Attention, exhaustivity and non-cooperativity

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Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came \( \downarrow \). \( \sim \) Mary and Bill didn’t.
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came\textdagdown. $\sim$ Mary and Bill didn’t.
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(1) Of John, Bill and Mary, who came to the party?
   a. John came \( \downarrow \). \( \sim \) Mary and Bill didn’t.
   b. John came \( \uparrow \).
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came ↘.
   \(\sim\) Mary and Bill didn’t.
   b. John came ↗.
   \(\sim\) ...wait, there’s more.
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came \(\downarrow\). \(\sim\) Mary and Bill didn’t.
   b. John came \(\uparrow\).
      \(\sim\) …wait, there’s more.
      \(\sim\) …perhaps that implies sth. about M&B?
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came ↘.   \(\sim\) Mary and Bill didn’t.
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      \(\sim\) ...but I’m not sure.
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came ↓.  ~ Mary and Bill didn’t.
   b. John came ↑.
      ~ ...wait, there’s more.
      ~ ...perhaps that implies sth. about M&B?
      ~ ...but I’m not sure.
      ~ ...did I make myself clear?
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came ↓.  ~ Mary and Bill didn’t.
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   a. John came \(\downarrow\). \(\sim\) Mary and Bill didn’t.
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      ~ ...perhaps that implies sth. about M&B?
      ~ ...but I’m not sure.
      ~ ...did I make myself clear?

‘In common conversation the confirmation of a part is meant to imply the denial of the remainder.’

(De Morgan, 1847)
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came $\downarrow$. $\sim$ Mary and Bill didn’t.
   b. John came $\uparrow$.
      $\sim$ ...wait, there’s more.
      $\sim$ ...perhaps that implies sth. about M&B?
      $\sim$ ...but I’m not sure.
      $\sim$ ...did I make myself clear?

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(De Morgan, 1847)
Part I

1. Diagnosis
2. Theory
3. Predictions
4. Discussion
1. Diagnosis

1.1. The problem

1.2. Towards a solution
1.1. The problem

(1) Of John, Bill and Mary, who came to the party?
   a. John came. \(\neg\) Mary and Bill didn’t. (exhaustivity)
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(1) Of John, Bill and Mary, who came to the party?
   a. John came ↘. \[ \sim \text{Mary and Bill didn’t.} \] (exhaustivity)

Conversational implicature (Grice, 1975)

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

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    a. John came ↘.
       ~ Mary and Bill didn’t. (exhaustivity)

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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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(1) Of John, Bill and Mary, who came to the party?
   a. John came \( \nabla \). \( \sim \) Mary and Bill didn’t. (exhaustivity)

Conversational implicature (Grice, 1975)

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.
2. She didn’t, so she lacks the belief that they came.
1.1. The problem

(1) Of John, Bill and Mary, who came to the party?
   a. John came \(\rightarrow\) Mary and Bill didn’t. \((exhaustivity)\)

Conversational implicature (Grice, 1975)

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.
2. She didn’t, so she lacks the belief that they came.
   ...
3. She believes that they didn’t come.
1.1. The problem

(1) Of John, Bill and Mary, who came to the party?
   a. John came \( \neg \). \( \Rightarrow \) Mary and Bill didn’t. \( (\text{exhaustivity}) \)

Conversational implicature (Grice, 1975)

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.
2. She didn’t, so she lacks the belief that they came.
   \( \ldots \) \( (\text{‘the epistemic step’} \) - Sauerland, 2004)
3. She believes that they didn’t come.
1.1. The problem

(1) Of John, Bill and Mary, who came to the party?
   a. John came. \( \sim \) Mary and Bill didn’t.  \((\text{exhaustivity})\)

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1.1. The problem

(1) Of John, Bill and Mary, who came to the party?
   a. John came \(\Rightarrow\). \(\sim\) Mary and Bill didn’t. (exhaustivity)

Conversational implicature (Grice, 1975)

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.
2. She didn’t, so she lacks the belief that they came.
   \(\ldots\) (‘the epistemic step’ - Sauerland, 2004)
3. She believes that they didn’t come.

“[the epistemic] step does not follow from Gricean maxims and logic alone.” - Chierchia, et al. (2008)

Wrong, it does!
1.2. Towards a solution

(2) a. Of John, Bill and Mary, who came to the party?
   b. John came.  \[\sim \text{Mary didn't come}\]
1.2. Towards a solution

(2) a. Of John, Bill and Mary, who came to the party?
   b. John came. ~ Mary didn’t come
   c. John came, or Mary and John. ⊤️ Mary didn’t come
1.2. Towards a solution

(2) a. Of John, Bill and Mary, who came to the party?
   b. John came. ~ Mary didn’t come
   c. John came, or Mary and John. ~✓ Mary didn’t come

Intuition
(2b) and (2c) differ in their *attentive content*. 
1.2. Towards a solution

(2) a. Of John, Bill and Mary, who came to the party?
   b. John came.  ~ Mary didn’t come
   c. John came, or Mary and John.  ~ Mary didn’t come

Intuition
(2b) and (2c) differ in their **attentive content**.

- (2c) draws attention to the poss. that Mary came too.
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(2) a. Of John, Bill and Mary, who came to the party?
   b. John came. ~ Mary didn’t come
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Intuition
(2b) and (2c) differ in their attentive content.

» (2c) draws attention to the poss. that Mary came too.
» (And so does (2a).)
1.2. Towards a solution

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

Intuition
(2b) and (2c) differ in their *attentive content*.

- (2c) draws attention to the poss. that Mary came too.
- (And so does (2a).)
- (2b) doesn’t; it leaves the possibility *unattended*. 
1.2. Towards a solution

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

Intuition

(2b) and (2c) differ in their *attentive content*.

- (2c) draws attention to the poss. that Mary came too.
- (And so does (2a).)
- (2b) doesn’t; it leaves the possibility *unattended*.

Apparently, pragmatic reasoning is sensitive to this.
1.2. Towards a solution

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

Intuition
(2b) and (2c) differ in their attentive content.
- (2c) draws attention to the poss. that Mary came too.
- (And so does (2a).)
- (2b) doesn’t; it leaves the possibility unattended.

Apparently, pragmatic reasoning is sensitive to this.
1.2. Towards a solution

(2) a. Of John, Bill and Mary, who came to the party?
   b. John came.  ~ Mary didn’t come
   c. John came, or Mary and John.  ~ Mary didn’t come

Intuition
(2b) and (2c) differ in their \textit{attentive content}. 

- (2c) draws attention to the poss. that Mary came too.
- (And so does (2a).)
- (2b) doesn’t; it leaves the possibility \textit{unattended}.

Apparently, pragmatic reasoning is sensitive to this.
1.2. Towards a solution

(2) a. Of John, Bill and Mary, who came to the party?  
    b. John came.  \[\neg\text{Mary didn’t come}\]  
    c. John came, or Mary and John.  \[\not\!\not\!\not\text{Mary didn’t come}\]

Intuition
(2b) and (2c) differ in their **attentive content**.
- (2c) draws attention to the poss. that Mary came too.
- (And so does (2a).)
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1.2. Towards a solution

(2) 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.  \[\not\sim \text{Mary didn’t come}\]

Intuition
(2b) and (2c) differ in their \textit{attentive content}.

\begin{itemize}
  \item (2c) draws attention to the poss. that Mary came too.
  \item (And so does (2a).)
  \item (2b) doesn’t; it leaves the possibility \textit{unattended}.
\end{itemize}

Apparently, pragmatic reasoning is sensitive to this.
2. Theory

2.1. Translation into logic
2.2. Semantics
2.3. Pragmatics
2.1. Translation into logic

(3) a. Of John, Bill and Mary, who came to the party?
    b. John came.                                    \( \sim \) Mary didn’t come
    c. John came, or Mary and John.\( \sim \) Mary didn’t come
2.1. Translation into logic

(3) a. Of John and Mary, who came to the party?
   b. John came. \(\sim \) Mary didn’t come
   c. John came, or Mary and John. \(\not\sim \) Mary didn’t come
2.1. Translation into logic

(3) a. Of John and Mary, some came to the party.
   b. John came.  \(\sim\) Mary didn’t come
   c. John came, or Mary and John.  \(\lor\) Mary didn’t come
2.1. Translation into logic

(3) a. John came, or Mary, or John and Mary.
   b. John came. \( \sim \) Mary didn’t come
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2.1. Translation into logic

(3) a. John came, or Mary, or John and Mary.
   b. John came.
   c. John came, or Mary and John.
2.1. Translation into logic

(3) 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. \( p \lor (p \land q) \)
2.2. Semantics (Roelofsen, 2011)
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- *Possibility*: a set of worlds \((a, b)\)
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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 \((a, b)\)
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- **Informative content**: \(|\varphi| := \bigcup[\varphi]|
2.2. Semantics (Roelofsen, 2011)

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\[
\begin{align*}
(3a) \ [p \lor q \lor (p \land q)] & \quad (3b) \ [p] & \quad (3c) \ [p \lor (p \land q)]
\end{align*}
\]
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(3a) \([p \lor q \lor (p \land q)]\)

(3b) \([p]\)

(3c) \([p \lor (p \land q)]\)

**Entailment**

*A entails B*, \(A \vDash B\), iff

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

(ii) for all \(b \in B\), if \(b \cap \bigcup A \neq \emptyset\), \(b \cap \bigcup A \in A\)
2.2. Semantics (Roelofsen, 2011)

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- **Informative content**: \(|\varphi| := \bigcup [\varphi]\

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\begin{align*}
(3a) & \quad [p \lor q \lor (p \land q)] \\
(3b) & \quad [p] \\
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\end{align*}
\]

**Entailment**

\(A\) entails \(B\), \(A \models B\), iff

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

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

\[\text{at least as informative}\]
2.2. Semantics (Roelofsen, 2011)

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

\[
(3a) \quad [p \lor q \lor (p \land q)]
\]
\[
(3b) \quad [p]
\]
\[
(3c) \quad [p \lor (p \land q)]
\]

**Entailment**

\(A\) entails \(B\), \(A \models B\), iff

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

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

\(\rightarrow\) at least as informative

\(\rightarrow\) at least as attentive
2.2. Semantics (Roelofsen, 2011)

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- **Proposition**: a set of possibilities \((A, B, [\varphi])\)
- **Informative content**: \(|\varphi| := \bigcup[\varphi]\)

(3a) \([p \lor q \lor (p \land q)]\)

(3b) \([p]\)

(3c) \([p \lor (p \land q)]\)

Entailment

\(A\) entails \(B\), \(A \models B\), iff

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

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

Now, (3c) \(\models\) (3a), but (3b) \(\not\models\) (3a).
2.3. Pragmatics

The relevant maxims

1. Quality:
2. Quantity:
3. Relation:
2.3. Pragmatics

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

1. Quality:
2. Quantity:
3. Relation:
2.3. 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**:

(4) Did John go to the party?
It was raining.
If it rained, John {went / didn’t go}.
2.3. Pragmatics

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**:

(4) Did John go to the party?

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

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

If it rained, John {went / didn't go}. 


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(4) Did John go to the party?
   It was raining.
The relevant maxims

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

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3. **Relation**: $\{ r \cap s \mid r \in R \} \vdash Q$.

(4) Did John go to the party?

It was raining.
The relevant maxims

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

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(4) Did John go to the party?
It was raining.
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The relevant maxims
For a cooperative speaker with information \( s \), responding \( R \) to \( Q \):

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

\[ \begin{align*}
\text{rp} & \quad \text{rp} \\
\text{rp} & \quad \text{rp} \\
\text{rp} & \quad \text{rp} \\
\text{rp} & \quad \text{rp} \\
\end{align*} \quad = \quad \text{rp} \quad \text{rp} \quad \quad \text{rp} \quad \text{rp} \quad \quad \text{rp} \quad \text{rp} \quad \quad \text{rp} \quad \text{rp} \quad \quad \text{rp} \quad \text{rp} \]

\[ \models \]

\[ \begin{align*}
\text{rp} & \quad \text{rp} \\
\text{rp} & \quad \text{rp} \\
\text{rp} & \quad \text{rp} \\
\text{rp} & \quad \text{rp} \\
\end{align*} \]
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For a cooperative speaker with information \( s \), responding \( R \) to \( Q \):

1. **Quality**: \( s \subseteq \bigcup R \).
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3. **Relation**: \( \{ r \cap s \mid r \in R \} \models Q \).

(4) Did John go to the party?

It was raining. \( \models \) If it rained, John \{went / didn’t go\}.
2.3. 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**: $\{ r \cap s \mid r \in R \} \models Q$. 

(4) Did John go to the party?  
It was raining. 
\[ \text{If it rained, John} \right\{ \text{went / didn't go} \} \]
3. Predictions

3.1. Examples

3.2. General results
3.1. Examples

(3) 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. \( (p \lor (p \land q)) \)
3.1. Examples

(3) 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)
3.1. Examples

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

(3) 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)}

2. \(s \not\subseteq |q|\)  
   \text{(Quantity)}
3.1. Examples

(3) 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. \(s \subseteq |p \lor (p \land q)| = |p|\) \hspace{1cm} \text{(Quality)}

2. \(s \nsubseteq |q|\) \hspace{1cm} \text{(Quantity)}

\(p \lor (p \land q) \models p \lor q \lor (p \land q)\)
3.1. Examples

(3) 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)
3. - \(p \lor (p \land q) \models p \lor q \lor (p \land q)\) (Relation)
3.1. Examples

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

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

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

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

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

   2. \(s \not\subseteq |q|\)  
      (Quantity)

   3. - \(p \lor (p \land q) \not\subseteq p \lor q \lor (p \land q)\)  
      (Relation)

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)

3. - \(p \lor (p \land q) \not\subseteq p \lor q \lor (p \land q)\)  
   (Relation)
3.1. Examples

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

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

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)
   3. \(p \lor (p \land q) \models p \lor q \lor (p \land q)\) (Relation)
3.1. Examples

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

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

\[ p \not\subseteq p \lor q \lor (p \land q) \]  
   (Quality)
\[ s \not\subseteq q \]  
   (Quantity)

---

c. John came, or Mary and John. \((p \lor (p \land q))\)
   1. \(s \subseteq |p \lor (p \land q)| = |p|\)  
      (Quality)
   2. \(s \not\subseteq |q|\)  
   3. - \[ p \lor (p \land q) \models p \lor q \lor (p \land q) \]  
      (Relation)
3.1. Examples

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

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

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

   (Quality)
   (Quantity)

   ![Diagram](image)

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

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

   (Quality)
   (Quantity)

   ![Diagram](image)

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. - \(p \lor (p \land q) \models p \lor q \lor (p \land q)\)

   (Relation)
3.1. Examples

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

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

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

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

(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. \(\lor(p \land q) \Rightarrow p \lor q \lor (p \land q)\)

(Quality)

(Quantity)

(Relation)
3.1. Examples

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

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

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

\((\text{Quality})\)

\((\text{Quantity})\)

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

\((\text{Quality})\)

\((\text{Quantity})\)

\((\text{Relation})\)

```latex
\begin{array}{ccc}
   \text{pq} & \text{pq} & \text{pq} \\
   \text{pq} & \text{pq} & \text{pq} \\
   \text{pq} & \text{pq} & \text{pq} \\
\end{array}
\quad = \quad
\begin{array}{ccc}
   \text{pq} & \text{pq} & \text{pq} \\
   \text{pq} & \text{pq} & \text{pq} \\
   \text{pq} & \text{pq} & \text{pq} \\
\end{array}
\quad \quad \quad \quad \quad \quad \\
\begin{array}{ccc}
   \text{pq} & \text{pq} & \text{pq} \\
   \text{pq} & \text{pq} & \text{pq} \\
   \text{pq} & \text{pq} & \text{pq} \\
\end{array}
```

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. \[p \lor (p \land q) \vdash p \lor q \lor (p \land q)\]

\((\text{Quality})\)

\((\text{Quantity})\)

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

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

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

\(p \not\subseteq p \lor q \lor (p \land q)\)  \hspace{1cm} \text{(Quality)}
\(p \not\subseteq (p \land q)\)  \hspace{1cm} \text{(Quantity)}


c. John came, or Mary and John. \((p \lor (p \land q))\)
   1. \(s \subseteq |p \lor (p \land q)| = |p|\)  \hspace{1cm} \text{(Quality)}
   2. \(s \not\subseteq |q|\)  \hspace{1cm} \text{(Quantity)}
   3. \(p \lor (p \land q) \supseteq p \lor q \lor (p \land q)\)  \hspace{1cm} \text{(Relation)}
3.1. Examples

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

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

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

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

(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. - \(p \lor (p \land q) \not\subseteq p \lor q \lor (p \land q)\)

(Quality)

(Quantity)

(Relation)
3.1. Examples

(3) 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 \(s \subseteq |p| \cup |q|\)

(Quantity)

(Relation)

(3) 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 \(s \subseteq |p| \cup |q|\)

(Quantity)

(Relation)

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

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

(Relation)

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

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(Quantity)

(Relation)

(3) 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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(Quantity)

(Relation)

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

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

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

(Relation)
3.1. Examples

(3) 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 \(s \subseteq |p| \cup |q|\)

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(3) 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. \(- \quad p \lor (p \land q) \not\subseteq p \lor q \lor (p \land q)\)

(Quality)  
(Quality)  
(Quality)  
(Relation)
3.1. Examples

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

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

1. \(s \subseteq \lvert p \rvert\)
2. \(s \not\subseteq \lvert q \rvert\)
3. \(s \subseteq \lvert p \rvert \cup \lvert q \rvert\) or \(s \subseteq \lvert p \rvert \cup \lvert q \rvert\) (Quality)


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

1. \(s \subseteq \lvert p \lor (p \land q) \rvert = \lvert p \rvert\) (Quality)
2. \(s \not\subseteq \lvert q \rvert\)
3. \(p \lor (p \land q) \models p \lor q \lor (p \land q)\) (Relation)
3.1. Examples

(3) 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 \(s \subseteq |p| \cup |q|\)

\[ p \not\subseteq p \lor q \lor (p \land q) \]  (Quality)
\[ p \not\subseteq |q| \]  (Quantity)
\[ p \subseteq |p| \cup |q| \]  (Relation)

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


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

1. \(s \subseteq |p \lor (p \land q)| = |p|\)  (Quality)
2. \(s \not\subseteq |q|\)
3. \(p \lor (p \land q) \models p \lor q \lor (p \land q)\)  (Relation)
3.2. General results

Recall: \( A \) entails \( Q \), \( A \models Q \), iff
(i) \( \bigcup A \subseteq \bigcup Q \); and
(ii) for all \( q \in Q \), \( q \cap \bigcup A = \emptyset \) or \( q \cap \bigcup A \in A \)
3.2. General results

Recall: \( A \) entails \( Q \), \( A \models Q \), iff

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

(ii) for all \( q \in Q \), \( q \cap \bigcup A = \emptyset \) or \( q \cap \bigcup A \in A \)

Relation implicature

For a cooperative speaker with info \( s \), responding \( A \) to \( Q \):
3.2. General results

Recall: \( A \) entails \( Q \), \( A \models Q \), iff
(i) \( \bigcup A \subseteq \bigcup Q \); and
(ii) for all \( q \in Q \), \( q \cap \bigcup A = \emptyset \) or \( q \cap \bigcup A \in A \)

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

Recall: A entails Q, $A \models Q$, iff
(i) $\bigcup A \subseteq \bigcup Q$; and
(ii) for all $q \in Q$, $q \cap \bigcup A = \emptyset$ or $q \cap \bigcup A \in A$

Relation implicature
For a cooperative speaker with info $s$, responding $A$ to $Q$:
(i) $s \subseteq \overline{\bigcup A} \cup \bigcup Q$
(ii) ...
3.2. General results

Recall: \( A \) entails \( Q \), \( A \models Q \), iff
(i) \( \bigcup A \subseteq \bigcup Q \); and
(ii) \( \text{for all } q \in Q \), \( q \cap \bigcup A = \emptyset \) or \( q \cap \bigcup A \in A \)

Relation implicature

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

Recall: $A$ entails $Q$, $A \models Q$, iff

(i) $\bigcup A \subseteq \bigcup Q$; and

(ii) for all $q \in Q$, $q \cap \bigcup A = \emptyset$ or $q \cap \bigcup A \in A$

Relation implicature

For a cooperative speaker with info $s$, responding $A$ to $Q$:

(i) $s \subseteq \bigcup A \cup \bigcup Q$

(ii) for all $q \in Q$, $q \cap \bigcup A \cap s = \emptyset$ or \ldots
3.2. General results

Recall: A entails Q, $A \models Q$, iff
(i) $\bigcup A \subseteq \bigcup Q$; and
(ii) for all $q \in Q$, $q \cap \bigcup A = \emptyset$ or $q \cap \bigcup A \in A$

Relation implicature

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

Recall: $A$ entails $Q$, $A \models Q$, iff

(i) $\bigcup A \subseteq \bigcup Q$; and
(ii) for all $q \in Q$, $q \cap \bigcup A = \emptyset$ or $q \cap \bigcup A \in A$

Relation implicature

For a cooperative speaker with info $s$, responding $A$ to $Q$:

(i) $s \subseteq \overline{\bigcup A} \cup \bigcup Q$
(ii) for all $q \in Q$, $s \subseteq \overline{\bigcup A} \cup \overline{q}$ or there is an $a \in A$ s.t. given $s$, $q \cap \bigcup A$ and $a$ are equivalent.
3.2. General results

Recall: A entails $Q$, $A \models Q$, iff
(i) $\bigcup A \subseteq \bigcup Q$; and
(ii) for all $q \in Q$, $q \cap \bigcup A = \emptyset$ or $q \cap \bigcup A \in A$

Relation implicature

For a cooperative speaker with info $s$, responding $A$ to $Q$:
(i) $s \subseteq \overline{\bigcup A} \cup \bigcup Q$
(ii) for all $q \in Q$, $s \subseteq \overline{\bigcup A} \cup \overline{q}$ or there is an $a \in A$ s.t.
$s \subseteq (q \cap \bigcup A \cap \overline{a}) \cup (q \cap \bigcup A \cap a)$
3.2. General results

Recall: A entails Q, $A \models Q$, iff
(i) $\cup A \subseteq \cup Q$; and
(ii) for all $q \in Q$, $q \cap \cup A = \emptyset$ or $q \cap \cup A \in A$

Relation implicature

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

And if responding $\{a\}$ to $Q$ for some $a \in Q$:
for all $q \in Q$, $s \subseteq \overline{\cup A} \cup q$ or there is an $a \in A$ s.t.
$s \subseteq (q \cap \cup A \cap \overline{a}) \cup (q \cap \cup A \cap a)$
3.2. General results

Recall: $A$ entails $Q$, $A \models Q$, iff
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Relation implicature

For a cooperative speaker with info $s$, responding $A$ to $Q$:
(i) $s \subseteq \overline{\bigcup A} \cup \bigcup Q$
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Relation implicature for singleton answer
And if responding $\{a\}$ to $Q$ for some $a \in Q$:
3.2. General results

Recall: \( A \) entails \( Q \), \( A \models Q \), iff
(i) \( \cup A \subseteq \cup Q \); and
(ii) for all \( q \in Q \), \( q \cap \cup A = \emptyset \) or \( q \cap \cup A \in A \)

Relation implicature
For a cooperative speaker with info \( s \), responding \( A \) to \( Q \):
(i) \( s \subseteq \overline{\cup A} \cup \cup Q \)
(ii) for all \( q \in Q \), \( s \subseteq \overline{\cup A} \cup \overline{q} \) or there is an \( a \in A \) s.t.
\[ s \subseteq (q \cap \cup A \cap \overline{a}) \cup (q \cap \cup A \cap a) \]

Relation implicature for singleton answer
And if responding \( \{a\} \) to \( Q \) for some \( a \in Q \):
3.2. General results

Recall: \( A \) \emph{entails} \( Q \), \( A \models Q \), iff
(i) \( \cup A \subseteq \cup Q \); and
(ii) for all \( q \in Q \), \( q \cap \cup A = \emptyset \) or \( q \cap \cup A \in A \)

Relation implicature
For a cooperative speaker with info \( s \), responding \( A \) to \( Q \):
(i) \( s \subseteq \overline{\cup A} \cup \cup Q \)
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Relation implicature for singleton answer
And if responding \( \{a\} \) to \( Q \) for some \( a \in Q \):
for all \( q \in Q \),
3.2. General results

Recall: A entails $Q$, $A \models Q$, iff
(i) $\bigcup A \subseteq \bigcup Q$; and
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Relation implicature

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

Relation implicature for singleton answer

And if responding \{a\} to $Q$ for some $a \in Q$:
for all $q \in Q$, $s \subseteq \overline{a} \cup \overline{q}$ or \ldots
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Recall: $A$ entails $Q$, $A \models Q$, iff

(i) $\cup A \subseteq \cup Q$; and
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Relation implicature

For a cooperative speaker with info $s$, responding $A$ to $Q$:

(i) $s \subseteq \overline{\cup A} \cup \cup Q$
(ii) for all $q \in Q$, $s \subseteq \overline{\cup A} \cup \overline{q}$ or there is an $a \in A$ s.t.

$s \subseteq (q \cap \cup A \cap \overline{a}) \cup (q \cap \cup A \cap a)$

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And if responding $\{a\}$ to $Q$ for some $a \in Q$:

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3.2. General results

Recall: A entails $Q$, $A \models Q$, iff
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For a cooperative speaker with info $s$, responding $A$ to $Q$:
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And if responding $\{a\}$ to $Q$ for some $a \in Q$:
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Recall: \( A \) entails \( Q \), \( A \models Q \), iff

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Relation implicature

For a cooperative speaker with info \( s \), responding \( A \) to \( Q \):

(i) \( s \subseteq \overline{\bigcup A} \cup \bigcup Q \)
(ii) for all \( q \in Q \), \( s \subseteq \overline{\bigcup A} \cup \overline{q} \) or there is an \( a \in A \) s.t.
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Relation implicature for singleton answer

And if responding \( \{a\} \) to \( Q \) for some \( a \in Q \):

for all \( q \in Q \), \( s \subseteq \overline{a} \cup \overline{q} \) or \( s \subseteq \overline{a} \cup q \)
4. Discussion

4.1. Opinionatedness
4.2. ‘Alternatives’
4.3. Semantics
4.4. Other maxims of Relation
4.5. Relatedness and knowledge
4.6. Logical relatedness
4.1. Opinionatedness

Most existing work (going back to Mill, 1867):

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

Most existing work (going back to Mill, 1867):

1. The speaker lacks the belief that Mary came  (Quantity)
4.1. Opinionatedness

Most existing work (going back to Mill, 1867):
1. The speaker lacks the belief that Mary came (Quantity)
2. She is opinionated about whether Mary came (Context)

Counterexample:

(5) I’m asking the wrong person, but who came to the party? John and Bill came. Not Mary.

Instead, in my approach:

The Relation implicature implies ‘conditional opinionatedness’.
4.1. Opinionatedness

Most existing work (going back to Mill, 1867):

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

Most existing work (going back to Mill, 1867):

1. The speaker lacks the belief that Mary came
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John and Bill came. /uni219D
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4.1. Opinionatedness

Most existing work (going back to Mill, 1867):

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Counterexample:

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4.1. Opinionatedness

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(5) I’m asking the wrong person, but who came to the party?
   John and Bill came. \(\sim\) Not Mary.

Instead, in my approach:

- The Relation implicature implies ‘conditional opinionatedness’.
4.2. ‘Alternatives’

Existing approaches (since Gazdar, 1979):
  ▶ ‘Why did the speaker not say “p ∧ q”?’
4.2. ‘Alternatives’

Existing approaches (since Gazdar, 1979):

▶ ‘Why did the speaker not say “p ∧ q”? ’
▶ Mere ignorance is sufficient reason.

Beware: These ‘alternatives’ are fully determined by the maxims. Speakers need not reason in terms of alternatives.
4.2. ‘Alternatives’

Existing approaches (since Gazdar, 1979):
- ‘Why did the speaker not say “p ∧ q”? ’
- Mere ignorance is sufficient reason.

My approach:
- ‘Why did the speaker not say “p ∨ (p ∧ q)”?’
4.2. ‘Alternatives’

Existing approaches (since Gazdar, 1979):

- ‘Why did the speaker not say “\(p \land q\)”?’
- Mere ignorance is sufficient reason.

My approach:

- ‘Why did the speaker not say “\(p \lor (p \land q)\)”?’
- *Ignorance is no excuse.*
4.2. ‘Alternatives’

Existing approaches (since Gazdar, 1979):
- ‘Why did the speaker not say “p ∧ q”? ’
- Mere ignorance is sufficient reason.

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

Existing approaches (since Gazdar, 1979):
  ▶ ‘Why did the speaker not say “p \land q”?’
  ▶ Mere ignorance is sufficient reason.

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

**Beware**
  ▶ These ‘alternatives’ are fully determined by the maxims.
  ▶ Speakers need not reason in terms of alternatives.
4.3. 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. $[\neg \varphi] = \{ \cup[\varphi] \}$ if $\cup[\varphi]$ is nonempty; $\emptyset$ otherwise.
3. $[\varphi \lor \psi] = ([\varphi] \cup [\psi])|_{\varphi \lor \psi} = [\varphi] \cup [\psi]$
4. $[\varphi \land \psi] = ([\varphi] \cup [\psi])|_{\varphi \land \psi}$

Attentive semantics is not the only suitable semantics: $\not\equiv$

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

Minimally, the semantics must lack the absorption laws:

Absorption:

\[ p \lor (p \land q) \equiv p \equiv p \land (p \lor q) \]
4.3. Semantics

Restriction

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

Semantics (Roelofsen, 2011)

1. $\llbracket p \rrbracket = \{ \{ w \in \textbf{Worlds} \mid w(p) = \text{true} \} \}$
2. $\llbracket \neg \varphi \rrbracket = \{ \bigcup \llbracket \varphi \rrbracket \}$ if $\bigcup \llbracket \varphi \rrbracket$ is nonempty; $\emptyset$ otherwise.
3. $\llbracket \varphi \lor \psi \rrbracket = (\llbracket \varphi \rrbracket \cup \llbracket \psi \rrbracket)_{|\varphi| \cup |\psi|} = \llbracket \varphi \rrbracket \cup \llbracket \psi \rrbracket$
4. $\llbracket \varphi \land \psi \rrbracket = (\llbracket \varphi \rrbracket \cup \llbracket \psi \rrbracket)_{|\varphi| \cap |\psi|}$

Attentive semantics is not the only suitable semantics:

- *Unrestricted Inquisitive Sem.* (Ciardelli, 2009; Westera, 2012)
4.3. 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. \( [-\varphi] = \{ \bigcup[\varphi] \} \) if \( \bigcup[\varphi] \) is nonempty; \( \emptyset \) otherwise.
3. \( [\varphi \lor \psi] = ([\varphi] \cup [\psi])_{|\varphi| \lor |\psi|} = [\varphi] \cup [\psi] \)
4. \( [\varphi \land \psi] = ([\varphi] \cup [\psi])_{|\varphi| \land |\psi|} \)

Attentive semantics is not the only suitable semantics:

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

Minimally, the semantics must lack the absorption laws:

- Absorption: \( p \lor (p \land q) \equiv p \equiv p \land (p \lor q) \)
4.4. Other maxims of Relation

i. $R_s \models Q$  

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

iii. $R_h \models Q$ ($\approx$ 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.  

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

If it rained, John $\{\text{went} / \text{didn't go}\}$.
4.4. Other maxims of Relation

i. \( R_s \models Q \)  
   (mine)

ii. \( R_{CG} \models Q \)  
   (Roberts’s (1996) contextual entailment)
4.4. Other maxims of Relation

i. $R_s \vDash Q$ (mine)

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

iii. $R_h \vDash Q$ (≈ 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. (left implicit here)
4.4. Other maxims of Relation

i. $R_s \models Q$  
    (mine)

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

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(4) Did John go to the party?
If it rained, John \{ went / didn’t go \}. 
4.4. Other maxims of Relation

i. $R_s \models Q$  \hspace{1cm} (mine)

ii. $R_{CG} \models Q$ \hspace{1cm} (Roberts’s (1996) *contextual entailment*)

iii. $R_h \models Q$ \hspace{1cm} ($\approx$ 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*.

(left implicit here)
4.4. Other maxims of Relation

i. $R_s \models Q$  
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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.
   (left implicit here)

(4) Did John go to the party?
   It was raining. $\sim$ If it rained, John \{went / didn’t go\}. 
4.5. Relatedness and knowledge

\[ R_s \models Q \quad \text{‘the speaker knows how } R \text{ is related to } Q\]
4.5. 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 \( f \), \( w \in f \), \( A_f \models Q \).

Within a world, everything is related.
4.5. 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 sp. knows that A is rel. to Q iff in all \( w \in s \), A is rel. to Q.
4.5. 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 sp. *knows that* \( A \) is rel. to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \).
- The sp. *knows how* \( A \) is rel. to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \) *by the same* \( f \).
4.5. 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 sp. knows that \( A \) is rel. to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \).
- The sp. knows how \( A \) is rel. to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \) by the same \( f \).

Now:

- For all \( A, Q \) true in \( w \), there is a fact \( f \), \( w \in f \), s.t. \( A_f \models Q \).
4.5. 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 sp. *knows that* \( A \) is rel. to \( Q \) iff in all \( w \in s, A \) is rel. to \( Q \).
- The sp. *knows how* \( A \) is rel. to \( Q \) iff in all \( w \in s, A \) is rel. to \( Q \) *by the same* \( f \).

Now:

- For all \( A, Q \) true in \( w \), there is a fact \( f, w \in f, s.t. A_f \models Q \).
  (e.g., let \( f \) be \( \{w\} \))
4.5. 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 sp. *knows that* \( A \) is rel. to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \).
- The sp. *knows how* \( A \) is rel. to \( Q \) iff in all \( w \in s \), \( A \) is rel. to \( Q \) *by the same* \( f \).

Now:

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

*Within a world, everything is related.*
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

(6) Dogs and cats are mammals. (Logical cons.)
Dogs are mammals.
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

(6) Dogs and cats are mammals.  
Dogs are mammals.  
(Logical cons.)

(7) Dogs are mammals.  
Dogs are animals.  
(Non-logical cons.)
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

(6) Dogs and cats are mammals.                         (Logical cons.)
Dogs are mammals.

(7) Dogs are mammals. + world knowledge       (Non-logical cons.)
Dogs are animals.
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

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

(7) Dogs are mammals. + world knowledge  (Non-logical cons.)
Dogs are animals.
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

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

Dogs are mammals.

(7) **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.
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

(6) Dogs and cats are mammals. \[ \text{+ logic} \]  
Dogs are mammals.

(7) Dogs are mammals. \[ \text{+ world knowledge} \]  
Dogs are animals.

Relatedness

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

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

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

(Groenendijk and Roelofsen, 2009)

(6) Dogs and cats are mammals. + logic
   Dogs are mammals.

(7) Dogs are mammals. + world knowledge
   Dogs are animals.

Relatedness

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.
- Non-logical iff f is a contingency.
4.6. Logical relatedness

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

(Groenendijk and Roelofsen, 2009)

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

(7) 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.

- Logical iff f captures all and only the laws of logic.
- Non-logical iff f is a contingency.

Logical consequence is logical relatedness.
End of Part I
Two puzzles

(1) Of John, Bill and Mary, who came to the party?
   a. John came ↓. ~ Mary and Bill didn’t.
   b. John came ↑.
      ~ ...wait, there’s more.
      ~ ...perhaps that implies sth. about M&B?
      ~ ...but I’m not sure.
      ~ ...did I make myself clear?
Part II

5. Analysis
6. Predictions
7. Discussion
5. Analysis
5. Analysis

(1) Of John, Bill and Mary, who came to the party?
   b. John came↗.
      ↗ ...wait, there’s more.
      ↗ ...perhaps that implies sth. about M&B?
      ↗ ...but I’m not sure.
      ↗ ...did I make myself clear?
5. Analysis

(1) Of John, Bill and Mary, who came to the party?
b. John came↗.
    ↗ ...wait, there’s more. (Quantity)
    ↗ ...perhaps that implies sth. about M&B?
    ↗ ...but I’m not sure.
    ↗ ...did I make myself clear?
5. Analysis

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

b. John came ↗.

\[ \sim \ldots \text{wait, there’s more.} \quad \text{(Quantity)} \]
\[ \sim \ldots \text{perhaps that implies sth. about M&B?} \quad \text{(Relation)} \]
\[ \sim \ldots \text{but I’m not sure.} \]
\[ \sim \ldots \text{did I make myself clear?} \]
(1) Of John, Bill and Mary, who came to the party?
b. John came ↗.
   → ...wait, there’s more.           (Quantity)
   → ...perhaps that implies sth. about M&B?  (Relation)
   → ...but I’m not sure.
   → ...did I make myself clear?

Proposal

1. The final rise marks the violation of a maxim.
5. Analysis

(1) Of John, Bill and Mary, who came to the party?
   b. John came↗.
      ↗ ...wait, there’s more.  (Quantity)
      ↗ ...perhaps that implies sth. about M&B?  (Relation)
      ↗ ...but I’m not sure.  (Quality)
      ↗ ...did I make myself clear?

Proposal

1. The final rise marks the violation of a maxim.
5. Analysis

(1) Of John, Bill and Mary, who came to the party?
   b. John came ↗.
   \[ \sim \ldots \text{wait, there's more.} \quad \text{(Quantity)} \]
   \[ \sim \ldots \text{perhaps that implies sth. about M&B?} \quad \text{(Relation)} \]
   \[ \sim \ldots \text{but I'm not sure.} \quad \text{(Quality)} \]
   \[ \sim \ldots \text{did I make myself clear?} \quad \text{(Manner)} \]

Proposal

1. The final rise marks the violation of a maxim.
5. Analysis

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

Proposal

1. The final rise marks the violation of a maxim.
5. Analysis

(1) Of John, Bill and Mary, who came to the party?
   b. John came \( \Rightarrow L \).
      \( \leadsto \) ...wait, there’s more. (Quantity)
      \( \leadsto \) ...perhaps that implies sth. about M&B? (Relation)
   c. John came \( \Rightarrow H \).
      \( \leadsto \) ...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 the severity of the violation
   (low: Quantity/Relation; high: Quality/Manner).
6. Predictions

6.1. Example

6.2. General results
6.1. Example

(8) Of J and M, who came to the party? (p ∨ q ∨ (p ∧ q))
John came ↗.

Readings

✓ ...wait, there's more.
✓ ...perhaps that implies sth. about Mary?
✓ ...but I'm not sure.
✓ ...did I make myself clear?

Furthermore:

/uni25B8 Exhaustivity disappears in all readings except Manner.
/uni25B8 Complete answers lack Relation/Quantity reading.

(Except maybe in sarcastic pretense?)
6.1. Example

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

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)

Furthermore:
/uni25B8 Exhaustivity disappears in all readings except Manner.
/uni25B8 Complete answers lack Relation/Quantity reading. (Except maybe in sarcastic pretense?)
6.1. Example

(8) Of J and M, who came to the party?

John came↑.

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

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)
6.1. Example

(8) 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. 
(Quantity)

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

...but I’m not sure. 
(Quality)

...did I make myself clear? 
(Manner)
6.1. Example

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

John came \(\uparrow\).

1. \(s \not\subseteq |p|\)
2. \(s \not\subseteq |q|\)
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? \((\text{Manner})\)
6.1. Example

(8) 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? \((\text{Manner})\)
6.1. Example

(8) Of J and M, who came to the party? 

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

John came ↗.

1. \( s \subseteq |p| \)  
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.  
...perhaps that implies sth. about Mary? 
✓ ...but I’m not sure. 
✓ ...did I make myself clear?
6.1. Example

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

John came \(\uparrow\).

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

Readings

...wait, there’s more. \(\leftarrow\) (Quantity)

...perhaps that implies sth. about Mary? \(\leftarrow\) (Relation)

✓ ...but I’m not sure. \(\leftarrow\) (Quality)

...did I make myself clear? \(\leftarrow\) (Manner)
6.1. Example

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

John came ↗.

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

Readings

✓ ...wait, there’s more.  \((p)\)

...perhaps that implies sth. about Mary? \((p)\)

✓ ...but I’m not sure. \((p)\)

...did I make myself clear?

(Quantity)

(Relation)

(Quality)

(Manner)
6.1. Example

(8) 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. \(s \subseteq \overline{|p| \cup |q|}\) or \(s \subseteq \overline{|p|} \cup \overline{|q|}\)  
   (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)
6.1. Example

(8) 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. \( s \notin |p| \cup |q| \) and \( s \notin |p| \cup |q| \) (↑)
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)
6.1. Example

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

Readings

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

(Quantity)  
(Relation)  
(Quality)  
(Manner)
6.1. Example

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

John came ↑.

1. \(s \subseteq \langle p \rangle\)  
2. \(s \notin \langle q \rangle\)
3. \(s \subseteq \langle p \rangle \cup \langle q \rangle\) or \(s \subseteq \langle p \rangle \cup \langle q \rangle\)
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? \((\text{Manner})\)
6.1. Example

(8) 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 \(s \subseteq \overline{|p|} \cup \overline{|q|}\) (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)
6.1. Example

(8) 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 $s \subseteq |p| \cup |q|$
    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?
6.1. Example

(8) 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. \(s \notin |q|\)  
   (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.  
   (\(\uparrow\))

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)
6.1. Example

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

1. \(s \subseteq |p|\) \hspace{1cm} \text{(Quality)}
2. \(s \notin |q|\) \hspace{1cm} \text{(Quantity)}
3. \(s \subseteq |p| \cup |q| \) or \(s \subseteq |p| \cup |q|\) \hspace{1cm} \text{(Relation)}
4. The speaker doesn’t think she’s clear, concise, etc. \hspace{1cm} \text{\(\nrightarrow\)}

Readings

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

Furthermore:

- Exhaustivity disappears in all readings except Manner.
6.1. Example

(8) 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)
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Readings

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

- Exhaustivity disappears in all readings except Manner.
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4. The speaker doesn’t think she’s clear, concise, etc. \(\nearrow\)

Readings

✓ ...wait, there’s more. \hspace{1cm} (Quantity)
✓ ...perhaps that implies sth. about Mary? \hspace{1cm} (Relation)
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✓ ...did I make myself clear? \hspace{1cm} (Manner)

Furthermore:

- Exhaustivity disappears in all readings except Manner.
- Complete answers lack Relation/Quantity reading.
  (Except maybe in sarcastic pretense?)
6.2. General results

Relation violation
For sp. with info $s$, responding $A$ to $Q$, violating Relation:

\[(i) \quad s \subseteq A \cup Q; \quad \text{or} \quad (ii) \quad \text{for some } q \in Q, \quad s \subseteq A \cup q \quad \text{and for all } a \in A, \quad s \subseteq (q \cap A \cap a) \cup (q \cap A \cap a)\]
6.2. General results

Relation violation
For sp. with info $s$, responding $A$ to $Q$, violating Relation:
(i) $s \not\subseteq A \cup Q$; or
(ii) for some $q \in Q$, $s \not\subseteq A \cup \bar{q}$ and for all $a \in A$, $s \not\subseteq (q \cap A \cap \bar{a}) \cup (q \cap U A \cap a)$
6.2. General results

Relation violation
For sp. with info $s$, responding $A$ to $Q$, violating Relation:
(i) $s \not\in \overline{\bigcup A \cup Q}$; or
(ii) for some $q \in Q$, $s \not\in \overline{\bigcup A \cup \overline{q}}$ and for all $a \in A$, $s \not\in (q \cap \overline{\bigcup A \cap \overline{a}}) \cup (q \cap \overline{\bigcup A \cap a})$
6.2. General results

Relation violation
For sp. with info $s$, responding $A$ to $Q$, violating Relation:
(i) $s \notin \bigcup A \cup \bigcup Q$; or
(ii) for some $q \in Q$, $s \notin \bigcup A \cup \neg q$ and for all $a \in A$,
$s \notin (q \cap \bigcup A \cap \neg a) \cup (q \cap \bigcup A \cap a)$

Relation violation on singleton answer
And if responding $\{a\}$ to $Q$ for some $a \in Q$:
for some $q \in Q$, $s \notin \neg a \cup \neg q$ and $s \notin \neg a \cup q$
6.2. General results

Relation violation
For sp. with info \( s \), responding \( A \) to \( Q \), violating Relation:
(i) \( s \notin \bigcup A \cup Q \); or
(ii) for some \( q \in Q \), \( s \notin \bigcup A \cup \overline{q} \) and for all \( a \in A \),
\( s \notin (q \cap \bigcup A \cap \overline{a}) \cup (q \cap \bigcup A \cap a) \)

Relation violation on singleton answer
And if responding \( \{a\} \) to \( Q \) for some \( a \in Q \):
for some \( q \in Q \), \( s \notin \overline{a} \cup q \) and \( s \notin \overline{a} \cup q \)

Quantity violation
For some \( Q' \subseteq Q \), \( s \subseteq \bigcup Q' \) and \( \bigcup R \notin \bigcup Q' \).
7. Discussion

7.1. Objective/subjective cooperativity
7.2. Existing work
7.3. Other uses of the rise
7.4. Evoked questions
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.
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- **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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7.2. Existing work

Gunlogson (2008): (high) final rise marks the speaker’s commitment to the proposition expressed as *contingent*.  
  ▪ Primarily, this is an account of the Quality reading.
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- Primarily, this is an account of the Quality reading.
- However, there is a mapping between our approaches:
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  ‘[the maxims are] observed at the level of what is implicated’ - Grice (1975)

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Constant (2012) on rise-fall-(low)rise:

‘*[it quantifies] nonvacuously over post-assertable alternative propositions, to the effect that none of these propositions can safely be claimed.’
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- Effectively: I’m unsure about *some* alternative.
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- ‘post-assertable’ = assertable post-pragmatically.
- Effectively: I’m unsure about some alternative.
- This is my Relation reading plus the Quality implicature
7.3. Other uses of the rise

Contrastive topic (Büring, 2003):

(9) [John]_{CT} had the [beans]_{F}. 
7.3. Other uses of the rise

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Contrastive topic (Büring, 2003):

(9) $[\text{John}]_F \rightarrow$ had the $[\text{beans}]_F \downarrow$.

Interrogatives:

(10) a. Was John there $\rightarrow$?
    b. Was John there $\downarrow$?
Contrastive topic (Büring, 2003):

(9) \[[\text{John}]_F \nearrow\ \text{had the}[\text{beans}]_F \searrow\].

Interrogatives:

(10) a. Was \text{John} \nearrow\?  
    b. Was \text{John} \searrow\?  

Future work!
7.4. Evoked questions

(11) I don’t know how/whether $\phi$

- Expressions like (11) *evoke* the question of how/whether $\phi$. 
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- The Quality, Relation and Manner readings are like this.
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(4) Did John go to the party?
   It was raining $\downarrow$.
   $\sim$ He $\{likes / dislikes\}$ rainy parties
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(4) Did John go to the party?
   It was raining $\downarrow$.
   $\sim$ *He {likes / dislikes} rainy parties*
   It was raining $\uparrow^L$.
   $\sim$ *Does he like rainy parties?*
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(4) Did John go to the party?

- It was raining $\downarrow$.  $\leadsto$ *He \{likes / dislikes\} rainy parties*
- It was raining $\uparrow^L$.  $\leadsto$ *Does he like rainy parties?*
- Does he like rainy parties $\uparrow$?  $\leadsto$ *Was it raining?*
7.4. Evoked questions

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- Expressions like (11) evoke the question of how/whether $\phi$.
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\[
\begin{align*}
\text{It was raining} & \downarrow. & \leadsto & \text{He} \{\text{likes / dislikes}\} \text{ rainy parties} \\
\text{It was raining} & \uparrow^L. & \leadsto & \text{Does he like rainy parties?} \\
\text{Does he like rainy parties} & \uparrow? & \leadsto & \text{Was it raining?}
\end{align*}
\]

Perfect for turning distributed knowledge common.
End of Part II
General conclusion

Part I:
If pragmatic reasoning is sensitive to attentive content then exhaustivity is a conversational implicature.

Part II:
If, furthermore, the final rise conveys the violation of a maxim then the many readings of the final rise are predicted.
General conclusion

Part I:
- If pragmatic reasoning is sensitive to *attentive content*
General conclusion

Part I:
- If pragmatic reasoning is sensitive to *attentive content*
- then *exhaustivity is a conversational implicature.*
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- If pragmatic reasoning is sensitive to *attentive content*
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- If, furthermore, the final rise conveys the violation of a maxim
- then the many readings of the final rise are predicted.
The End

Article

  \emph{ESSLLI StuS proceedings} (staff.science.uva.nl/~westera/)

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Appendix A. ‘Embedded’ implicatures
Chierchia, et al. (2008), and much subsequent discussion

(6) Which books did every student read?
    Every student read O. or K.L. \(\sim\) No student read both.
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The problem

The problem has never been the Gricean approach as such, but rather to find the right ‘alternatives’.
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In the present theory:
  ▶ The maxims are sensitive to attentive content
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- (Hence so do the ‘alternatives’.)
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In the present theory:
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- Attentive content mirrors sub-sentential structure.
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The ‘embedded’ implicature of (6) is in fact predicted.
Appendix B. ‘Gricean’?

“that there are, or appear to be, divergences in meaning between, on the one hand, [...] the formal devices - \( \neg, \land, \lor \) [...] and, on the other, [...] their analogs or counterparts in natural language - such expressions as not, and, or, [...]” (Grice, 1975)
Appendix B. ‘Gricean’?

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- The semantics treats informative content classically.
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- The semantics treats informative content classically.
- Cf. questions, presuppositions, expressive content, ...
- Also for att. content, the connectives are algebraically ‘basic’.

Besides: this is the only way.