Semantic Theory: DRT III: Accessibility and Presuppositions

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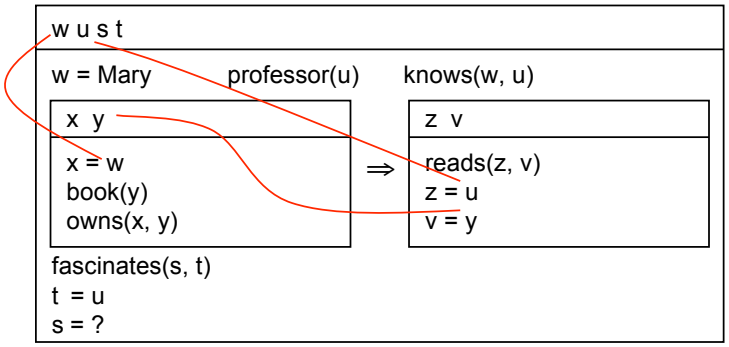
Anaphora and accessibility

- *Mary knows a professor. If she owns a book, he reads it. It fascinates him.*



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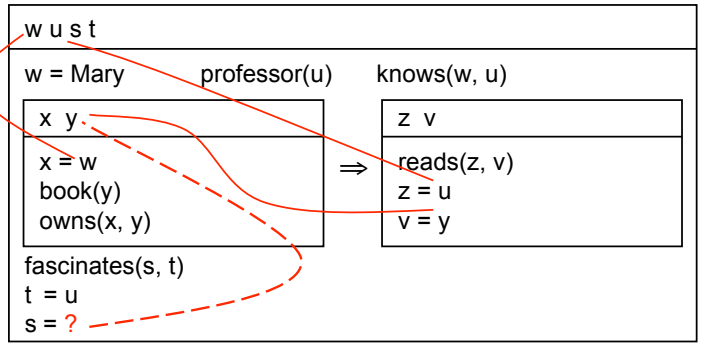

Accessible discourse referents

- The following discourse referents are accessible for a condition:
  - DRs in the same local DRS
  - DRs in a superordinate DRS
  - DRs on the top level of an antecedent DRS, if the condition occurs in the consequent DRS.

Accessible discourse referents

- Cases of non-accessibility:
  - *If a professor owns a book, he reads it. It has 300 pages.*
  - *It is not the case that a professor owns a book. He reads it.*
  - *Every professor owns a book. He reads it.*
  - *If every professor owns a book, he reads it.*
  - *Peter owns a book, or Mary reads it.*
  - *Peter owns a book, or Mary owns a CD. He hasn't read it yet.*

Subordination

- A DRS K_1 is an immediate sub-DRS of a DRS $K = \langle U_K, C_K \rangle$ iff C_K contains a condition of the form $\neg K_1$, $K_1 \Rightarrow K_2$, $K_2 \Rightarrow K_1$, $K_1 \vee K_2$ or $K_2 \vee K_1$.
- K_1 is a sub-DRS of K (notation: $K_1 \leq K$) iff
  (i) $K_1 = K$ or
  (ii) K_1 is an immediate sub-DRS of K or
  (iii) there is a DRS K_2 s.t. $K_2 \leq K_1$ and K_1 is an immediate sub-DRS of K.
  (i.e. reflexive, transitive closure)
- K_1 is a proper sub-DRS of K iff $K_1 \leq K$ and $K_1 \neq K$.

Accessibility

- Let K, K_1, K_2 be DRSes s.t. $K_1, K_2 \leq K$, $x \in U_{K_1}$, $\gamma \in C_{K_2}$
- x is accessible from γ in K iff
  (i) $K_2 \leq K_1$ or
  (ii) there are K_3, $K_4 \leq K$ s.t. $K_1 \Rightarrow K_3 \in C_{K_4}$ and $K_2 \leq K_3$

Revised DRS Construction rule for Pronouns

- Triggering Configuration:
  - Let K* be the main DRS that containing K
  - α a reducible condition in DRS K, containing $[_S\ [_{NP}\ \beta]\ [_{VP}\ \gamma]]$ or $[_{VP}\ [_V\ \gamma]\ [_{NP}\ \beta]]$ as substructure
  - β a personal pronoun.
- Action:
  - Add a new DR x to U_K.
  - Replace β in α by x.
  - Select an appropriate DR y that is accessible from α in K*, and add x = y to C_K.

DRS Construction Rule for Proper Names

- Triggering Configuration:
  - Let K* be the main DRS that containing K
  - α a reducible condition in DRS K, containing $[_S [_{NP}\ \beta] [_{VP}\ \gamma]]$ or $[_{VP} [_V\ \gamma] [_{NP}\ \beta]]$ as substructure.
  - β a proper name
- Action:
  - Add a new DR x to U_{K^*}.
  - Replace β in α by x.
  - Add $x = \beta$ to C_{K^*}.

Is accessibility a truth-conditional property?

- *There is a book that John doesn't own.*
  He wants to buy it.
- *John does not own every book.*
  ?He wants to buy it.
- *One of the ten balls is not in the bag.*
  It must be under the sofa.
- *? Nine of the ten balls are in the bag.*
  It must be under the sofa.

DRT is non-compositional

- DRT is non-compositional on truth conditions: The different discourse-semantic status of the text pairs is not predictable through the (identical) truth conditions of its component sentences.
- Since structural information which cannot be reduced to truth conditions is required to compute the semantic value of texts, DRt is called a representational theory of meaning.

DRT: What about full definite NPs?

- So far, DRT models:
  - Indefinite NPs (*a professor*)
  - Pronouns as a sub-case of definite NPs (*he, she, it*)
  - Proper names (*John, Mary*)
- What about full definite NPs, or „definite descriptions":
  - *the professor, the book*

Definite article in type-theoretic semantics

- Standard type-theoretic representation of definite article:

  the ⇒ λ*F*λ*G*∃y(∀x(*F*(x)↔x=y) ∧*G*(y))
  the sun ⇒ λ*G*∃y(∀x(*sun'*(x)↔x=y) ∧*G*(y))
  the sun is shining ⇒
  ∃y(∀x(*sun'*(x)↔x=y)∧*shine'*(y))
  the student is working ⇒
  ∃y(∀x(*student'*(x)↔x=y)∧*work'*(y)) ???

- Truth conditions – existence of one and only one student - are inadequate.

Issues for definite NPs in type theory

- There may be more than one reference object sytisfying the description.
- What are the truth conditions in the case that there is no object satisfying the description?
  - *The king of France is bald*
  - *The greatest prime number is odd*
- Standard compositional computation of the semantics of complex objects does not work.

Definite Descriptions and Negation

- *It is not the case that the sun is shining*
- A straightforward compositional analysis of the sentence leads to
  - ¬∃x(∀y(sun'(y) ↔ x = y) ∧ shine'(x))
  - "Either there is no sun, or more than one, or there is exactly one sun, and it isn't shining."
- A better representation for the sentence:
  - ∃x(∀y(sun'(y) ↔ x = y) ∧ ¬shine'(x))
  - "There is exactly one sun, and it isn't shining."

Definite Descriptions and Negation

- Only one part of the meaning representation is negated.
- The semantic material contributed by the descriptive part of the NP "survives"; it is projected upwards unchanged.
  - ∃x(∀y(chancellor'(y) ↔ x=y) ∧ ¬decides'(x))
  - "There is exactly one chancellor, and he doesn't decide."

Similar projection phenomena

- The descriptive content of definite NPs survives not only negation, but also other kinds of embeddings
  - *The sun is shining,* ***or*** *it is dark outside*

    >> There is a sun, and it is shining or it is dark outside
  - ***It is possible*** *that the student* ***will*** *work tomorrow.*
  - *Mary* ***believes*** *that John will pass the exam.*

The concept of Presupposition

- The semantic observations about definite noun phrases fit well to the general discourse-semantic view of context-meaning interaction.
- A sentence (containing a definite description) contains meaning information of two different types:
  - One specifies the requirements that the context must satisfy so the utterance can be interpreted at all.
  - The other one expresses the explicitly given additional infomation, in a certain context.
- We call the former the presupposition, the latter the assertion.

DRS Construction rule for definite NPs (First attempt)

- Triggering Configuration:
  - Let K* be the main DRS that containing K
  - α is reducible condition in DRS K, containing $[_S[_{NP}\ \beta]\ [_{VP}\ \gamma]]$ or $[_{VP}\ [_V\ \gamma]\ [_{NP}\ \beta]]$ as a substructure.
  - β is $\varepsilon\delta$, ε the definite article
- Action:
  - Add a new DR x to U_K.
  - Replace β in α by x.
  - Select an appropriate DR y that is accessible from α in K* and satisfies δ, and add x = y to C_K.

Presupposition

- Presupposition is a very general phenomenon in natural language: The projection behaviour under negation(and similar operators) is taken as a standard presupposition test - Presupposition Triggers
- The projection behaviour is more complex than the first guss definite NP rule suggests: Cancellation and Filtering
- The contribution of presupposition to the meaning of a discourse is not restricted to establishing the anaphoric link: Accomodation

Some Presupposition Triggers

- Definite noun phrases
  - –***The sun*** *is shining*
  - –>> There is sun (and it is shining)
- Factive verbs
  - –*John* ***regrets*** *that he has married.*
  - –>> John has married (and he regrets that)
- Implicative verbs
  - –*John* ***forgot*** *to close the door.*
  - –>> John intended to close the door (but he forgot to do it)

Presupposition Triggers

- Aspect
  - –*John has* ***stopped*** *smoking.*
  - –>> John used to smoke (and he has stopped doing it)
  - –*John opened the window* ***again****.*
  - –>> John had already opened the window before (repetetive)
  - –>> The window was open before (restitutive)
- Appositions / non-restrictive relative clauses.
  - – *John, a good friend of mine, studies CL.*
  - – *John, who is a good friend of mine, studies CL.*
  - –>> John is a good friend of mine (and he studies CL).

Presupposition Triggers

- It-Clefts
  - –***It was John who*** *ate the cake.*
  - –>> Somebody ate the cake (and it was John who did this)
- Focus particles
  - –***Only*** *John came to the party*
  - –>> John came to the party (and nobody else did).

Presupposition Projection Again

- Presuppositions behave in a uniform way, in that they survive negation and various kinds of embeddings
  - – *Either it will stop raining,* ***or*** *the match must be cancelled*
  - – >> it is raining.
  - – *John* ***possibly*** *regrets that he has married.*
  - – >> John has married.
  - – *Mary* ***believes*** *that John has stopped smoking.*
  - – >> John used to smoke.

Presupposition Cancellation

- In the context of negation, presuppositions can be overwritten or “cancelled” by explicitly claiming that they are false:
- *The king of France isn’t bald. France is a republic.*
- *John possibly regrets that he has married. But possibly, he hasn’t married at all.*

Presupposition Filtering

- There are contexts that can “neutralise” or filter some presuppositions: they block projection of these presuppositions.
- *If John is out of town, then **his wife** is unhappy.*
  - presupposes: John is married / has a wife
- *If John is married, then **his wife** is unhappy.*
  - does not presuppose: John is married

Accomodation

- *The sun is shining.*
- *Sorry to be late. I couldn‘t start the car*
- *The king of Samoa will visit Germany in July*.
- Missing discourse referents + NP content can be „accomodated“, if it is not present in the context. Thus, presuppositions are not strict conditions on context, but also a device toconvey additional information.

Presupposition phenomena: Wrap Up

- Presuppositions are triggered by a number of different words and linguistic constructions, including definite noun phrases.
- Presuppositions behave differently than assertions in semantics construction: They are typically projected unchanged, rather than used in functional application.
- Projected presuppositions can be filtered in the semantic composition process, and can be cancelled by contextual knowledge.
- Missing presuppositions can be accomodated.