lor q) \)
Semantic desiderata

- No absorption laws.
Semantic desiderata

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- Questions, the responses to which may be exhaustified, are *not* partitions.

(cf. Groenendijk and Stokhof, 1984)
Semantic desiderata

- No absorption laws.
- Questions, the responses to which may be exhaustified, are *not* partitions.
  
  (cf. Groenendijk and Stokhof, 1984)

- Wh-words are existential quantifiers over sets.
‘Gricean’?

“that there [appear to be] divergences in meaning between [...] the FORMAL devices [and] their analogs or counterparts in natural language” (Grice, 1975)
‘Gricean’?

“that there [appear to be] divergences in meaning between [...] the **FORMAL** devices [and] their analogs or counterparts in **natural** language” (Grice, 1975)

- The semantics treats informative content classically.
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- The connectives are still algebraically ‘basic’.
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- The semantics treats informative content classically.
- Grice wouldn’t be against other dimensions of meaning.
- The connectives are still algebraically ‘basic’.

Besides: this is the only way.
Focus vs. ‘only’

The foregoing is not to say that focus ‘means’ ‘only’:

(14) If [John] was there, Mary was there. (c.f., Horn, 1972) /slash.left ≡ If only John was there, Mary was there.

(15) [John] was there, and [Mary] was too. /slash.left ≡ Only John was there, and only Mary.

But at least for ‘simple’ sentences: /uni25B8 ‘[Subject] predicate’ ‘only [Subject] predicate’.
The foregoing is not to say that focus ‘means’ ‘only’:

\[(14) \text{ If } [\text{John}]_F \text{ was there, Mary was there.} \quad (\text{c.f., Horn, 1972}) \]
\[\neq \text{ If only John was there, Mary was there.}\]
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But at least for ‘simple’ sentences:

- ‘[Subject]$_F$ predicate’ $\sim$ ‘only [Subject]$_F$ predicate’.
Recall: \( A \) entails \( Q \), \( A \models Q \), iff
(i) \( \bigcup A \subseteq \bigcup Q \); and
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Formal results

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Relation implicature

For a cooperative speaker with info \( s \), responding \( A \) to \( Q \):
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Relation implicature
For a cooperative speaker with info $s$, responding $A$ to $Q$:
(i) $\bigcup A \cap s \subseteq \bigcup Q$
(ii) ...
Formal results

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For a cooperative speaker with info $s$, responding $A$ to $Q$:
(i) $s \subseteq \overline{\bigcup A} \cup \bigcup Q$
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For a cooperative speaker with info $s$, responding $A$ to $Q$: 
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(ii) for all $q \in Q$, 

And if responding $\{a\}$ to $Q$ for some $a \in Q$:
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(i) $s \subseteq \bigcup \overline{A} \cup \bigcup Q$
(ii) for all $q \in Q$, $s \subseteq \bigcup A \cup \overline{q}$ or there is an $a \in A$ s.t. given $s$, $q \cap \bigcup A$ and $a$ coincide.
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Relation implicature for singleton answer
And if responding $\{a\}$ to $Q$ for some $a \in Q$: 
Formal results

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And if responding \( \{a\} \) to \( Q \) for some \( a \in Q \):
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Other maxims of Relation

i. $R_s \models Q$  

ii. $R_{CG} \models Q$ (Roberts's (1996) contextual entailment)

iii. $R_h \models Q$ (≈ GS's (1984) pragmatic answer)

ii. and iii. are too strong:
The participants need not already know how $R$ is relevant.
They need only be able to figure it out.

(7) Did John go to the party? It was raining. $\{\text{If it rained, John went / didn't go} \}$. 
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i. \( R_s \models Q \)  

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(7) Did John go to the party? It was raining.

If it rained, John \( \{ \text{went} / \text{didn’t go} \} \).
Other maxims of Relation

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ii. $R_{CG} \vDash Q$ (Roberts’s (1996) contextual entailment)

iii. $R_h \vDash Q$ ($\approx$ GS’s (1984) pragmatic answer)
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Relatedness and knowledge

\[ R_s \models Q \quad \text{‘the speaker knows how } R \text{ is related to } Q \]
Relatedness and knowledge

\[ R_s \models Q \quad \text{‘the speaker knows how } R \text{ is related to } Q \text{’} \]

Relatedness

\( A \) is related to \( Q \) in world \( w \) iff for some fact \( f \), \( w \in f \), \( A_f \models Q \).

Now:

\[ \text{For all } A, Q \text{ true in } w : \text{there is a fact } f, w \in f, A_f \models Q. \]

(e.g., let \( f \) be \( \{w\} \))

Within a world, everything is related.
Relatedness and knowledge

\[ R_s \models Q \quad \text{‘the speaker \textit{knows how} } R \text{ is related to } Q \text{’} \]

Relatedness

\( A \) is \textit{related} to \( Q \) in world \( w \) iff for some fact \( f, w \in f, A_f \models Q \).

- The speaker \textit{knows that} \( A \) is related to \( Q \) iff in all \( w \in s, A \) is rel. to \( Q \).
Relatedness and knowledge

\[ R_s \models Q \]  ‘the speaker knows how \( R \) is related to \( Q \)’

Relatedness

\( A \) is related to \( Q \) in world \( w \) iff for some fact \( f \), \( w \in f \), \( A_f \models Q \).

- The speaker knows that \( A \) is related to \( Q \) iff in all \( w \in s \), \( A \) is related to \( Q \).
- The speaker knows how \( A \) is related to \( Q \) iff in all \( w \in s \), \( A \) is related to \( Q \) by the same \( f \).
Relatedness and knowledge

\[ R_s \models Q \]  \quad \text{‘the speaker knows how \( R \) is related to \( Q \)’}

**Relatedness**

\( A \) is *related* to \( Q \) in world \( w \) iff for some fact \( f \), \( w \in f \), \( A_f \models Q \).

- The speaker *knows that* \( A \) is related to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \).
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Now:

- For all \( A, Q \) true in \( w \):
  there is a fact \( f \), \( w \in f \), s.t. \( A_f \models Q \).
Relatedness and knowledge

\[ R_s \models Q \quad \text{‘the speaker knows how } R \text{ is related to } Q \’ \]

Relatedness

A is related to Q in world w iff for some fact f, \( w \in f \), \( A_f \models Q \).

- The speaker knows that A is related to Q iff in all \( w \in s \), A is related to Q.
- The speaker knows how A is related to Q iff in all \( w \in s \), A is related to Q by the same f.

Now:

- For all A, Q true in w:
  there is a fact f, \( w \in f \), s.t. \( A_f \models Q \).
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Relatedness and knowledge

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**Relatedness**

\( A \) is related to \( Q \) in world \( w \) iff for some fact \( f \), \( w \in f \), \( A_f \models Q \).

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  - there is a fact \( f \), \( w \in f \), s.t. \( A_f \models Q \).
  (e.g., let \( f \) be \( \{w\} \))

\[ \text{Within a world, everything is related.} \]
Logical relatedness

Just as [logical consequence] rules the validity of argumentation, [logical relatedness] rules the coherence of information exchange.

(Groenendijk and Roelofsen, 2009)
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(22) Dogs and cats are mammals. (Logical cons.)
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(22) Dogs and cats are mammals.  
Dogs are mammals.  
(23) Dogs are mammals. + world knowledge  
Dogs are animals.  
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Just as [logical consequence] rules the validity of argumentation, [logical relatedness] rules the coherence of information exchange.

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A is related to Q in world w iff for some fact f, w ∈ f, A_f ⊨ Q.
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A is related to Q in world w iff for some fact f, w ∈ f, A_f ⊨ Q.

- Logical iff f captures all and only the laws of logic.
Logical relatedness

Just as [logical consequence] rules the validity of argumentation, [logical relatedness] rules the coherence of information exchange.

(Groenendijk and Roelofsen, 2009)

(22) Dogs and cats are mammals. + logic (Logical cons.)
Dogs are mammals.

(23) Dogs are mammals. + world knowledge (Non-logical cons.)
Dogs are animals.

Relatedness

A is related to Q in world w iff for some fact f, w ∈ f, A_f ⊨ Q.

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Logical consequence is logical relatedness.
Objective/subjective cooperativity

The maxims can be (and have been) defined in two ways:

- **Objective**: Say only what is true, relevant, etc.
- **Subjective**: Say only what you think is true, relevant, etc.

My account of the final rise relies on subjective maxims:

- Violating 'say only what you think is true' = uncertainty
- Violating 'say only what is true' = lying

But an account based on objective maxims would also work:

- Final rise: 'For some maxim, I'm not sure whether or how I comply with it'.
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Exhaustivity without Quantity

Example given by Fox (forthcoming):

(25) There’s money in box A or in box B!

$(p \lor q)$

$\sim \text{Not in both.}$
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However, she does comply with Relation, Quality, Manner:

### 1.

\[ s \subseteq p \cup q \] (Quality)

### 2. (Quantity disabled)

### 3.

\[ s \subseteq p \cup q \cup (p \cap q) \] (Relation)

### 4.

\[ s \subseteq (p \cap q) \text{ or } s \subseteq p \cup q \] (from 1 and 2)

### 5. Comply with the maxims transparently. (Manner)

### 6. The quizmaster does not want to give it away.

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References (i)

- Geurts (2010). Quantity implicatures.
References (ii)