



university of
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Language and Inference

Day 4: Projection and Presupposition

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- Speakers take a lot of information for granted, they presuppose information
- Presupposed information can be conveyed by sentences
- Presuppositions are abundant in texts

Presuppositions

Even though semanticists agree on the fact that there are presuppositions, there is no agreement on a formal definition of presupposition (Beaver 1997)

- A sentence presupposes another sentences if the truth of the second is required to determine the truth value of the first (Strawson)
- Presupposition is Anaphora (Van der Sandt)

Presupposition -- Definition

- A presupposition is a kind of implication
- But quite an unusual one kind of implication, at least from a logical point of view, because:

Presuppositions are recalcitrant, refusing the authority of logic!

Presupposition -- Behaviour

p : James saw a kookabura.
 $\neg p$: James didn't see a kookabura.
 q : James saw an Australian bird.

p entails q
 $\neg p$ does not entail q



Normally behaved implications

p: Steve spotted the waxwing in the garden.
p→r: Steve would have been thrilled if he had spotted the waxwing in the garden.

q: Steve spotted the waxwing.

p entails q

p→r does not entail q



Normally behaved implications

p : James only saw a kookabura.
 $\neg p$: James not only saw a kookabura.
 q : James saw a kookabura.

p entails q
 $\neg p$ entails q



Recalcitrant implications

p : Steve spotted the waxwing in the garden.
 $p \rightarrow r$: Steve would have been thrilled if he had spotted the waxwing in the garden.

q : There was a waxwing in the garden.

p entails q
 $p \rightarrow r$ entails q



Recalcitrant implications

- Presuppositions are implications that survive under embedded contexts
- Embedded contexts:
negation, conditionals, modals

Embedded contexts

- Presuppositions *project* their meaning
- Words that give rise to presuppositions are called *triggers*

Terminology

factive verbs	clefts	repetitive phrases
aspectual verbs	definite descriptions	focusing adverbs
implicative verbs	proper names	sortal predicates

Presupposition triggers

- Bush regrets that he raised taxes.
- Bush did not regret that he raised taxes.
- ✓ Bush raised taxes.



Factives

- Berlusconi will run for president again.
- Berlusconi won't run for president again.
- ✓ Berlusconi ran for president before.



Repetitive adverbs

- It was Obama who found Bin Laden.
- It wasn't Obama who found Bin Laden.
- ✓ Someone found Bin Laden.



Clefts

- Merkel stopped objecting to the Libyan no-fly zone.
- Merkel did not stop objecting to the Libyan no-fly zone.
- ✓ Merkel objected to the Libyan no-fly zone.



Aspectual verbs

- Medvedev didn't react to Putin's words.
- Medvedev reacted to Putin's words.
- ✓ There exists someone named Putin.



Names

- Sarkozy brings his wife.
- If Sarkozy brings his wife, then everyone would be pleased
- ✓ Sarkozy is male.



Sortal Predicates

- Palin did not understand the question.
- Palin understood the question.
- ✓ There was a question.



Definites

- The reception was attended by Sarkozy and his wife.
- The reception wasn't attended by Sarkozy and his wife.
- ✓ Sarkozy has a wife.



Possessives

- Obama, winner of a Nobel Peace Prize, laughed.
- It wasn't the case that Obama, winner of a Nobel Peace Prize, laughed.

✓ Obama is winner of a Nobel Peace Prize.



Appositives

- “Berlusconi, that dirty old bastard, will run for president.”
 - “If Berlusconi, that dirty old bastard, will run for president, I am going to leave Italy.”
- ✓ Speaker believes that Berlusconi is a dirty old bastard.

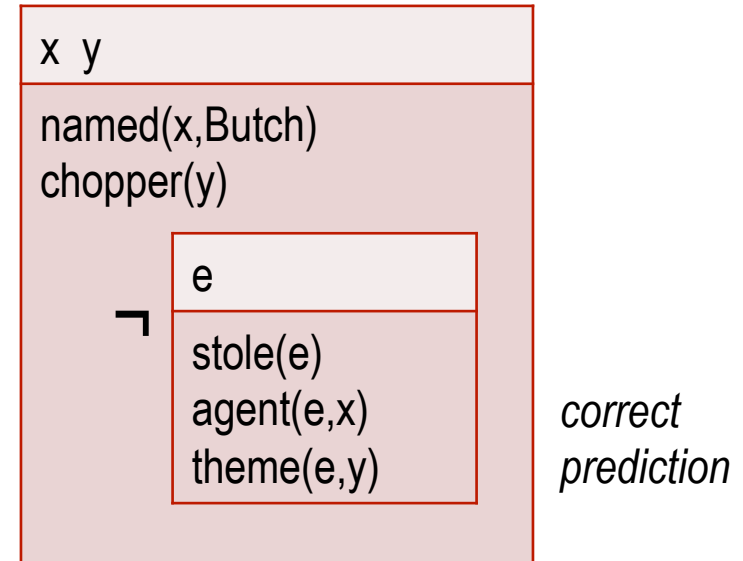
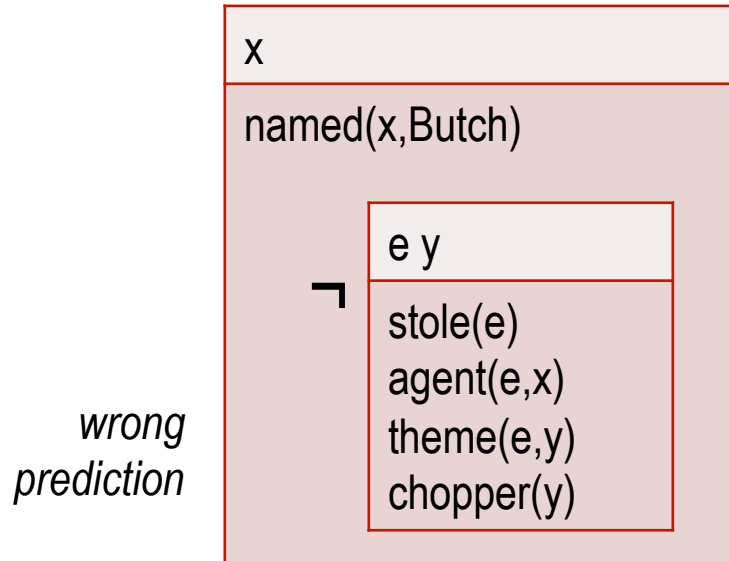


Non-restrictive relative clauses

- Accommodation
- Binding
- Cancellation

The ABC of presupposition problems

Accommodation



Butch did not steal the chopper.

Binding



- A boy was pushing his bicycle.

=> A boy has a bicycle.

(too weak: might be different boy)

- Every boy was pushing his bicycle.

=> Every boy has a bicycle.

(perhaps too strong: not every boy)

Cancellation



- If Mia dates Vincent, then her husband is out of town.
=> Mia has a husband.
- If Mia has a husband, then her husband is out of town.
=> Unclear whether Mia has a husband.
- If Mia is married, then her husband is out of town.
=> Unclear whether Mia has a husband.

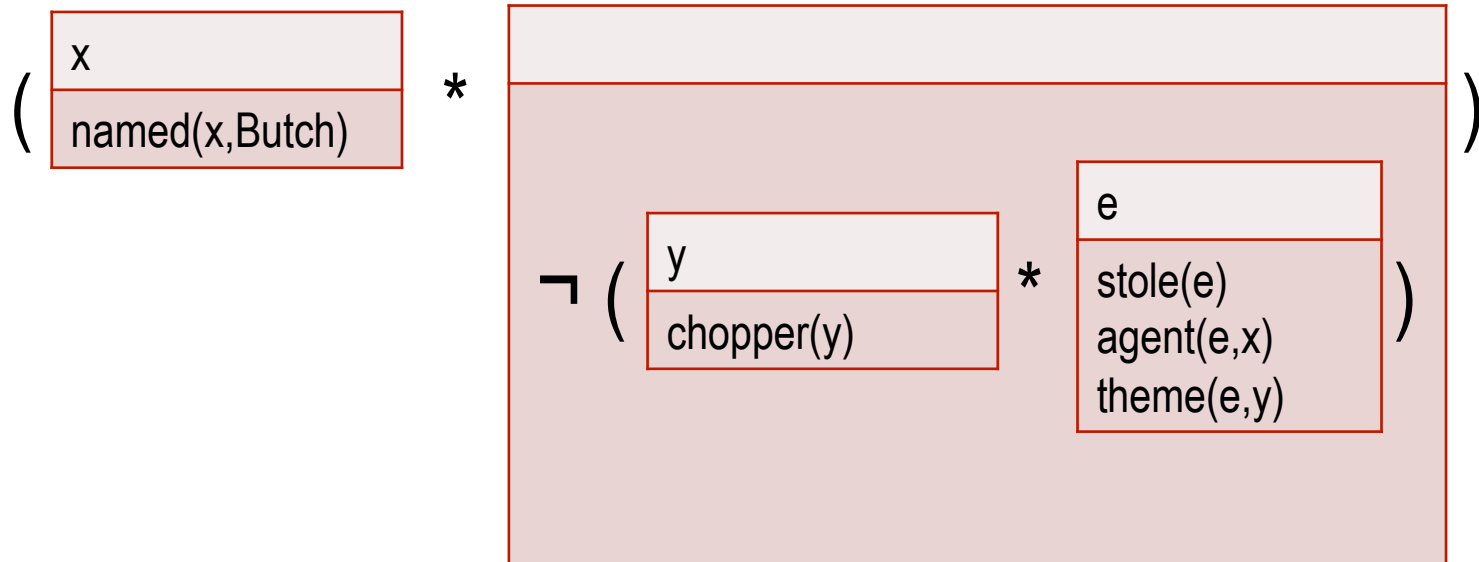
- Presuppositions are like anaphoric expressions
- There are two possibilities to resolve them:
 - bind them to an accessible discourse referent
 - accommodate them to an accessible DRS
- Resolution can give rise to more than one DRS
 - apply satisfiability constraints, i.e.
 - each DRS needs to be consistent and informative

Van der Sandt

- Presuppositions are of propositional type
- So it makes sense to represent a presupposition by a DRS
- We introduce a new two-place operator *
- The * marks a presuppositional DRS, and links it to the non-presuppositional content

Representing presuppositions

Representing presuppositions



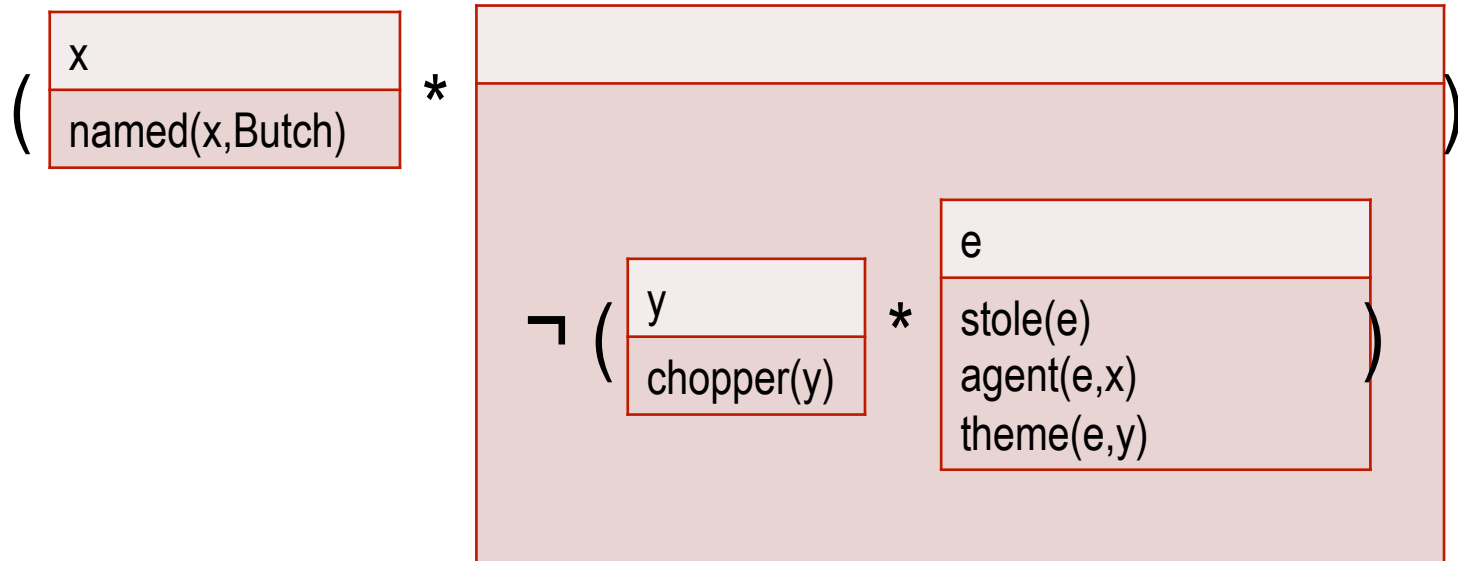
Butch did not steal the chopper.

What does it mean?



- Van der Sandt calls DRSs with unresolved anaphoric structures proto-DRSs
- Another way to view them is as underspecified semantic representations
- Resolving proto-DRSs can give rise to more than one interpretation

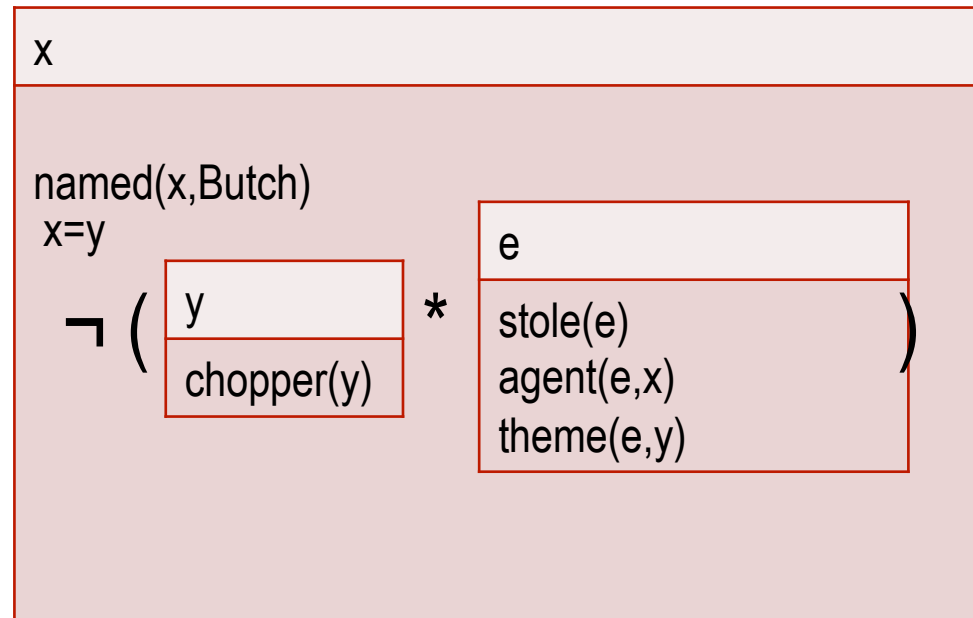
Resolving presuppositions



Butch did not steal the chopper.

Only one option: global accommodation

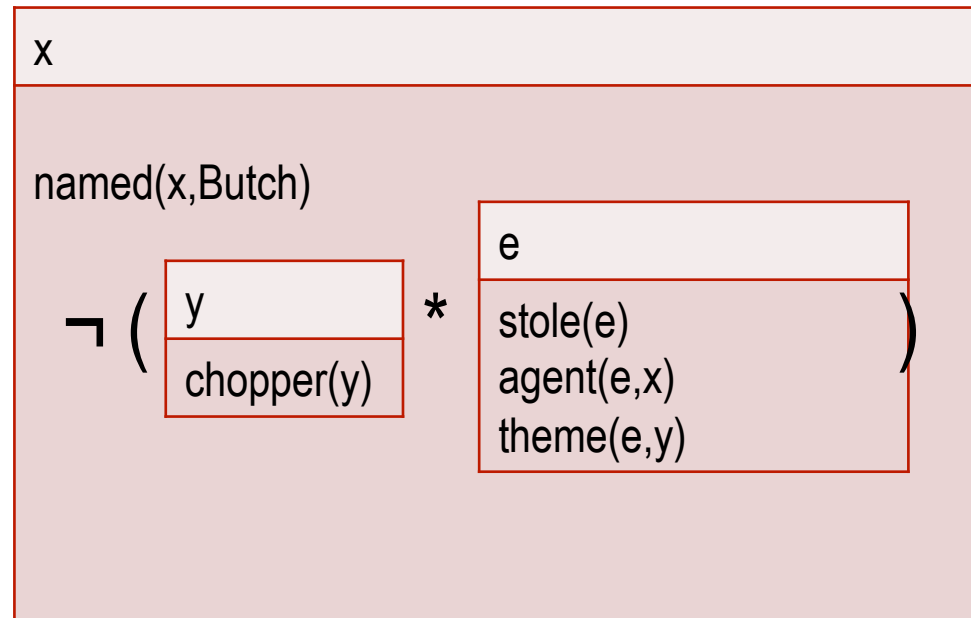
Resolving presuppositions



Butch did not steal the chopper.

Option 1: binding (inconsistent)

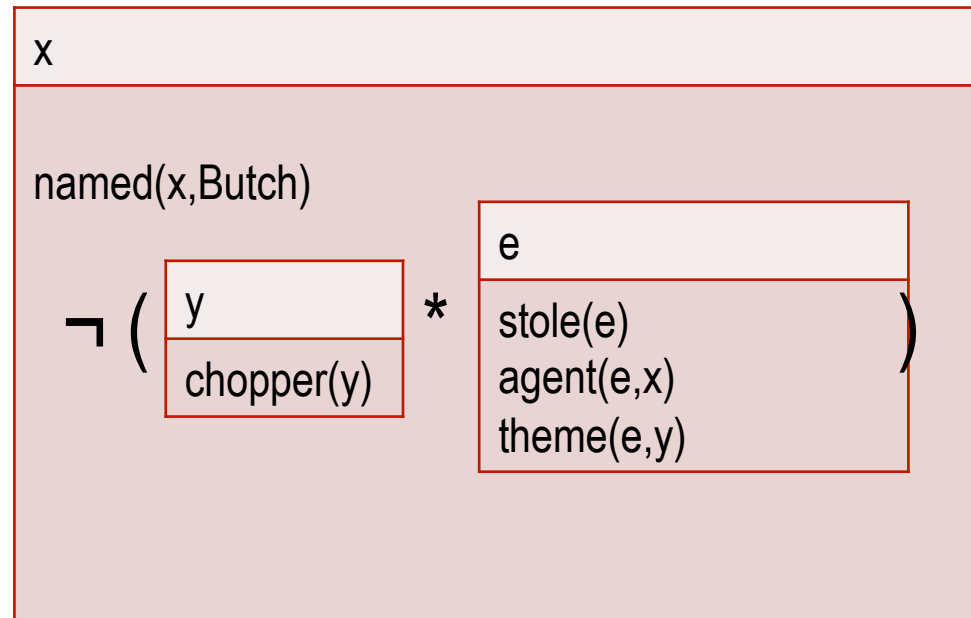
Resolving presuppositions



Butch did not steal the chopper.

Option 2: global accommodation (preferred)

Resolving presuppositions



Butch did not steal the chopper.

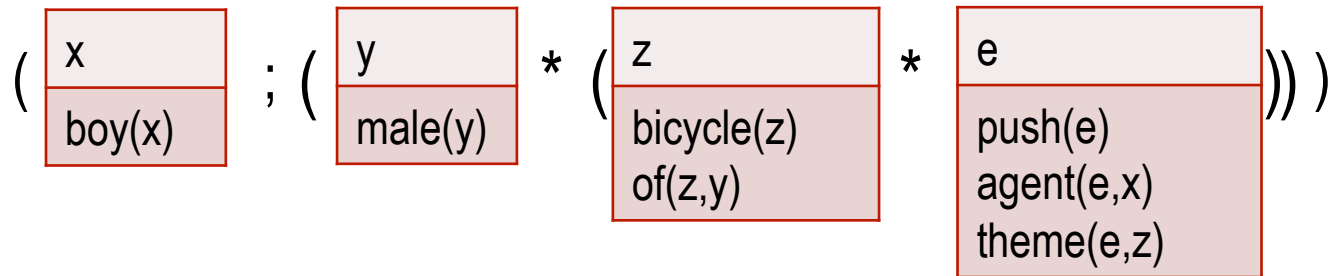
Option 3: local accommodation (dispreferred)

How well are we doing?



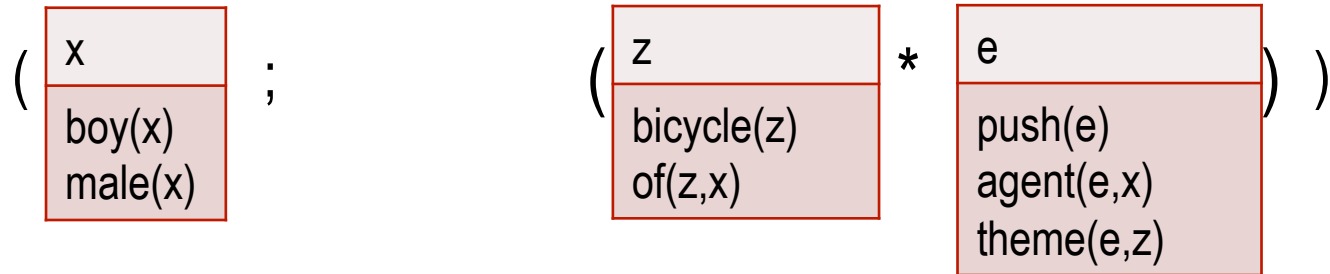
- A. Van der Sandt's approach solves the accommodation problem, because it's part and parcel of his theory!
- B. But how does it deal with the binding issues?

Binding (example 1)



A boy was pushing his bicycle.

Binding (example 1)



A boy was pushing his bicycle.

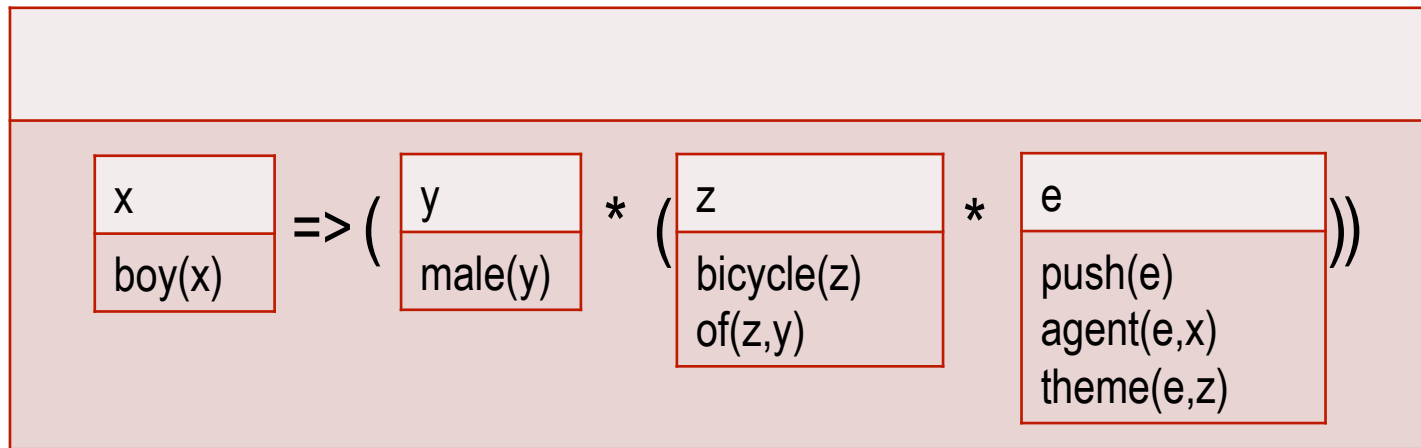
Binding (example 1)



x z e
boy(x)
male(x)
bicycle(z)
of(z,x)
push(e)
agent(e,x)
theme(e,z)

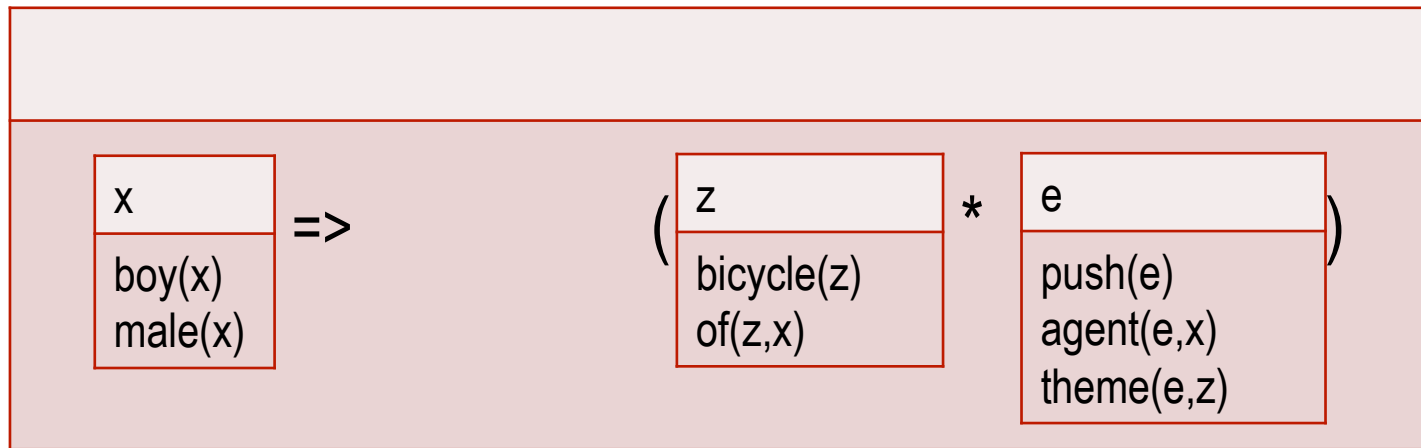
A boy was pushing his bicycle.

Binding (example 2)



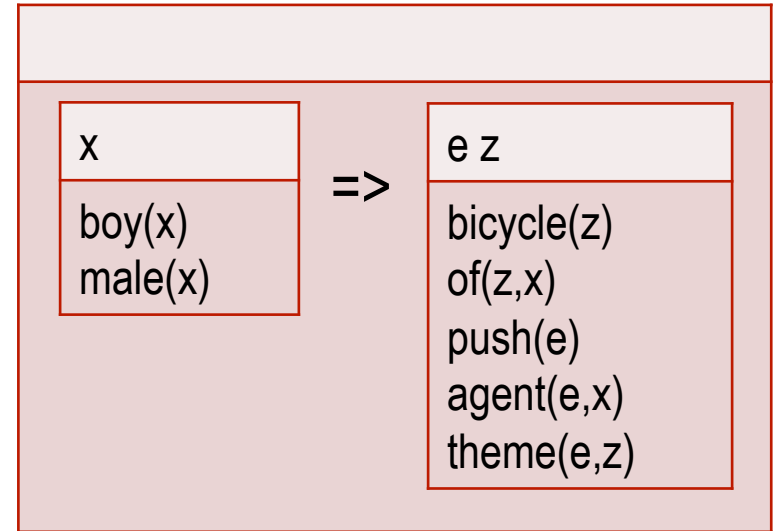
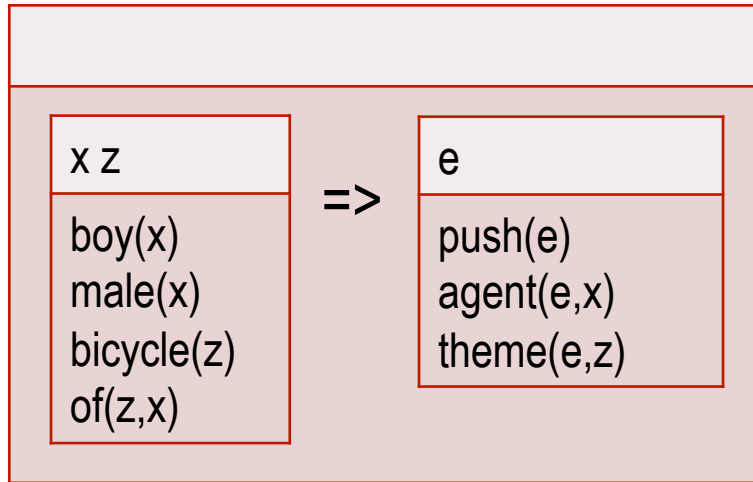
Every boy was pushing his bicycle.

Binding (example 2)



Every boy was pushing his bicycle.

Binding (example 2)



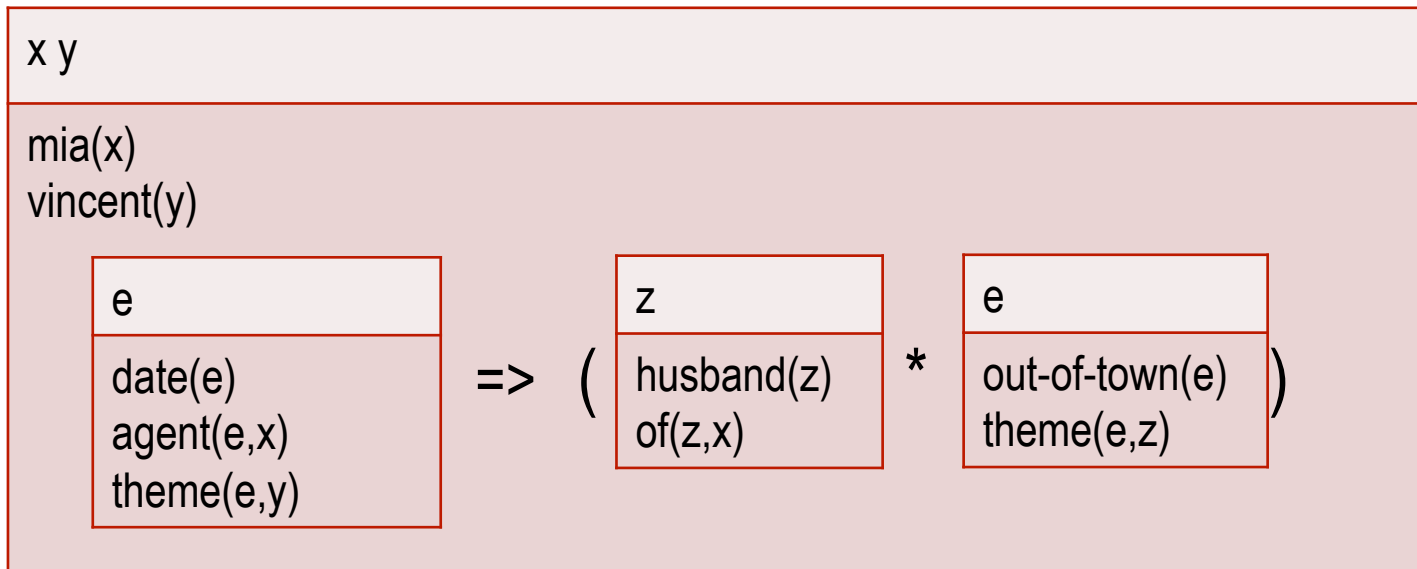
Every boy was pushing his bicycle.

How well are we doing?



- A. Van der Sandt's approach solves the accommodation problem, because it's part and parcel of his theory!
- B. We are not suffering from the binding problem, because presupposition and assertions are integrated into one representation!
- C. But what about cancellation?

Cancellation: example 1



If Mia dates Vincent, then her husband is out of town.

Expected behaviour: projection (global accommodation)

Acceptability Constraints



- Van der Sandt's theory is not deterministic, the algorithm generates various solutions
- Solutions that violate the acceptability constraints are disregarded
- Global accommodation preferred!

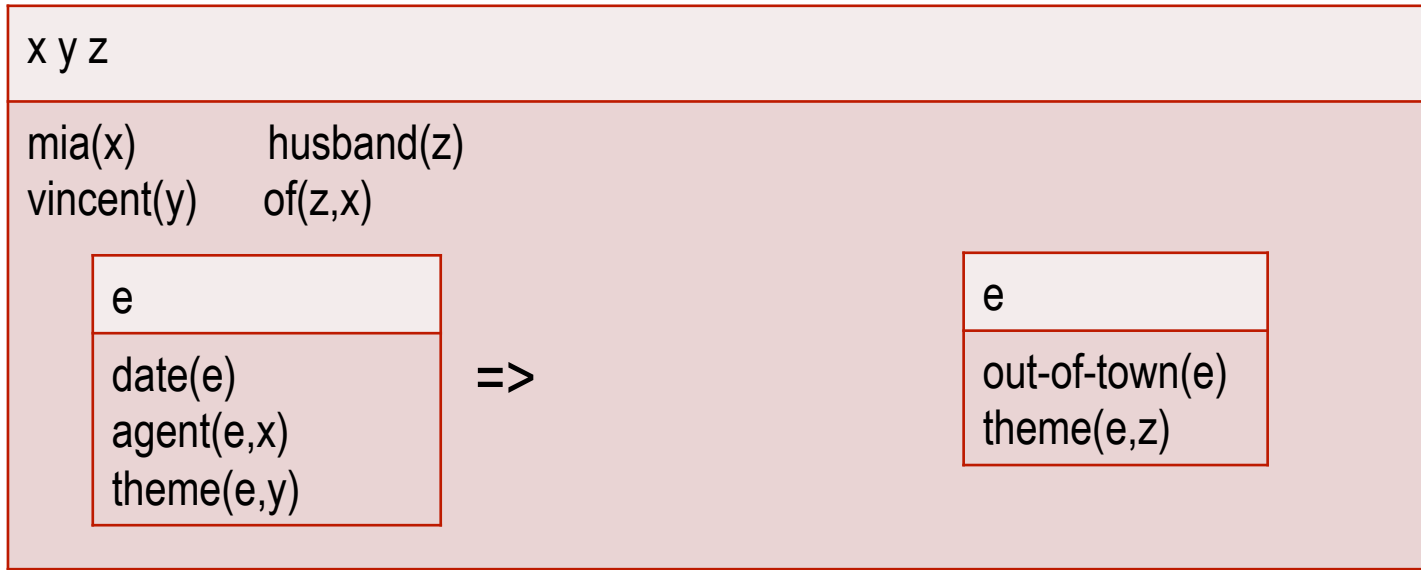
Global constraints:

- a DRS must be consistent
- a DRS must be informative

Local constraints:

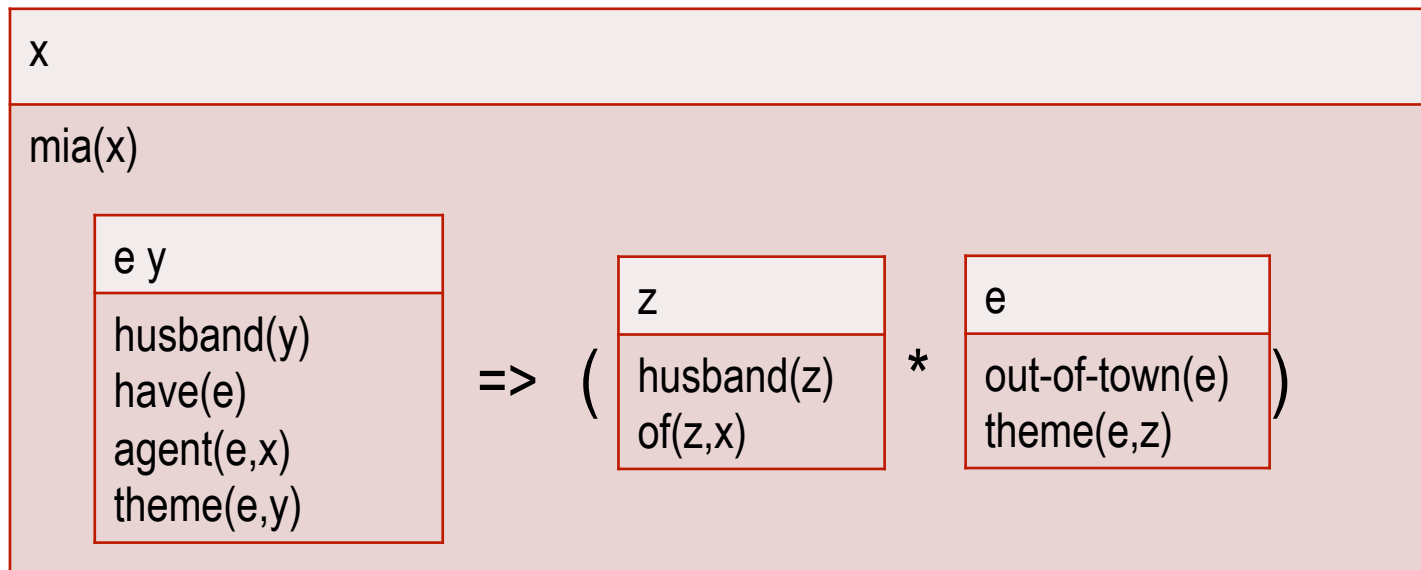
- a DRS must be locally consistent
- a DRS must be globally informative

Cancellation: example 1



If Mia dates Vincent, then her husband is out of town.

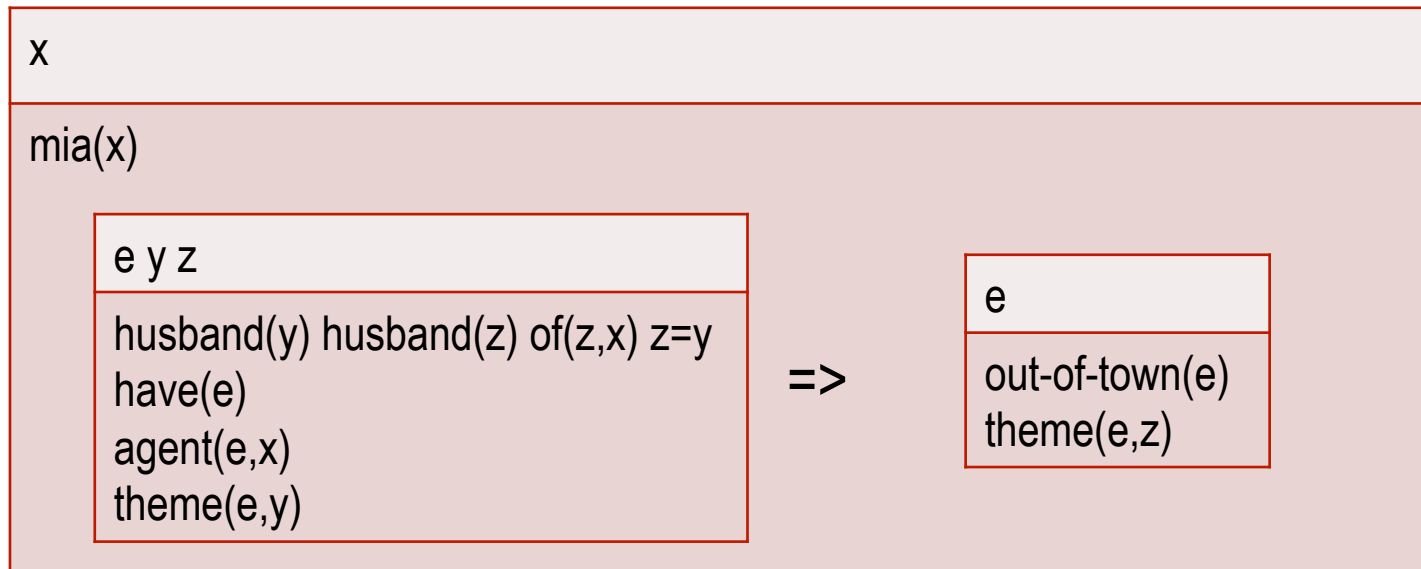
Cancellation: example 2



If Mia has a husband, then her husband is out of town.

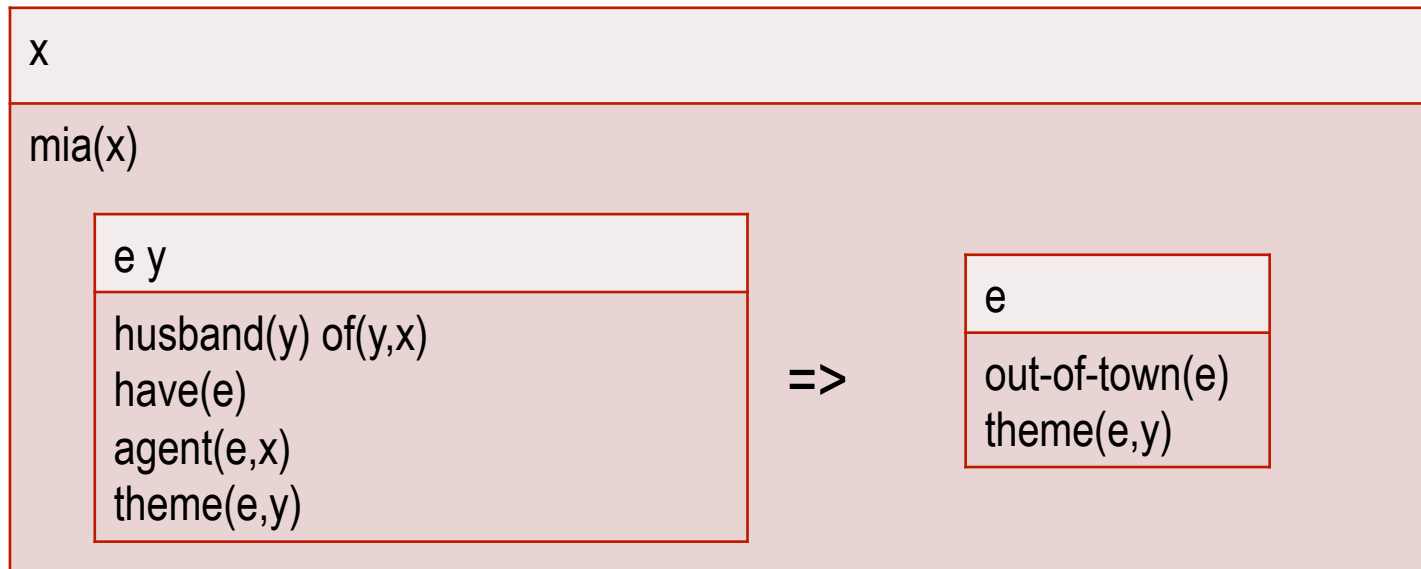
Expected behaviour: no projection

Cancellation: example 2



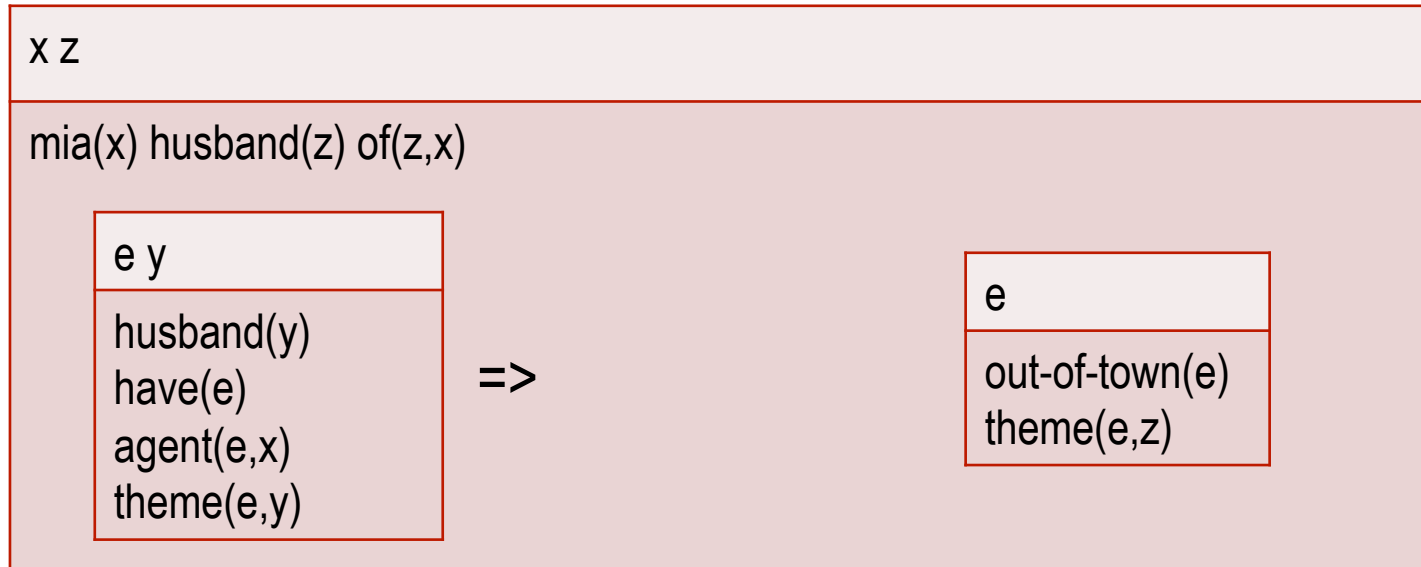
If Mia has a husband, then her husband is out of town.

Cancellation: example 2



If Mia has a husband, then her husband is out of town.

Cancellation: example 2

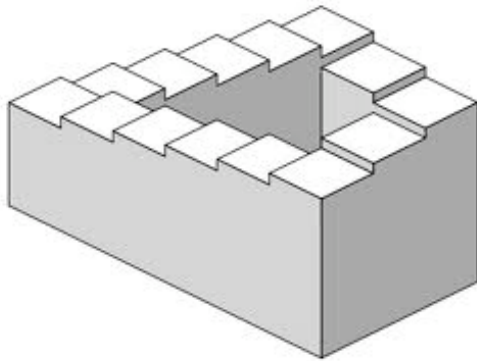


If Mia has a husband, then her husband is out of town.

Global accommodation: violates local informativeness

The negative test

- We give $\neg(B)^{fo}$ to a theorem prover.
- If it finds a proof, it follows that B is inconsistent



The positive test

- We give $(B)^{fo}$ to a model builder.
- If it finds a model, it follows that B is consistent

Checking whether a DRS is consistent

The negative test

- We give $(B)^{fo}$ to a theorem prover.
- If it finds a proof, it follows that B is uninformative

The positive test

- We give $\neg(B)^{fo}$ to a model builder.
- If it finds a model, it follows that B is informative

Checking whether a DRS is informative

The negative test

- We give $(B_1 \rightarrow B_2)^{fo}$ to a theorem prover
- If it finds a proof, it follows that B_2 is uninformative wrt B_1

The positive test

- We give $\neg(B_1 \rightarrow B_2)^{fo}$ to a model builder
- If it finds a model, it follows that B_2 is informative wrt B_1

Checking whether B_2 is informative wrt B_1

How well are we doing?



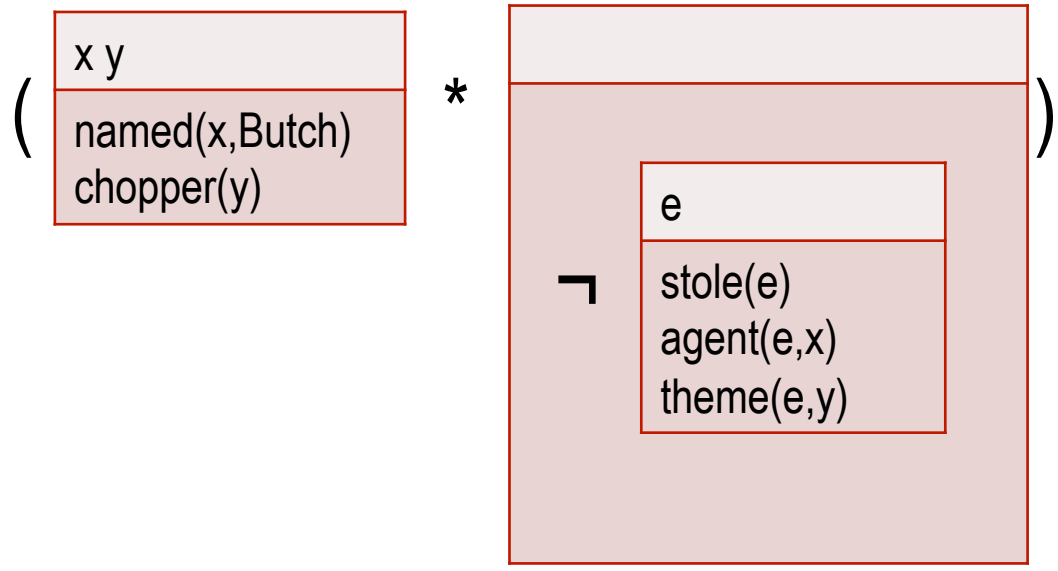
- A. Van der Sandt's approach solves the accommodation problem, because it's part and parcel of his theory!
- B. We are not suffering from the binding problem, because presupposition and assertions are integrated into one representation!
- C. The cancellation problem is dealt with by the local consistency and informativity constraints!

Lexical entries for triggers



Category	Partial DRS	Example
NP	$\lambda p. \left(\begin{array}{c} x \\ \hline \text{named}(x, \text{Butch}) \end{array} * (p@x) \right)$	<i>Butch</i>
NP/N	$\lambda p. \lambda q. \left(\begin{array}{c} x \\ \hline \end{array} ; (p@x) * (q@x) \right)$	<i>the</i>
N/N	$\lambda p. \lambda x. \left(\begin{array}{c} y \\ \hline \end{array} ; (p@y) \right) * \left(\begin{array}{c} \hline \\ x \neq y \end{array} ; p@x \right)$	<i>other</i>

Presuppositions in Boxer



Butch did not steal the chopper.



Tomorrow

**Inference
in the
Real World**
