A dynamic semantic theory of discourse interpretation
It uses rhetorical relations to model the semantics/pragmatics interface.
semantic underspecification is expressed as partial descriptions of logical forms, and
a glue logic which uses commonsense reasoning to construct logical forms, relating the semantically underspecified forms that are generated by the grammar to their pragmatically preferred interpretations
The Need for Rhetorical Relations: Data

Pronouns

(2)  a. John had a great evening last night.
    b. He had a fantastic meal.
    c. He ate salmon.
    d. He devoured lots of cheese.
    e. He won a dancing competition.
    f. ??It was a beautiful pink.

John had a lovely evening

\[ \text{Elaboration} \]

He had a great meal

\[ \text{Narration} \]

He ate salmon

\[ \text{Narration} \]

He won a dancing competition

\[ \text{Elaboration} \]
The Need for Rhetorical Relations: Data

Tense

(3) Max fell. John helped him up.

Words

(6) a. A: Did you buy the apartment?
   b. B: Yes, but we rented it./ No, but we rented it.

Bridging

(7) a. John took an engine from Avon to Dansville.
   b. He picked up a boxcar./ He also took a boxcar.
SDRSs: Extend DRT with rhetorical relations.

$L_{ulf}$: Supply a separate logic for describing SDRSs (semantic underspecification).

Glue logic: Construct logical form for discourse via:

1. default reasoning, over
2. $L_{ulf}$-formulae for clauses which are generated by the grammar and
3. ‘shallow’ representations of lexical semantics, domain knowledge, cognitive states...

Glue logic entails more consequences about content than the grammar does. These are *implicatures*.
SDRS-formulae:
- DRSs
- \( R(\pi, \pi') \), where \( R \) is a rhetorical relation and \( \pi \) and \( \pi' \) are labels.
- Boolean combinations of these

An SDRS is a structure \( \langle A, \mathcal{F}, \text{LAST} \rangle \)
- \( A \) is a set of labels
- \( \mathcal{F} \) maps labels to SDRS-formulae (i.e., labels tag content)
- \( \text{LAST} \) is a label (of the last utterance)
- Where \( \text{Succ}(\pi, \pi') \) means \( R(\pi', \pi'') \) or \( R(\pi'', \pi') \) is a literal in \( \mathcal{F}(\pi) \): \( A \) forms a partial order under \( \text{Succ} \) with a unique root.
Of Relations: \textit{Contrast}(\pi_1, \pi_2), \textit{Narration}(\pi_1, \pi_2)

(6)  
a. A: Did you buy the apartment?  
b. B: Yes, but we rented it.

Of Attachment sites: \textit{Correction}(\pi_2, \pi_3), \textit{Elaboration}(\pi_1, \pi_3)

(8)  
\pi_1 A: Max owns several classic cars.  
\pi_2 B: No he doesn’t.  
\pi_3 A: He owns two 1967 Alfa spiders.

- A single utterance can make more than one \textit{illocutionary contribution} to the discourse.
A Diagram

Max owns several classic cars

Correction

No he doesn’t

Correction

He owns two 1967 spiders
(2) \[ \begin{align*}
\pi_1 & \quad \text{John had a great evening last night.} \\
\pi_2 & \quad \text{He had a great meal.} \\
\pi_3 & \quad \text{He ate salmon.} \\
\pi_4 & \quad \text{He devoured lots of cheese.} \\
\pi_5 & \quad \text{He then won a dancing competition.}
\end{align*} \]

(2)' \[ \langle A, \mathcal{F}, \text{LAST} \rangle, \text{ where:} \]

\[ A = \{ \pi_0, \pi_1, \pi_2, \pi_3, \pi_4, \pi_5, \pi_6, \pi_7 \} \]
\[ \mathcal{F}(\pi_1) = K_{\pi_1}, \mathcal{F}(\pi_2) = K_{\pi_2}, \mathcal{F}(\pi_3) = K_{\pi_3}, \]
\[ \mathcal{F}(\pi_4) = K_{\pi_4}, \mathcal{F}(\pi_5) = K_{\pi_5}, \]
\[ \mathcal{F}(\pi_0) = \text{Elaboration}(\pi_1, \pi_6) \]
\[ \mathcal{F}(\pi_6) = \text{Narration}(\pi_2, \pi_5) \land \text{Elaboration}(\pi_2, \pi_7) \]
\[ \mathcal{F}(\pi_7) = \text{Narration}(\pi_3, \pi_4) \]
\[ \text{LAST} = \pi_5 \]
Other Ways of Showing This

\[\pi_1 \rightarrow [\text{John had a lovely evening}] \rightarrow \text{Elaboration} \rightarrow \pi_6\]

\[\pi_2 \rightarrow [\text{He had a great meal}] \rightarrow \text{Narration} \rightarrow \pi_5 \rightarrow [\text{he won a dance competition}] \rightarrow \text{Elaboration} \rightarrow \pi_7\]

\[\pi_3 \rightarrow [\text{he ate salmon}] \rightarrow \text{Narration} \rightarrow \pi_4 \rightarrow [\text{he devoured cheese}]\]
New information $\beta$ can attach to:

1. The label $\alpha = \text{\textsc{last}}$;
2. Any label $\gamma$ such that:
   1. $\text{\textsc{succ}}(\gamma, \alpha)$; or
   2. $F(l) = R(\gamma, \alpha)$ for some label $l$, where $R$ is a subordinating discourse relation
      ($\text{\textsc{elaboration}}, \text{\textsc{explanation}}$ or $\downarrow$)

We gloss this as $\alpha < \gamma$

3. Transitive Closure:
   Any label $\gamma$ that dominates $\alpha$ through a sequence of labels $\gamma_1, \ldots, \gamma_n$ such that $\alpha < \gamma_1, \gamma_1 < \gamma_2, \ldots, \gamma_n < \gamma$. 
(7) \( \pi_1 \) John took an engine to Dansville. \((\pi_1)\)
\( \pi_2 \) He picked up a boxcar \((\pi_2)\)
\( \pi_3 \) It had a broken fuel pump \((\pi_3)\)

DRT:
- Flat structure:
  \textit{An engine is accessible to it}

SDRT:
- \textit{Narration}(\pi_1, \pi_2);
- So \( \pi_1 \) isn’t available to \( \pi_3 \): \( R(\pi_1, \pi_3) \) can’t hold for any \( R \)
- So the engine is not an available antecedent to \textit{it}
Satisfaction Schema for Veridical Relations:

\[ f[R(\pi_1, \pi_2)]_M g \iff f[K_{\pi_1}]_M \circ [K_{\pi_2}]_M \circ [\phi R(\pi_1, \pi_2)]_M g \]

Veridical: Explanation, Elaboration, Background, Contrast, Parallel, Narration, Result, Evidence...

Non-veridical: Alternation, Consequence

Divergent: Correction, Counterevidence
Defining $\phi_R(\alpha, \beta)$ for various $R$

- **Axiom on Explanation:**
  
  (a) $\phi_{Explanation}(\alpha, \beta) \Rightarrow (\neg e_\alpha < e_\beta)$
  
  (b) $\phi_{Explanation}(\alpha, \beta) \Rightarrow (\text{event}(e_\beta) \Rightarrow e_\beta < e_\alpha)$

  *Max went to bed. He was sick. Max fell. John pushed him.*

- **Axiom on Elaboration:**

  $\phi_{Elaboration}(\alpha, \beta) \Rightarrow \text{Part-of}(e_\beta, e_\alpha)$

  *Max ate a big dinner. He had salmon.*
Defining $\phi_R(\alpha, \beta)$ for various $R$

- **Axiom on Background:**
  \[ \phi_{\text{Background}}(\alpha, \beta) \Rightarrow \text{overlap}(e_\beta, e_\alpha) \]
  Max entered. The room was dark.

- **Axiom on Narration:**
  \[ \phi_{\text{Narration}}(\alpha, \beta) \Rightarrow \]
  (a) $e_\alpha \prec e_\beta$ and
  (b) things don’t move location between the end of $e_\alpha$ and start of $e_\beta$
  (unless adverbials indicate otherwise).
  Max went to Paris. He visited a friend.