WIDE-COVERAGE SEMANTICS APPLIED TO TEMPORAL ORDERING AND PRESUPPOSITION

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WIDE-COVERAGE SEMANTICS

HOW TO PRODUCE A DISCOURE REPRESENTATION STRUCTURE FROM ARBITRARY FRENCH TEXT

CATEGORIAL GRAMMAR

- The lexicon is a set of word-formula-lambda term triples, (Montague-style, with the formula determining the type of the term),

- Grammatical sentences correspond to provable statements in the logic,

- Proofs correspond to (linear) lambda terms,

- Substitution and normalization produce a representation of the semantics of a sentence.

CATEGORIAL GRAMMAR

Universal grammar

SYNTAX

$$\frac{A/B \qquad B}{A}\,[/E] \qquad \frac{B \qquad B\backslash A}{A}\,[\backslash E]$$

SEMANTICS

$$\frac{B \qquad B\rightarrow A}{A}\,[\rightarrow E]$$

Syntax-semantics interface

$$\frac{\ldots \quad [B]^i}{\vdots}{\atop A/B}\,[/I]^i \qquad \frac{[B]^i \quad \ldots}{\vdots}{\atop B\backslash A}\,[\backslash I]^i \qquad \frac{[B]^i}{\vdots}{\atop B\rightarrow A}\,[\rightarrow I]^i$$

WIDE-COVERAGE SEMANTICS

- Provided that, like Montague, you are happy with having *sleep* - or $\lambda x.sleep(x)$ - as the semantics of 'sleep' (I will have a *tiny* bit more to say about extending this notion later), we can use categorial grammars for wide-coverage semantics,

- All we need is a big enough lexicon: both to provide the right formulas and to provide the right lambda-terms for words in the input text.

- Fortunately, we have the French Treebank, which has been converted to categorial grammar (Moot 2010).

WIDE-COVERAGE SEMANTICS

- A big enough lexicon for wide-coverage parsing will contain *many* lexical entries, especially for frequent words,

- No matter how big the lexicon, unseen text will still contain an annoying amount of unknown words,

- Though the part-of-speech tag gives a reliable indication of the formula corresponding to an unknown word, part-of-speech tags have an even greater number of formulas corresponding to them.

- The maximum entropy supertagger of Clark & Curran has been trained on the treebank to perform statistical disambiguation.

WIDE-COVERAGE SEMANTICS

DIFFICULT WORDS AND POS TAGS

849 formulas means (at least) 849 lambda terms

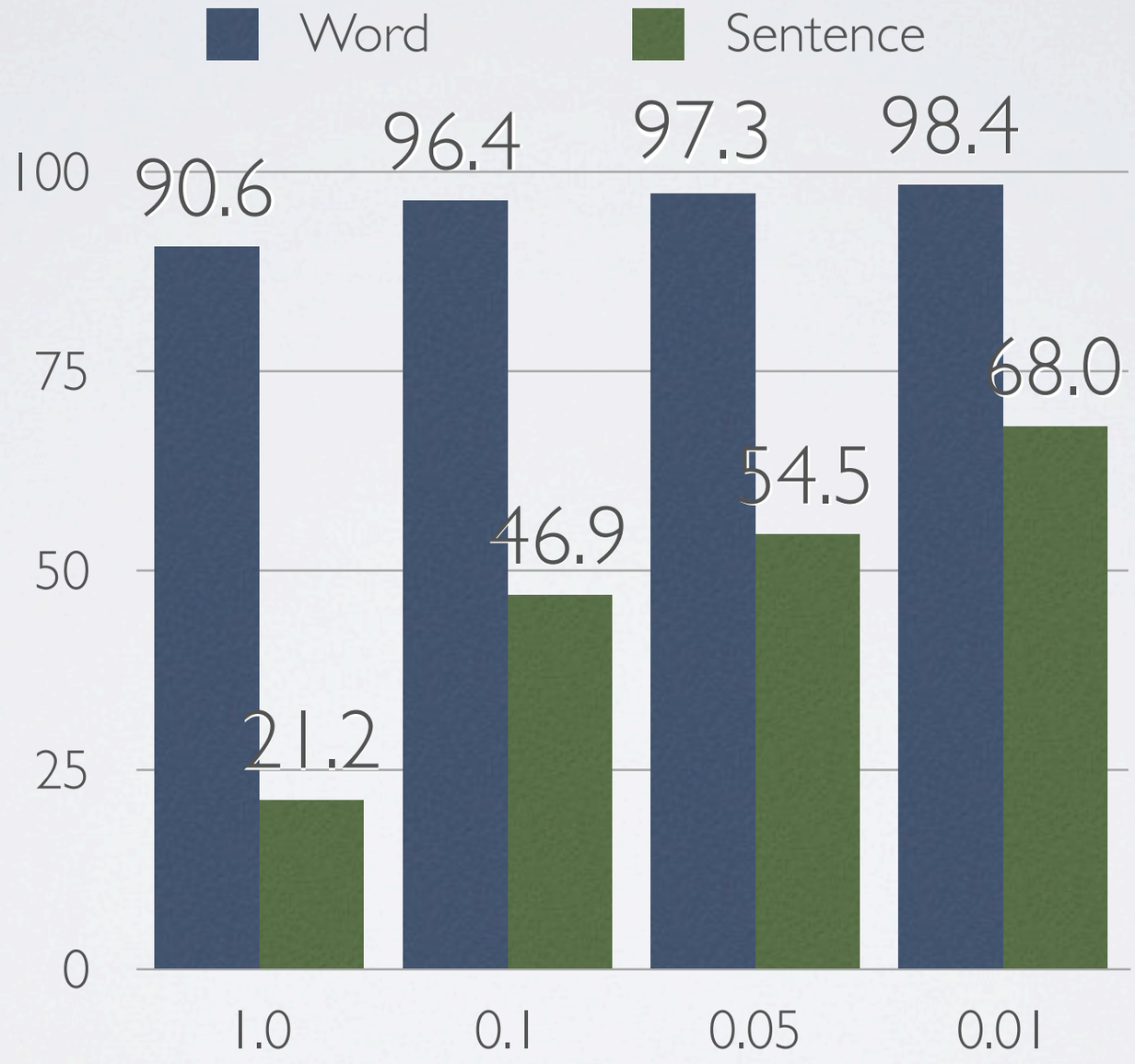
Word	POS	#
et	conj	84
,	ponct	71
à	prp	61
ou	conj	46
plus	adv	44
pour	prp	42
en	prp	41
de	prp	38
est	verb	38

POS	#
adv	136
conj	106
prp	145
ponct	100
verb	149

Sentences: 14132
Words: 412,966
Total formulas: 849
Avg. form/word: 7.22

WIDE-COVERAGE SEMANTICS

SUPERTAGGER PERFORMANCE



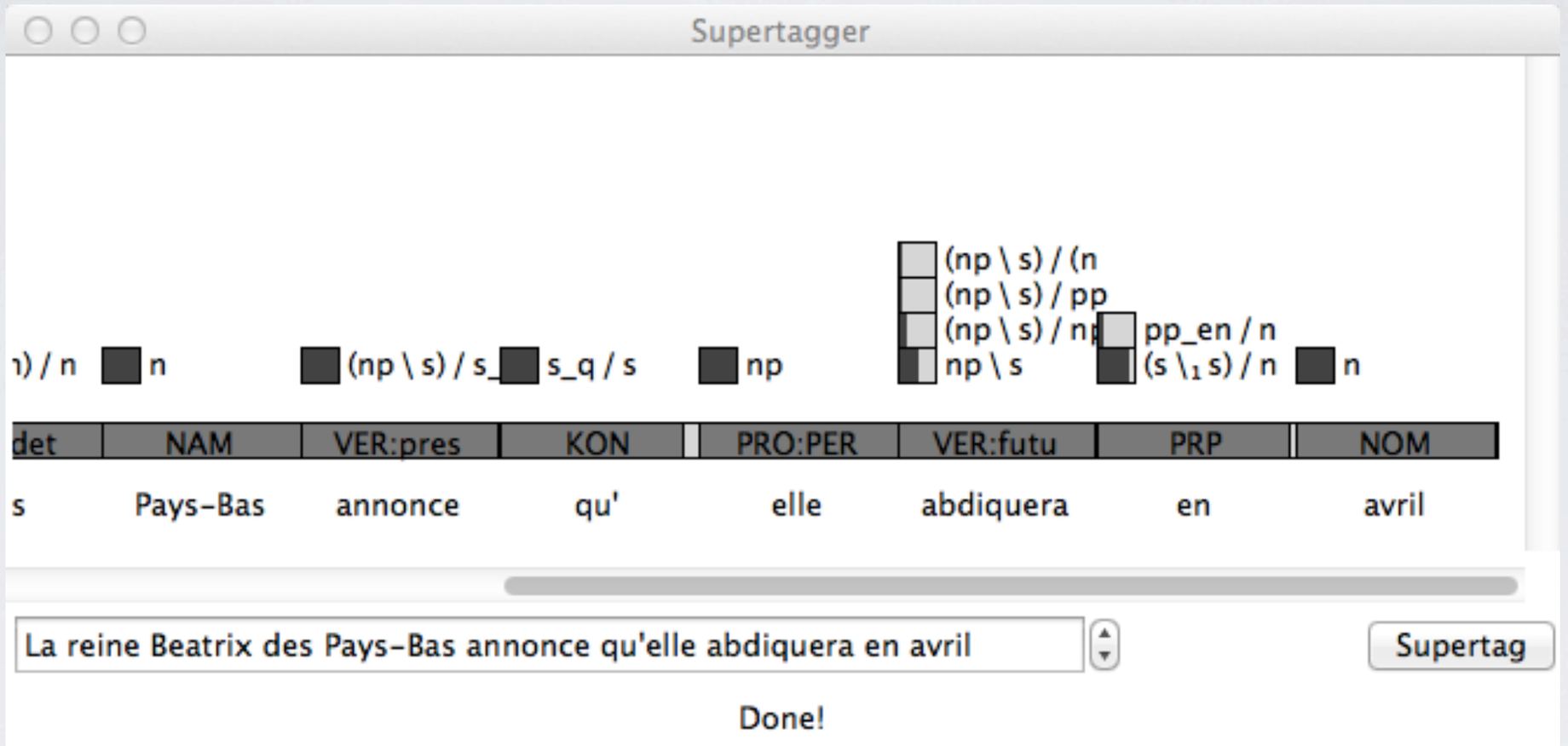
Formulas per word 1.4 1.6 2.3

Grail finds a parse for 87.5% of unknown sentences (tested on 6,838 sentences 152,152 words)

2.3 formulas per word is still a considerable improvement over the 7.2 of the previous slide!

THE GRAIL PARSER

SUPERTAGGER



THE GRAIL PARSER

PARSER OUTPUT

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{}{\text{La} \vdash np/n}\,[Lex] \quad \dfrac{\dfrac{\dfrac{}{\text{reine} \vdash n}\,[Lex] \quad \dfrac{}{\text{Beatrix} \vdash n\backslash n}\,[Lex]}{\text{reine} \circ \text{Beatrix} \vdash n}\,[\backslash E] \quad \dfrac{\dfrac{}{\text{des} \vdash (n\backslash n)/n}\,[Lex] \quad \dfrac{}{\text{Pays-Bas} \vdash n}\,[Lex]}{\text{des} \circ \text{Pays-Bas} \vdash n\backslash n}\,[/E]}{(\text{reine} \circ \text{Beatrix}) \circ (\text{des} \circ \text{Pays-Bas}) \vdash n}\,[\backslash E]}{\text{La} \circ ((\text{reine} \circ \text{Beatrix}) \circ (\text{des} \circ \text{Pays-Bas})) \vdash np}\,[/E] \quad \dfrac{\dfrac{}{\text{annonce} \vdash (np\backslash s_{main})/s_q}\,[Lex] \quad \dfrac{\dfrac{}{\text{qu'} \vdash s_q/s_{main}}\,[Lex] \quad \dfrac{\dfrac{}{\text{elle} \vdash np}\,[Lex] \quad \dfrac{}{\text{abdiquera} \vdash np\backslash s_{main}}\,[Lex]}{\text{elle} \circ \text{abdiquera} \vdash s_{main}}\,[\backslash E]}{\text{qu'} \circ (\text{elle} \circ \text{abdiquera}) \vdash s_q}\,[/E]}{\text{annonce} \circ (\text{qu'} \circ (\text{elle} \circ \text{abdiquera})) \vdash np\backslash s_{main}}\,[\backslash E]}{(\text{La} \circ ((\text{reine} \circ \text{Beatrix}) \circ (\text{des} \circ \text{Pays-Bas}))) \circ (\text{annonce} \circ (\text{qu'} \circ (\text{elle} \circ \text{abdiquera}))) \vdash s_{main}}\,[\backslash E] \quad \dfrac{\dfrac{}{\text{en} \vdash (s_{main}\backslash_1 s_{main})/n}\,[Lex] \quad \dfrac{}{\text{avril} \vdash n}\,[Lex]}{\text{en} \circ \text{avril} \vdash s_{main}\backslash_1 s_{main}}\,[/E]}{((\text{La} \circ ((\text{reine} \circ \text{Beatrix}) \circ (\text{des} \circ \text{Pays-Bas}))) \circ (\text{annonce} \circ (\text{qu'} \circ (\text{elle} \circ \text{abdiquera})))) \circ (\text{en} \circ \text{avril}) \vdash s_{main}}\,[\backslash E]$$

THE GRAIL PARSER

PARSER OUTPUT (ZOOM)

$$\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{\dfrac{}{\text{qu'} \vdash s_q/s_{main}}\,[Lex] \quad \dfrac{\dfrac{\dfrac{}{\text{elle} \vdash np}\,[Lex] \quad \dfrac{}{\text{abdiquera} \vdash np\backslash s_{main}}\,[Lex]}{\text{elle} \circ \text{abdiquera} \vdash s_{main}}\,[\backslash E]}{\text{qu'} \circ (\text{elle} \circ \text{abdiquera}) \vdash s_q}\,[/E] \quad \dfrac{}{\text{annonce} \vdash (np\backslash s_{main})/s_q}\,[Lex]}{\text{annonce} \circ (\text{qu'} \circ (\text{elle} \circ \text{abdiquera})) \vdash np\backslash s_{main}}\,[\backslash E]}{\text{le} \circ \text{Beatrix}) \circ (\text{des} \circ \text{Pays-Bas}))) \circ (\text{annonce} \circ (\text{qu'} \circ (\text{elle} \circ \text{abdiquera})))) \circ (\text{en} \circ \text{avril}) \vdash s_{main}}\,[\backslash E] \quad \dfrac{\dfrac{}{\text{en} \vdash (s_{main}\backslash_1 s_{main})/n}\,[Lex] \quad \dfrac{}{\text{avril} \vdash n}\,[Lex]}{\text{en} \circ \text{avril} \vdash s_{main}\backslash_1 s_{main}}\,[/E]$$

THE GRAIL PARSER

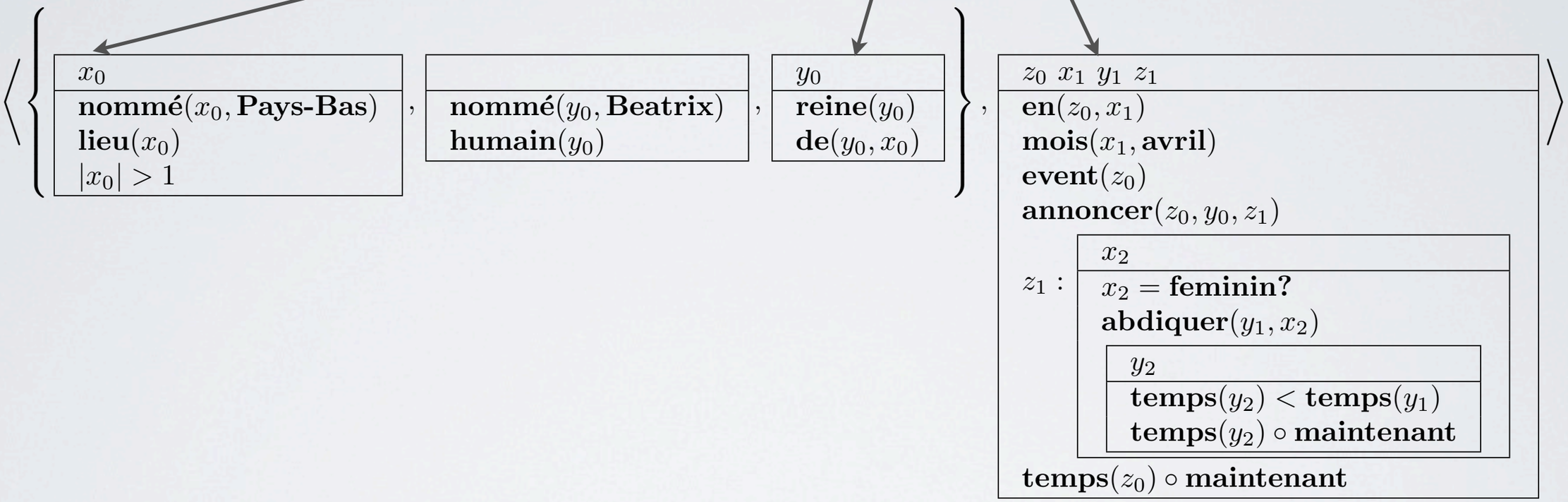
DRT SEMANTICS

$$\left\langle \left\{ \begin{array}{|l|}\hline x_0 \\ \hline \textbf{nommé}(x_0, \textbf{Pays-Bas}) \\ \textbf{lieu}(x_0) \\ |x_0| > 1 \\ \hline \end{array} , \begin{array}{|l|}\hline \\ \hline \textbf{nommé}(y_0, \textbf{Beatrix}) \\ \textbf{humain}(y_0) \\ \hline \end{array} , \begin{array}{|l|}\hline y_0 \\ \hline \textbf{reine}(y_0) \\ \textbf{de}(y_0, x_0) \\ \hline \end{array} \right\}, \begin{array}{|l|}\hline z_0\ x_1\ y_1\ z_1 \\ \hline \textbf{en}(z_0, x_1) \\ \textbf{mois}(x_1, \textbf{avril}) \\ \textbf{event}(z_0) \\ \textbf{annoncer}(z_0, y_0, z_1) \\ z_1 : \begin{array}{|l|}\hline x_2 \\ \hline x_2 = \textbf{feminin?} \\ \textbf{abdiquer}(y_1, x_2) \\ \begin{array}{|l|}\hline y_2 \\ \hline \textbf{temps}(y_2) < \textbf{temps}(y_1) \\ \textbf{temps}(y_2) \circ \textbf{maintenant} \\ \hline \end{array} \\ \hline \end{array} \\ \textbf{temps}(z_0) \circ \textbf{maintenant} \\ \hline \end{array} \right\rangle$$

THE GRAIL PARSER

DRT SEMANTICS

existentially quantified variables



THE GRAIL PARSER

DRT SEMANTICS

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presuppositions
(more on this later!)

THE GRAIL PARSER

DRT SEMANTICS

$$\left\langle \left\{ \begin{array}{|l|}\hline x_0 \\ \hline \textbf{nommé}(x_0, \textbf{Pays-Bas}) \\ \textbf{lieu}(x_0) \\ |x_0| > 1 \\ \hline \end{array} , \begin{array}{|l|}\hline \\ \hline \textbf{nommé}(y_0, \textbf{Beatrix}) \\ \textbf{humain}(y_0) \\ \hline \end{array} , \begin{array}{|l|}\hline y_0 \\ \hline \textbf{reine}(y_0) \\ \textbf{de}(y_0, x_0) \\ \hline \end{array} \right\}, \begin{array}{|l|}\hline z_0\ x_1\ y_1\ z_1 \\ \hline \textbf{en}(z_0, x_1) \\ \textbf{mois}(x_1, \textbf{avril}) \\ \textbf{event}(z_0) \\ \textbf{annoncer}(z_0, y_0, z_1) \\ z_1 : \begin{array}{|l|}\hline x_2 \\ \hline x_2 = \textbf{feminin?} \\ \textbf{abdiquer}(y_1, x_2) \\ \begin{array}{|l|}\hline y_2 \\ \hline \textbf{temps}(y_2) < \textbf{temps}(y_1) \\ \textbf{temps}(y_2) \circ \textbf{maintenant} \\ \hline \end{array} \\ \hline \end{array} \\ \textbf{temps}(z_0) \circ \textbf{maintenant} \\ \hline \end{array} \right\rangle$$

embedded DRS

THE GRAIL PARSER

DRT SEMANTICS

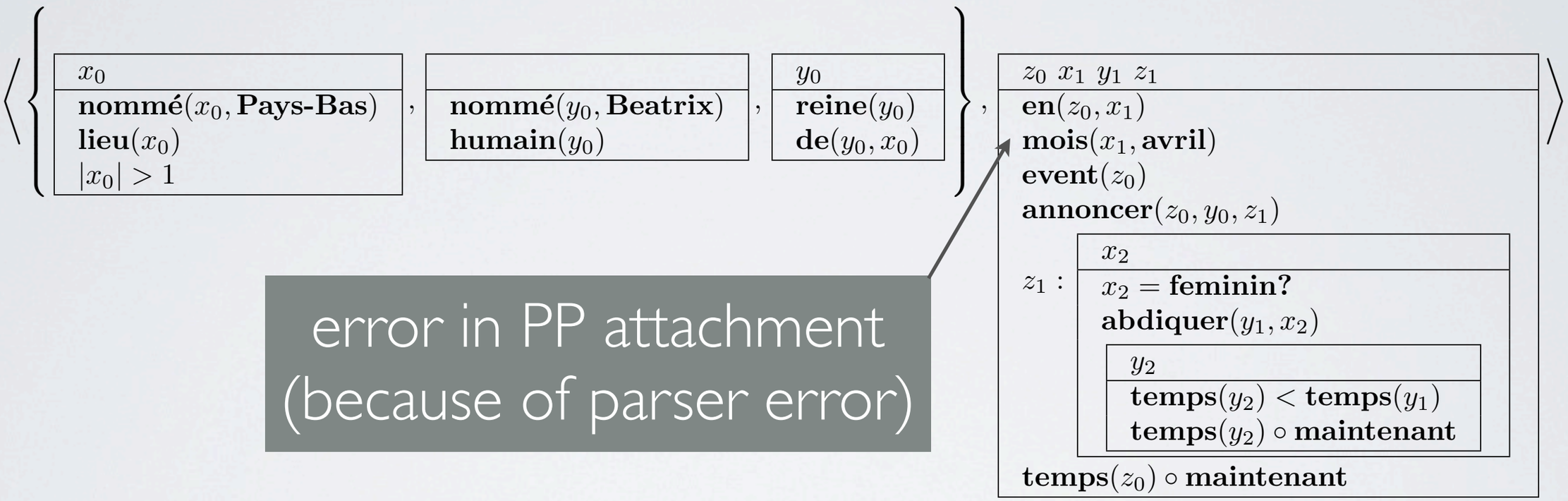
$$\left\langle \left\{ \boxed{\begin{array}{|l} x_0 \\ \hline \textbf{nommé}(x_0, \textbf{Pays-Bas}) \\ \textbf{lieu}(x_0) \\ |x_0| > 1 \end{array}}, \boxed{\begin{array}{|l} \\ \hline \textbf{nommé}(y_0, \textbf{Beatrix}) \\ \textbf{humain}(y_0) \end{array}}, \boxed{\begin{array}{|l} y_0 \\ \hline \textbf{reine}(y_0) \\ \textbf{de}(y_0, x_0) \end{array}} \right\}, \boxed{\begin{array}{|l} z_0\ x_1\ y_1\ z_1 \\ \hline \textbf{en}(z_0, x_1) \\ \textbf{mois}(x_1, \textbf{avril}) \\ \textbf{event}(z_0) \\ \textbf{annoncer}(z_0, y_0, z_1) \\ z_1 : \boxed{\begin{array}{|l} x_2 \\ \hline x_2 = \textbf{feminin?} \\ \textbf{abdiquer}(y_1, x_2) \\ \boxed{\begin{array}{|l} y_2 \\ \hline \textbf{temps}(y_2) < \textbf{temps}(y_1) \\ \textbf{temps}(y_2) \circ \textbf{maintenant} \end{array}} \end{array}} \\ \textbf{temps}(z_0) \circ \textbf{maintenant} \end{array}} \right\rangle$$

unresolved anaphor corresponding to “elle”

the verb “abdiquer” has kings and queens as subject, so x2 = y0 would be the obvious resolution. Lexical resources (JeuxDeMots or vector spaces, Mathieu’s talk and Tim’s talk respectively) would help with this

THE GRAIL PARSER

DRT SEMANTICS

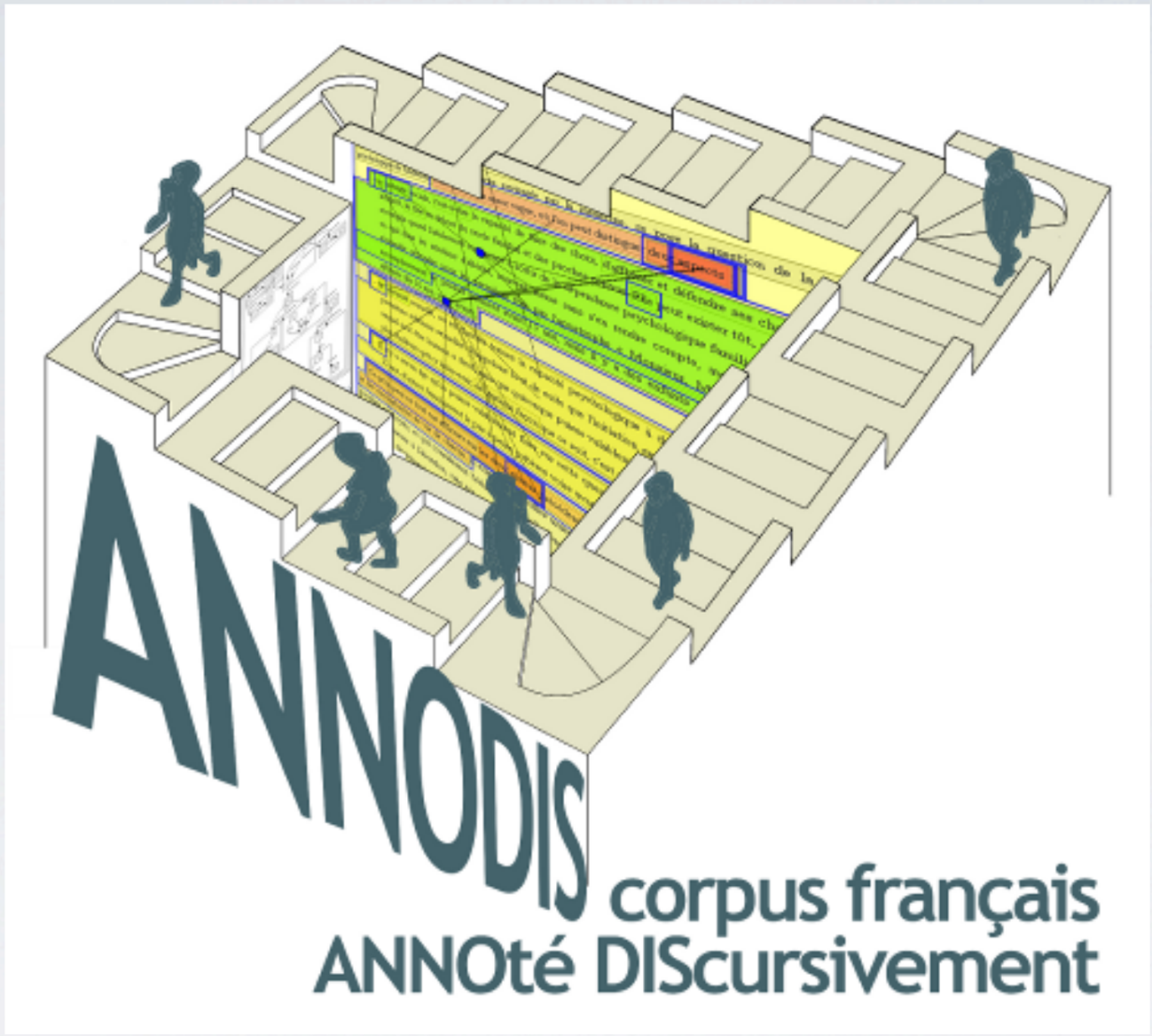


error in PP attachment
(because of parser error)

WIDE-COVERAGE SEMANTICS GOING FURTHER

- How can we extend the treatment of semantics to increase the level of detail?
- By finding ways of exploiting the available French language resources
- I will sketch two possible extensions which I think are promising.

1. Temporal ordering, using ANNODIS and the French Timebank
2. A more detailed treatment of presuppositions using the JeuxDesMots network



TEMPORAL ORDERING

USING TENSE AND DISCOURSE STRUCTURE TO INFER THE TIMELINE OF THE EVENTS IN DISCOURSE

TENSE, TIME AND DISCOURSE

- In and of itself, tense provides only limited information: for example, the past tense doesn't say much more than that an event or state started in the past

- Inferring the temporal order between events is a difficult task: Mani & Schiffman (2003) report 60% inter-annotator agreement (using five relations)

- As is well-known, discourse structure plays an important role (see Asher & Lascarides 2003).

1. Max fell. John pushed him.

ANNODIS EXAMPLE

242. La Commission nationale sur les attaques terroristes contre les États-Unis a été créée en 2002

243. pour expliquer comment ces attentats ont pu se produire

244. et pour éviter que cela ne se reproduise.

245. Dans son rapport publié fin août 2004,

246. elle établit la responsabilité du réseau Al-Qaida,

247. en affirmant

248. que les dix-neuf pirates de l'air impliqués dans ces attentats-suicides en étaient membres

249. et que le commanditaire en était Oussama Ben Laden.

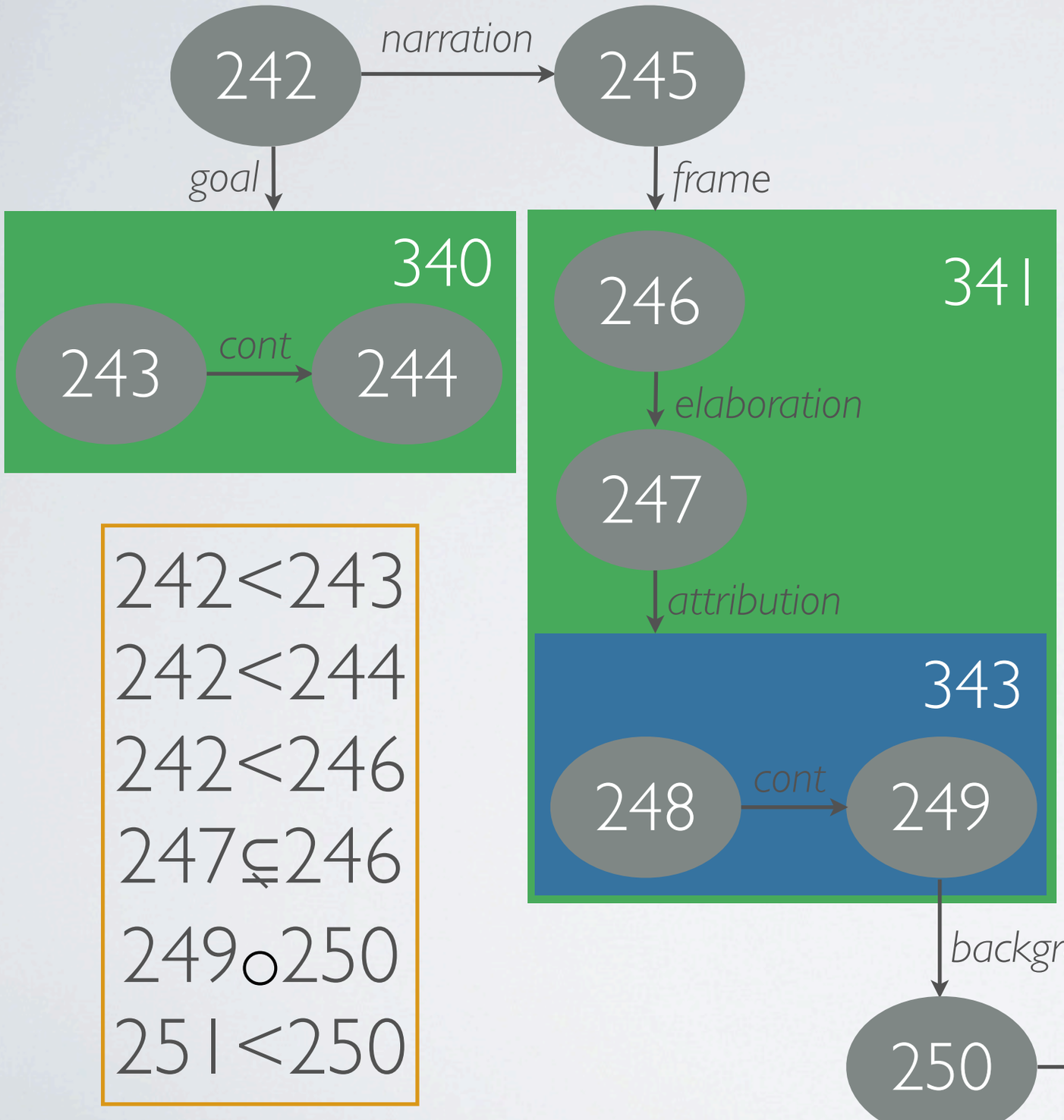
250. Ce dernier s'est félicité de ces attaques dans des vidéos diffusées en novembre et décembre 2001.

242. Oussama Ben Laden avait été désigné comme responsable le plus probable par les autorités américaines dès le soir du 11 septembre.

DISCOURSE STRUCTURE

242: la commission (...) a été créée
243: pour expliquer comment (...)
244: et pour éviter que (...)
245: dans son rapport
246: elle établit la resp. du (...) Al Qaeda
247: en affirmant
248: que les 19 pirates en étaient membres
249: que [son comm.] était (...) Ben Laden
250: ce dernier s'est félicité (...)
251: Ben Laden avait été désigné comme resp.

DISCOURSE STRUCTURE



242: la commission (...) a été créée
243: pour expliquer comment (...)
244: et pour éviter que (...)
245: dans son rapport
246: elle établit la resp. du (...) Al Qaeda
247: en affirmant
248: que les 19 pirates en étaient membres
249: que [son comm.] était (...) Ben Laden
250: ce dernier s'est félicité (...)
251: Ben Laden avait été désigné comme resp.

242<243
242<244
242<246
247⊆246
249∘250
251<250

COMPUTING DISCOURSE STRUCTURE, COMPUTING TEMPORAL ORDERING

- Some interesting preliminary work on automatically assigning discourse structure has been done by Baldridge & Lascarides (though only at 43.2% labeled relations versus 50.3% inter-annotator agreement)

- It would be interesting to compute temporal ordering (combining the information from temporal adverbials, tense and discourse relation, both gold and automatically computed) and compare this with the annotation of the French timebank.

- That is, confront (1) Annodis+Grail+... and (2) Grail+discourse annotation +... with the French timebank.

- Alternatively, we can use a "blackboard" -style strategy with tense, adverbs and discourse structure mutually constraining eachother.

PRESUPPOSITION

USING LEXICAL INFORMATION FOR PRESUPPOSITION BINDING AND BRIDGING INFERENCES

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

SOME PROTOTYPICAL EXAMPLES

1. [Factive verbs] We regret to inform you that your paper has not been accepted.

   ➡Your paper has not been accepted

2. [Definite descriptions] The President of Somalia Hassan Sheikh Mohamud is to begin ...

   ➡Somalia has a president

3. It is fortunate that no incident has occurred.

   ➡No incident has occurred

4. Others: know, begin/stop, it-clefts, too

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

Note however, that this diagnostic is rather approximate, since it follows that if C is a tautology then all sentences A will presuppose C.

$$\frac{\Gamma, A \vdash C \quad \Gamma, \neg A \vdash C}{\Gamma \vdash C}$$

If statement A allows us to infer C (in context/common ground Γ) and statement ¬A allows us to infer C as well (in the same context Γ), then C follows from the context/ common ground.

This is of course just the cut rule! However, in a dialogue we are often unsure about the exact content of Γ

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

$$\frac{\Gamma, A \vdash C \quad \Gamma, \neg A \vdash C}{\Gamma \vdash C}$$

Example:
A = Fred regrets kissing Betty
¬A= Fred doesn't regret kissing Betty
C = Fred kissed Betty

PRESUPPOSITION

- As with many things, the intuitions for the basic phenomena are very clear, but other issues are (and have been) hotly debated,

- Part of the difficulty lies with the fact the presuppositions allow inferences which are preserved intact even in the scope of negation.

- Varied set of both lexical and syntactic triggers.

PRESUPPOSITION

BINDING

1. An irishman and a scotsman walk into a bar.

2. The irishman orders a whisky.

The irishman = An irishman

ACCOMMODATION

3. An irishman and a scotsman walk into a bar.

4. The bartender asks: "is this some kind of joke?"

This is already a form of bridging, more on this later!

The bartender is someone different from both the irishman and the scotsman (ie. there are 3 people in the story as opposed to 2 for the first version)

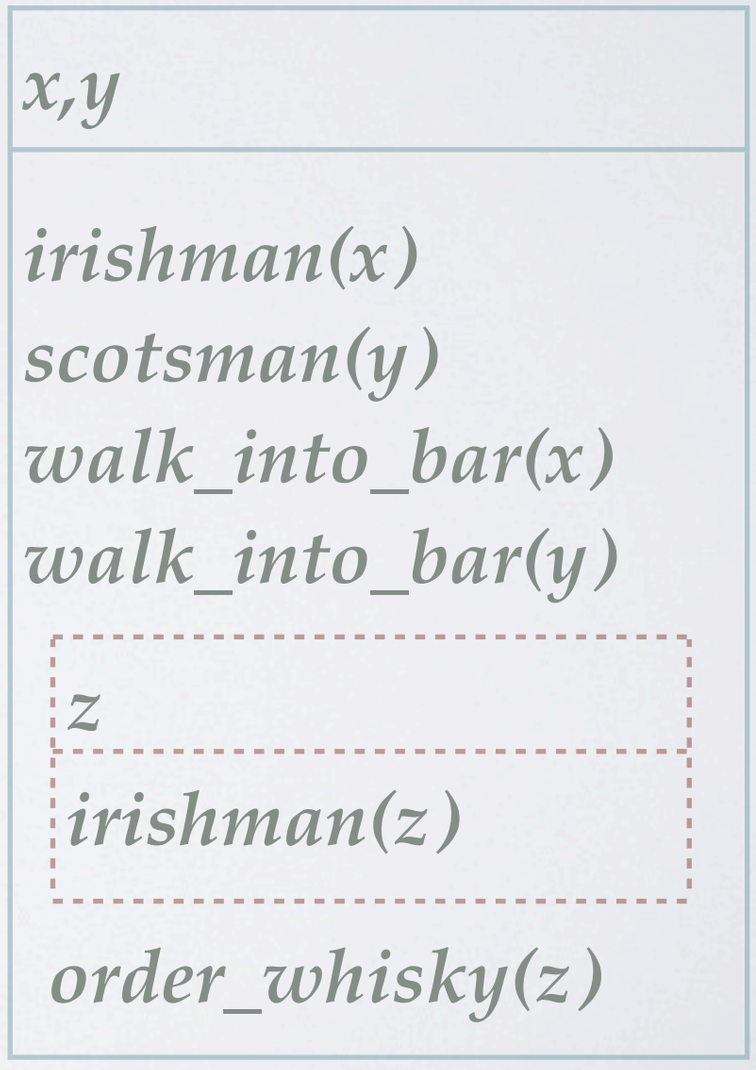
Accommodation uses a form of hard-to-formalize "normalness" or "typicality"

PRESUPPOSITION

BINDING

1. An irishman and a scotsman walk into a bar.

2. The irishman orders a whisky.



PRESUPPOSITION

BINDING

1. An irishman and a scotsman walk into a bar.

2. The irishman orders a whisky.

x,y,z
irishman(x) *scotsman(y)* *walk_into_bar(x)* *walk_into_bar(y)* *z=x* *irishman(z)* *order_whisky(z)*

PRESUPPOSITION

BINDING

1. An irishman and a scotsman walk into a bar.

2. The irishman orders a whisky.

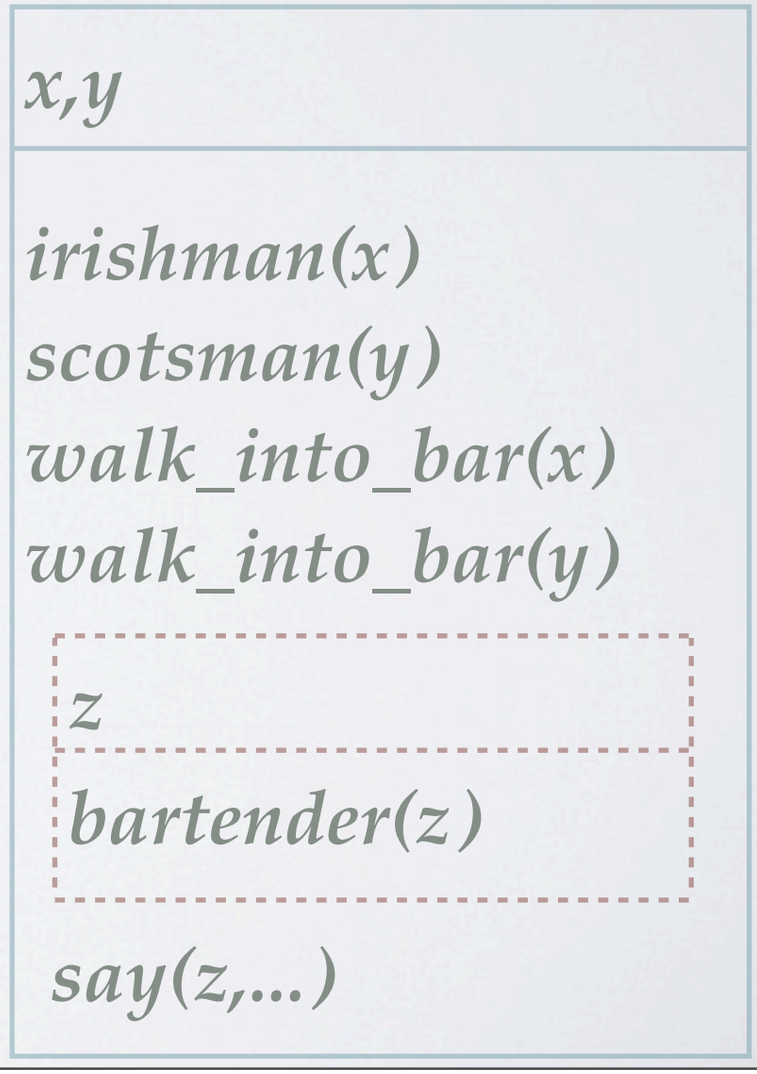
x,y
irishman(x) *scotsman(y)* *walk_into_bar(x)* *walk_into_bar(y)* *order_whisky(x)*

PRESUPPOSITION

ACCOMMODATION

3. An irishman and a scotsman walk into a bar.

4. The bartender asks: "is this some kind of joke?"



PRESUPPOSITION

ACCOMMODATION

3. An irishman and a scotsman walk into a bar.

4. The bartender asks: "is this some kind of joke?"

x,y,z
irishman(x) *scotsman(y)* *walk_into_bar(x)* *walk_into_bar(y)* *bartender(z)* *say(z,...)*

PRESUPPOSITION

ACCOMMODATION

Accommodation is easier for "normal" things

1. I'm sorry I'm late, my car broke down
2. #I'm sorry I'm late, my tank/fire engine/chariot broke down
3. My daughter/the president/the hospital

How do we decide what's normal?

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

PROJECTION

Following Geurts (1999)

- Let s[p] be a sentence containing a potential presupposition p, then sentences of the following form all normally imply that p

1. not s[p]

2. it is possible that s[p]

3.John believes that s[p]

4.if s[p] then t

5.either s[p] or t

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

PROJECTION

- Let s[p] be a sentence containing a potential presupposition p, then sentences of the following form all normally imply that p

1. Fred doesn't regret kissing Betty.

2. It is possible that Fred regrets kissing Betty.

3. John believes that Fred regrets kissing Betty.

4. If Fred regrets kissing Betty, then she does too.

5. Either Fred regrets kissing Betty or he is unrepentant.

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

CANCELLATION/DENIAL

- Let s[p] be a sentence containing a potential presupposition p, then sentences of the following form do *not* imply that p

  1. if p then s[p]

  2. it is possible that p and s[p]

  3.either not p or s[p]

- Finally, there are special, marked constructions of the schemata of the previous slide which do not imply that p.

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

CANCELLATION/DENIAL

- Let s[p] be a sentence containing a potential presupposition p, then sentences of the following form do *not* imply that p

1. If Fred kissed Betty then he regrets kissing Betty.

2. It is possible that Fred kissed Betty and that he regrets kissing her.

3. Either Fred didn't kiss Betty or he regrets kissing her.

- Finally, there are special, marked constructions of the projection schemata of the previous slide which do *not* imply that p.

4. Fred didn't kiss Betty and therefore he doesn't regret kissing her either.

WHAT ARE PRESUPPOSITIONS AND HOW DO WE RECOGNIZE THEM?

CANCELLATION/DENIAL

- Note: according to these tests, types and appositives are *not* presuppositions, but form a weaker class of projective meanings.

1. Stephen, who is a well-known author, lives in Maine.

CONDITIONS

See eg. Beaver (2001 Section 5.2)

CONSTRAINTS

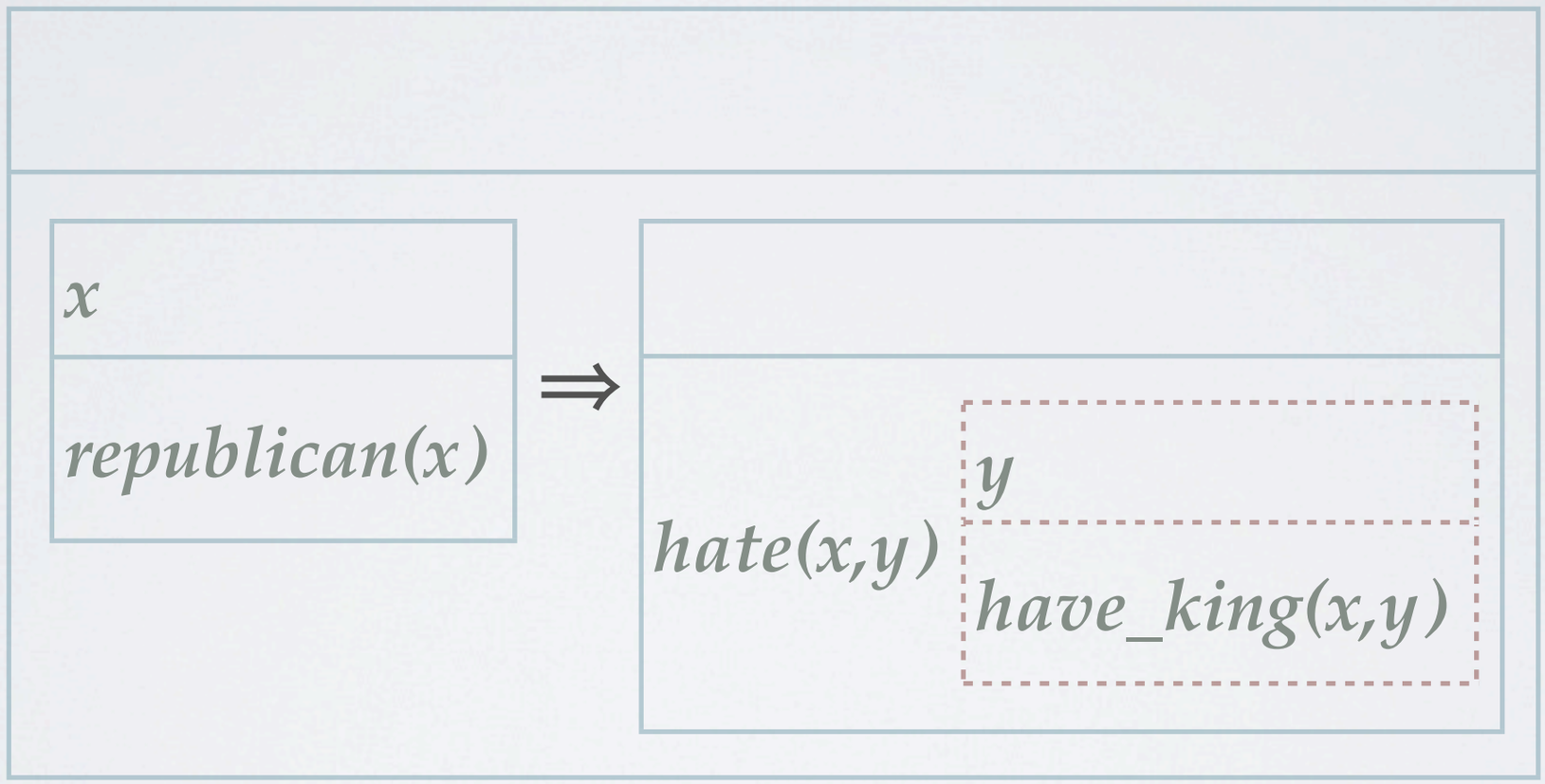
- Trapping
- Update informativity
- Local informativity
- Consistency

PREFERENCES

- Prefer binding to accommodation
- Prefer local binding
- Prefer global accommodation

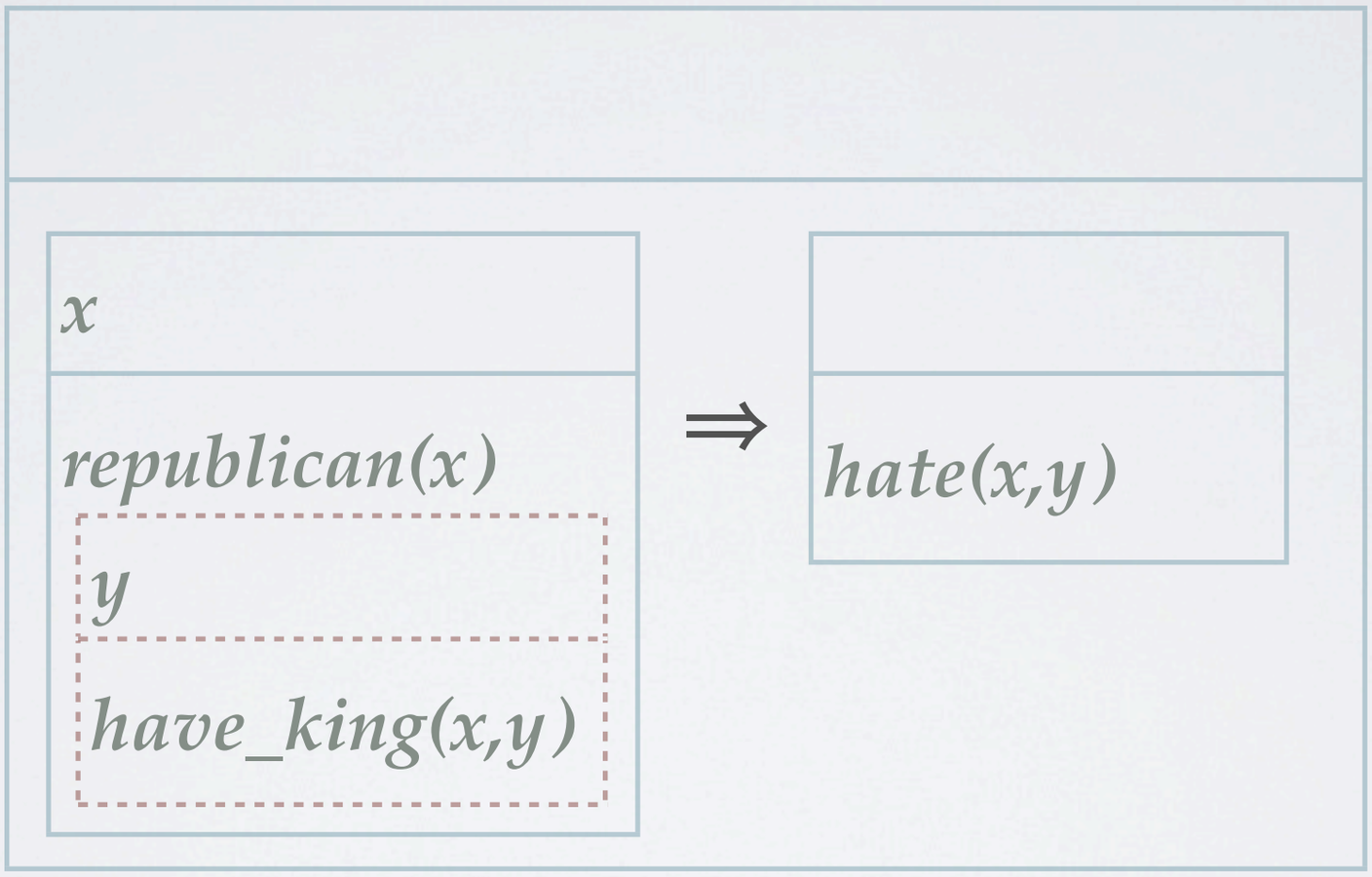
TRAPPING

Every republican hates his king.



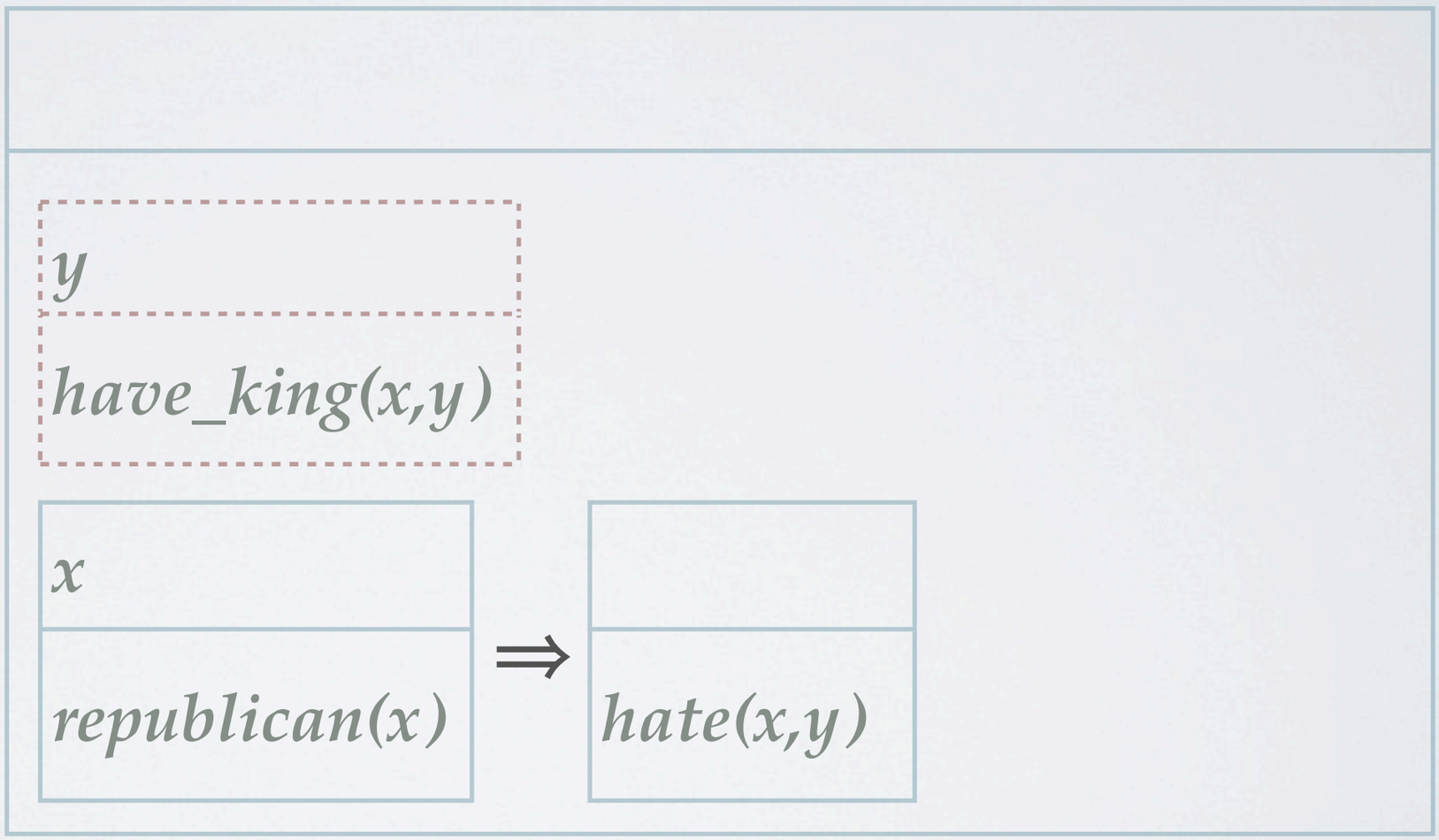
TRAPPING

Every republican hates his king.



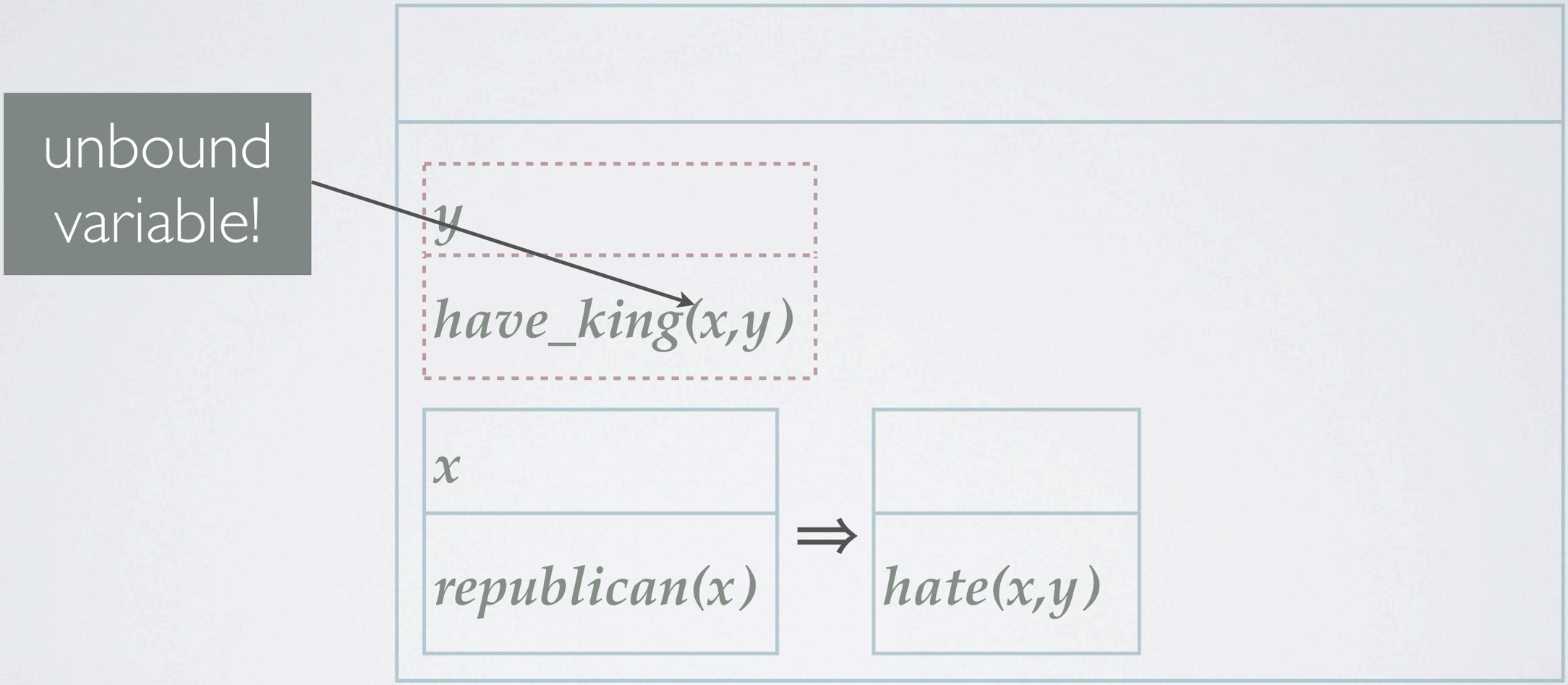
TRAPPING

Every republican hates his king.



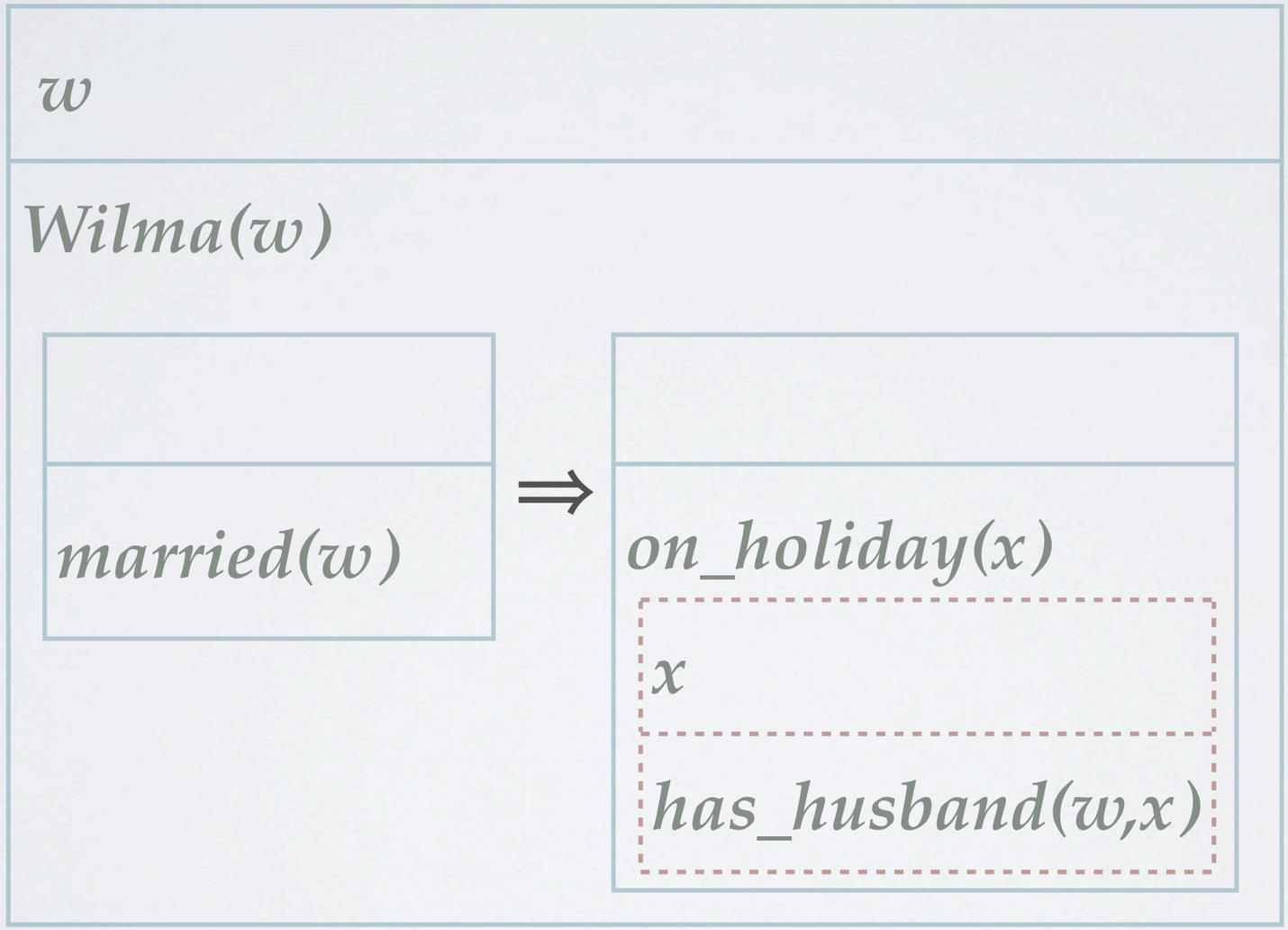
TRAPPING

Every republican hates his king.



INFORMATIVITY

If Wilma is married, then her husband is on holiday.



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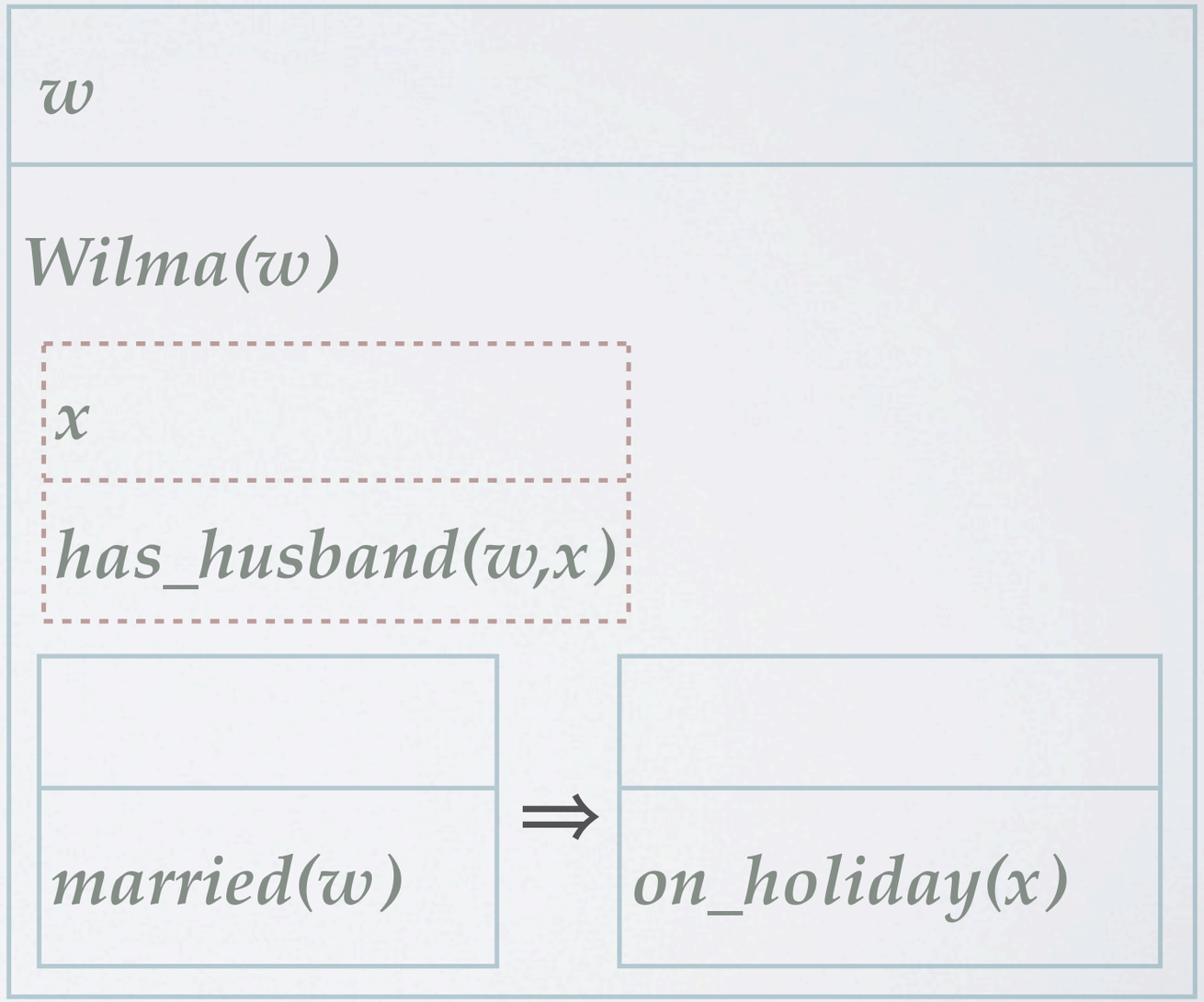

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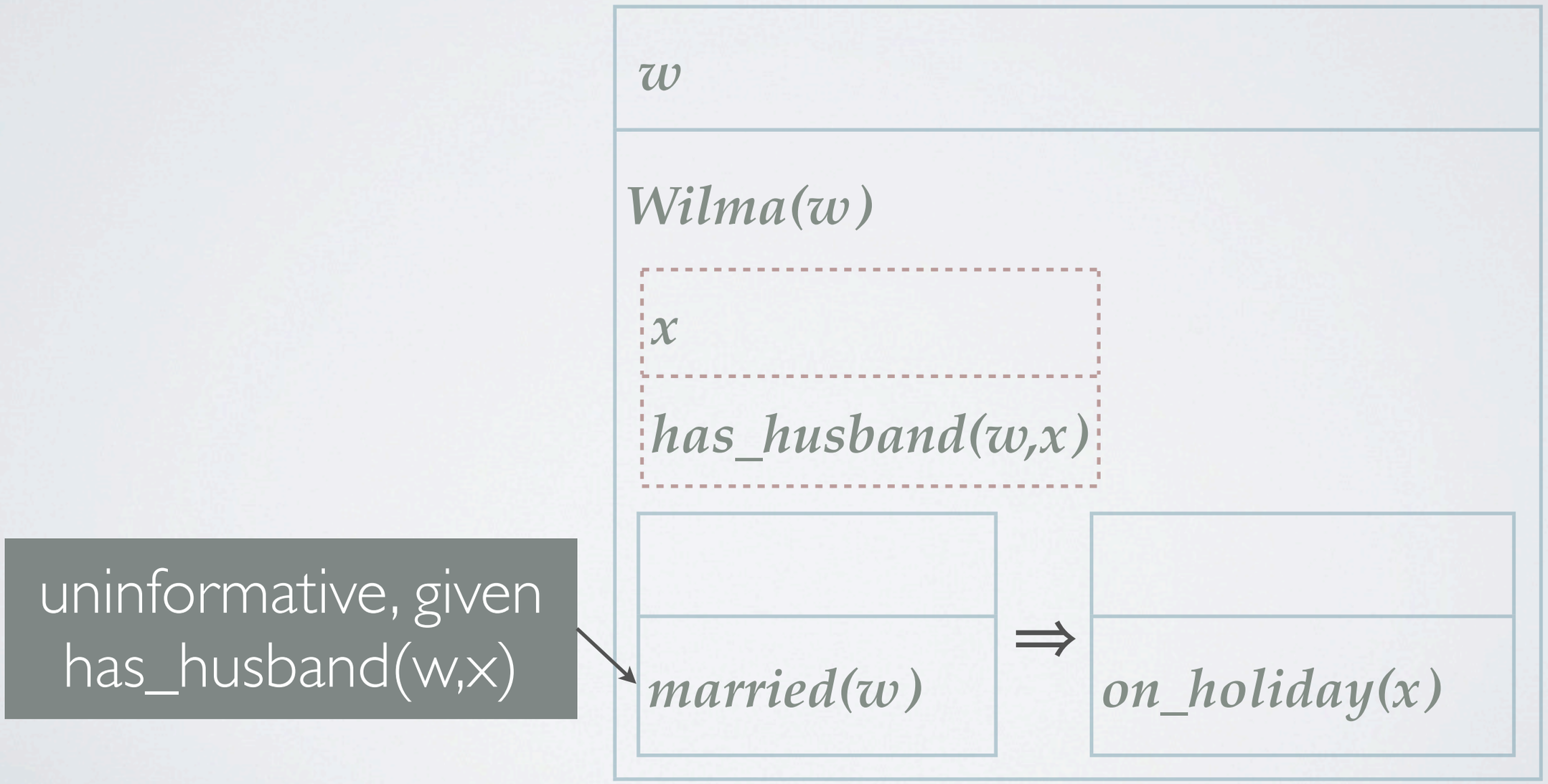
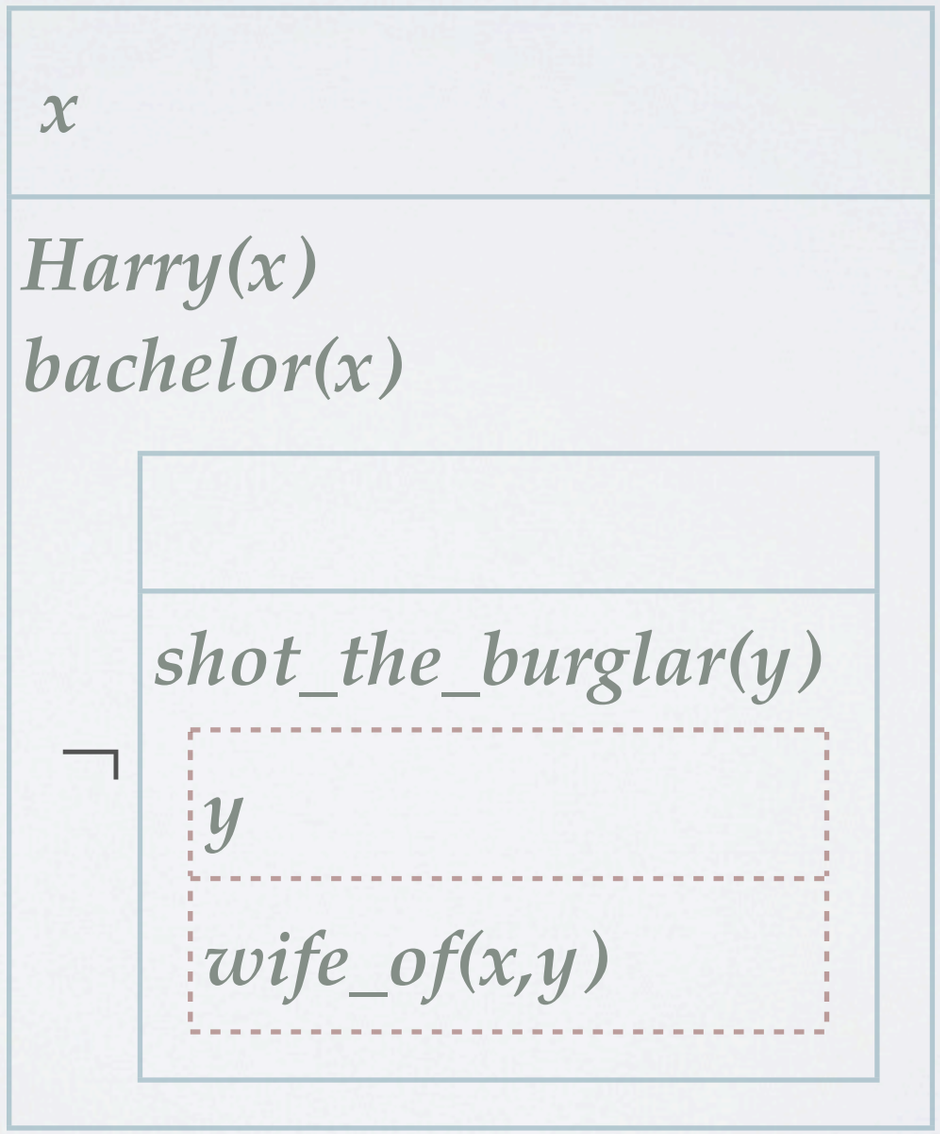


CONSISTENCY

Harry is a bachelor, so it wasn't Harry's wife who shot the burglar.



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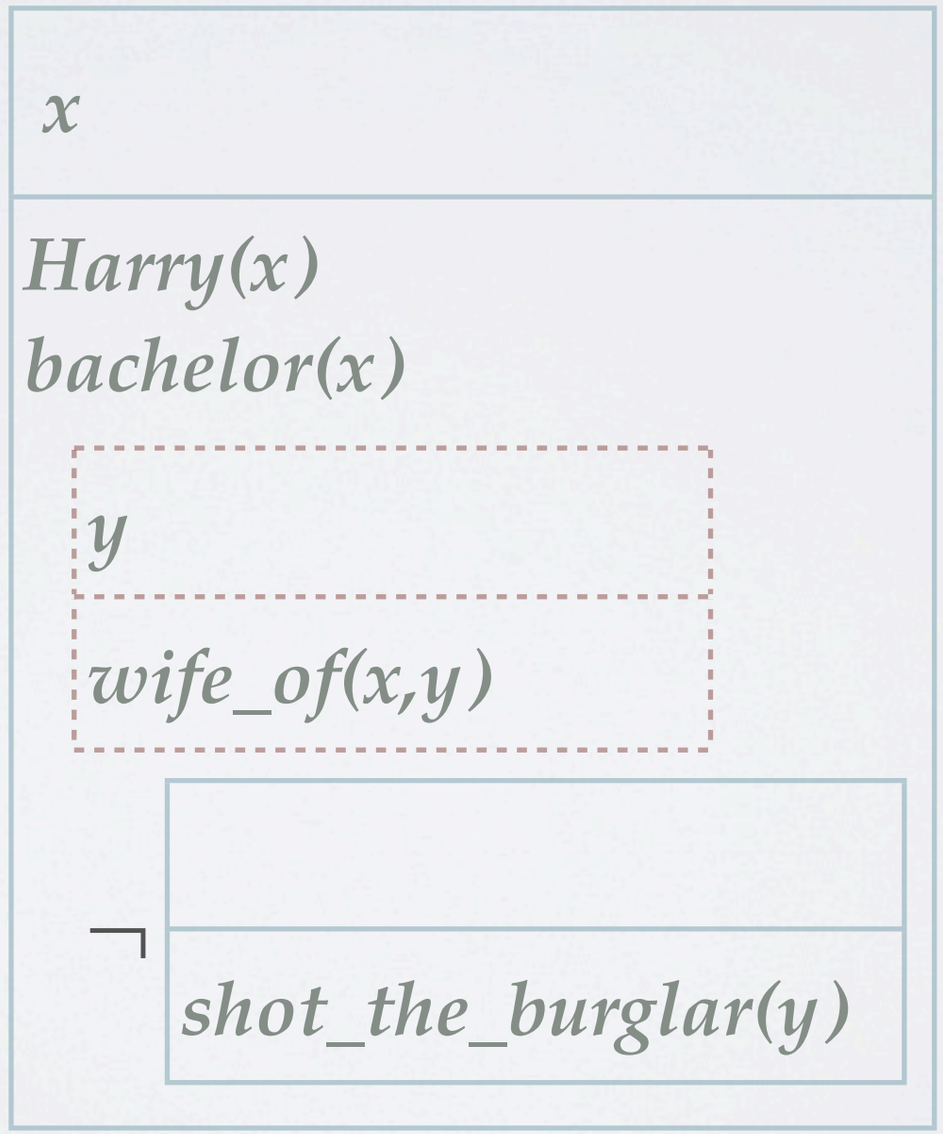
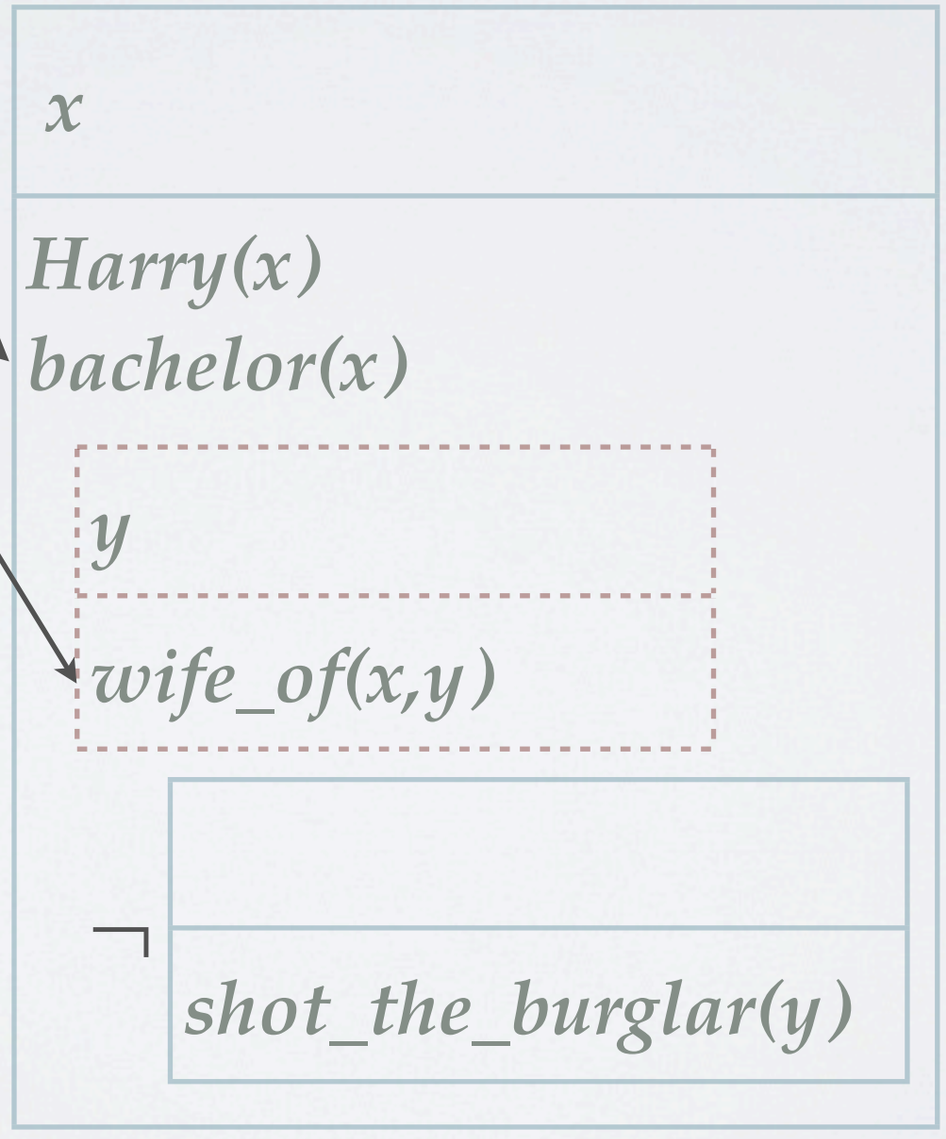


CONSISTENCY

Harry is a bachelor, so it wasn't Harry's wife who shot the burglar.

inconsistent!



SOME GOOD PROPERTIES OF NIJMEGEN-STYLE PRESUPPOSITIONS

1. Since proper names are presupposed, the DRT stipulation that names are always introduced at the highest DRS is now a consequence of the theory of presuppositions.

2. Anaphora resolution is a special case of presupposition binding (accommodation is restricted for anaphora)

3. Among the theories to account for the largest amount of presupposition data.

HOW LEXICAL AND CORPUS-BASED RESOURCES CAN HELP

1. Selection restrictions can be a very useful factor in choosing among possible antecedents for an anaphor (eg. abdicate-king/queen).

2. The *synonym/antonym/hypernym/isa* relations are useful for resolving binding and implementing the informativity and consistency constraints.

3. The *association, place* and *part_of* relation can help identify at least some of the "normal" associated ideas.

4. The idea is to replace (at least some) theorem-proving in higher order logic by graph search (of limited weight/path distance); what we get is both something *weaker* (eg. married-wife, bartender-bar are just marked as associated) and something *stronger* than deduction (since it includes typical relations, eg. picknick-beer).

For the bartender, we also have that a bar is a typical place for him, which is a useful script-like factoid

BRIDGING

1. John read a book about Schubert and wrote to the author.

➡ the author of the book about Schubert

2. John became a guitarist because he thought it was a beautiful instrument.

➡ the guitar

3. If John buys a car, he checks the motor first.

➡ the motor of the car

BRIDGING

1. If Harry has fallen into a depression again, his therapist will have a hard time getting him out of it.

2. If I go to a wedding, then the rabbi will get drunk.

3. Jane sat in the car. She adjusted the rear-view mirror.

4. If David scuba dives, he'll bring his regulator.

5. If Wilma is married then her husband in on holiday.

6. A man enters a bar. The bartender is cleaning the glasses.

BRIDGING

1. Alex went to a party last night. He is going to get drunk again tonight.

➡ Party-drunk

2. Mary got some picnic supplies out of the car. The beer was warm.

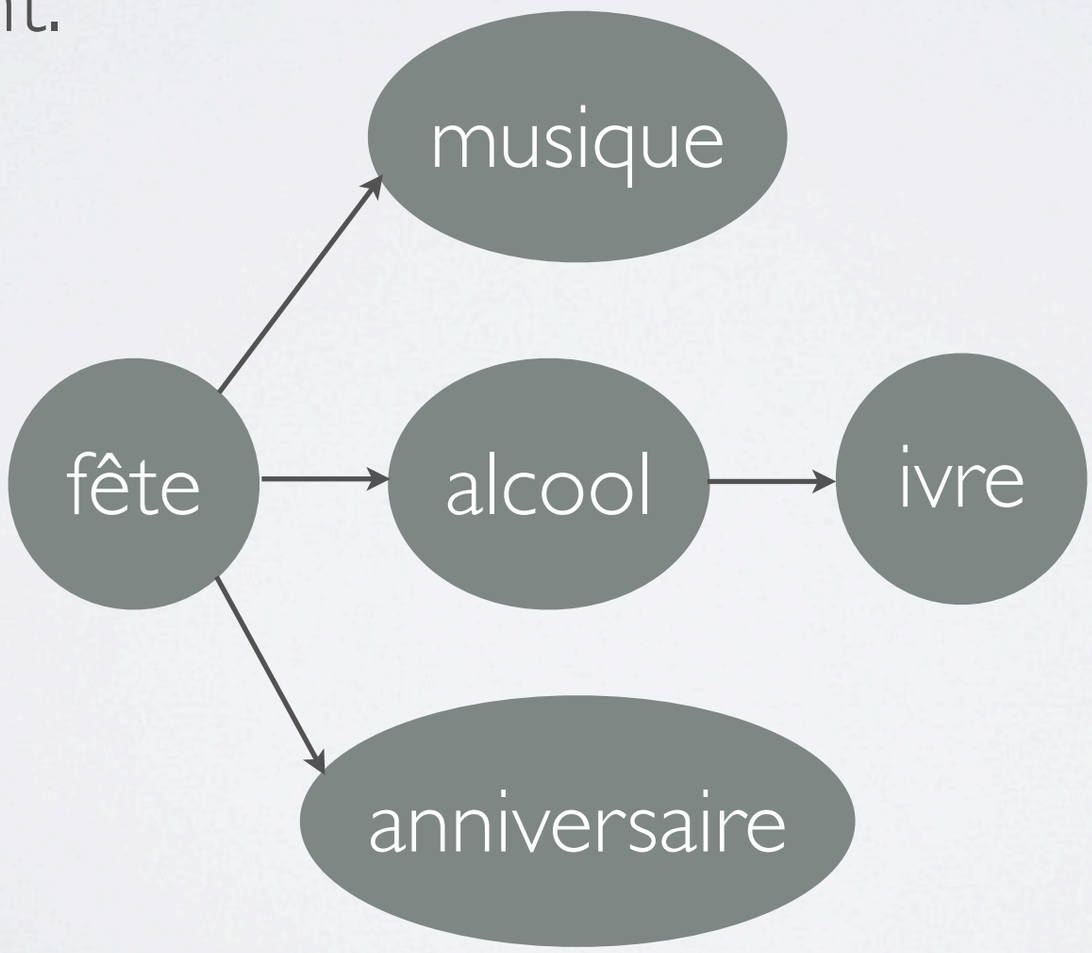
➡ Picnic supplies-beer

3. If John buys a car, he checks the motor first.

➡ the motor of the car (since part_of(car,motor))

BRIDGING

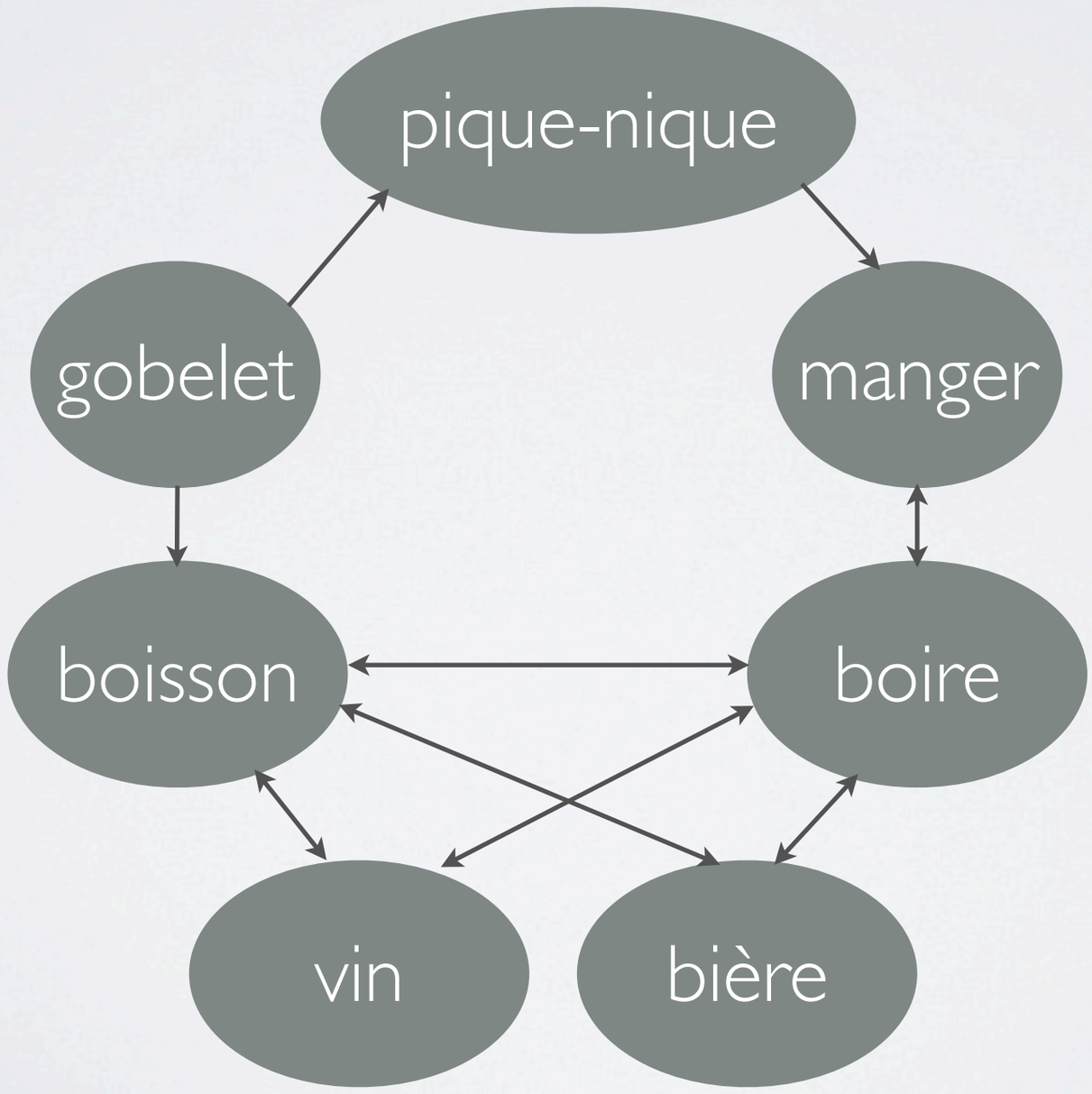
1. Alex went to a party last night. He is going to get drunk again tonight.



Note: only the strongest connections are shown

BRIDGING

2. Mary got some picnic supplies out of the car. The beer was warm.



Two steps from a "cluster" (in the sense of Bruno's talk, where most, as opposed to all, nodes are interconnected) containing drinks, including beer and wine by the association relation.

Alternatively, a picknick is indicated as has_part(picknick,wine), which gets us straight to the "drinks" cluster.

CONCLUSIONS

- I have sketched two possible ways of using publicly available resources to extend the coverage and level of detail of wide-coverage for French.

- Many things remain to be implemented, experimented with and verified, but the Polymnie project is still young!