A Formal Semantics of the Final Rise

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Observations

Are you asking me or telling me?

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(1) Sheldon: What's the sixth noble gas?

Leonard: Uh, RADON.
H* LH%

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I am presenting a formal semantics of the final rise in English

- that is underspecified to account for the range of observed phenomena.
- that is resolved in context.

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a. B: I'm a MILLIONAIRE. ⇝ *'Yes, a millionaire.'*
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- There is a difference in B's public commitments.

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c.' A: Okay, good. / Where is that?

The Final Rise

We model incompleteness as follows:

- A final rise utterance demands a follow-up to resolve the incompleteness.
- Permissible follow-ups are underspecified.
- Usually, question force is assumed.
- Additionally, the speaker displays an uncertain attitude, prompting a need for resolution.

$\Rightarrow$ Incompleteness demands to be resolved, but resolution is negotiated online.

Follow-ups

(5) A: What did you do today?

B: I sat in on a history class.
LH%

B: I learned about housing prices.
LH%

B: And I watched a cool documentary.
LL%

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- Final Rise: *'I am not done.'*

Uncertainty

(4) a.A: Where are you from?
b.B: I'm from SKOKIE.
H* LH%
c.'A: Where is that?

(1) A: What's the sixth noble gas?
B: Uh, RADON.
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- Final Rise: *'Does this answer your question?'*

Inferred Question Force

(1) A: What's the sixth noble gas?
B: Uh, RADON.
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A: Are you asking me or telling me?

(2) A: You're a millionaire.
b.B: I'm a MILLIONAIRE.
H* LH%

- Final Rise: *'Is this true?'*

Inferred Question Force: Details

(6) a.A: Did you go to the cinema last night?
LH%

b.A: # You went to the cinema last night.
LH%

(7) A: You are rich.

a.B: I'm rich. *'Am I?'*
LH%

b.B: # I'm a millionaire.
LH%

- Inferring question force needs a suitable antecedent.

Observations

Framework

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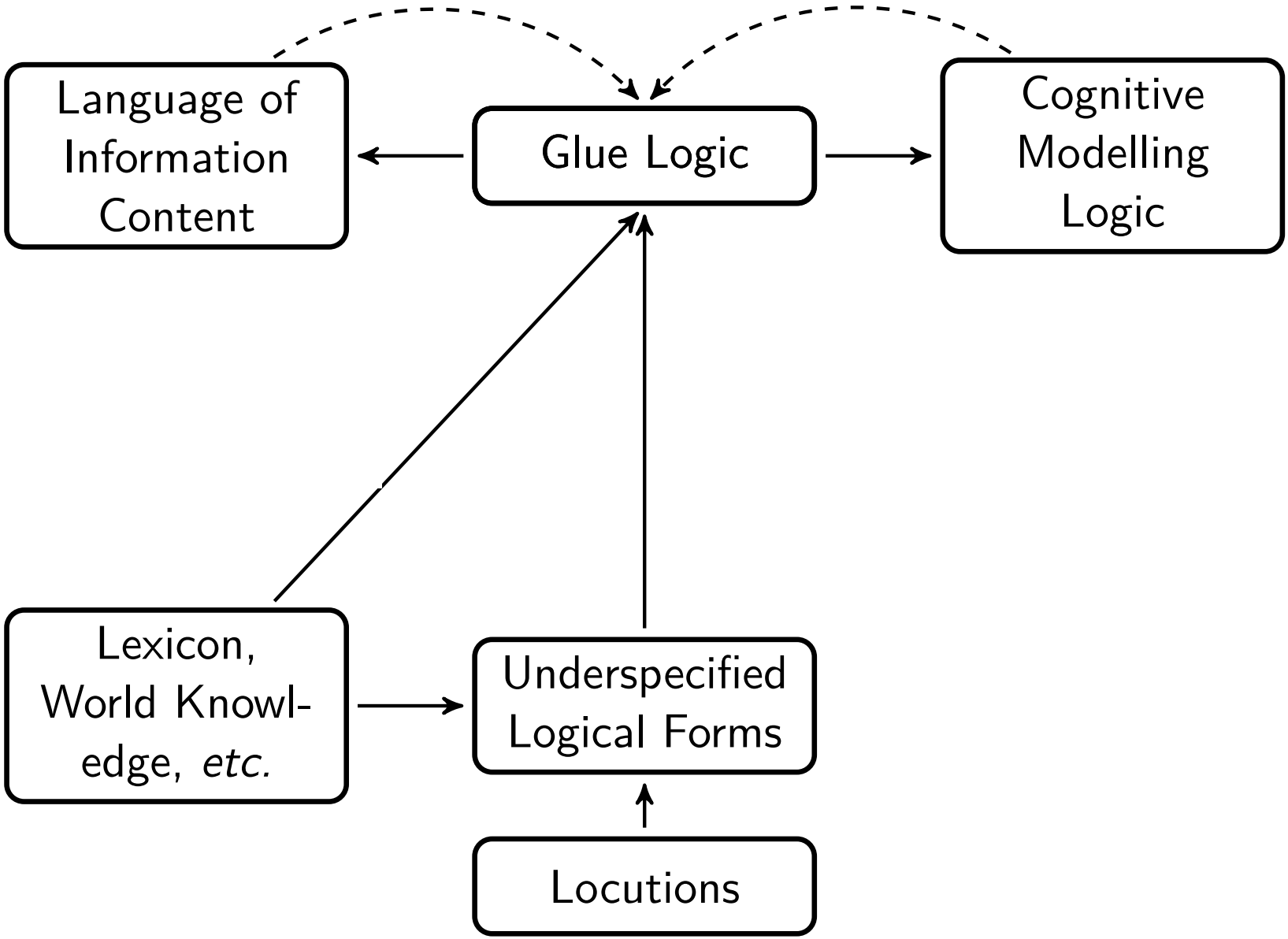
SDRT: Overview



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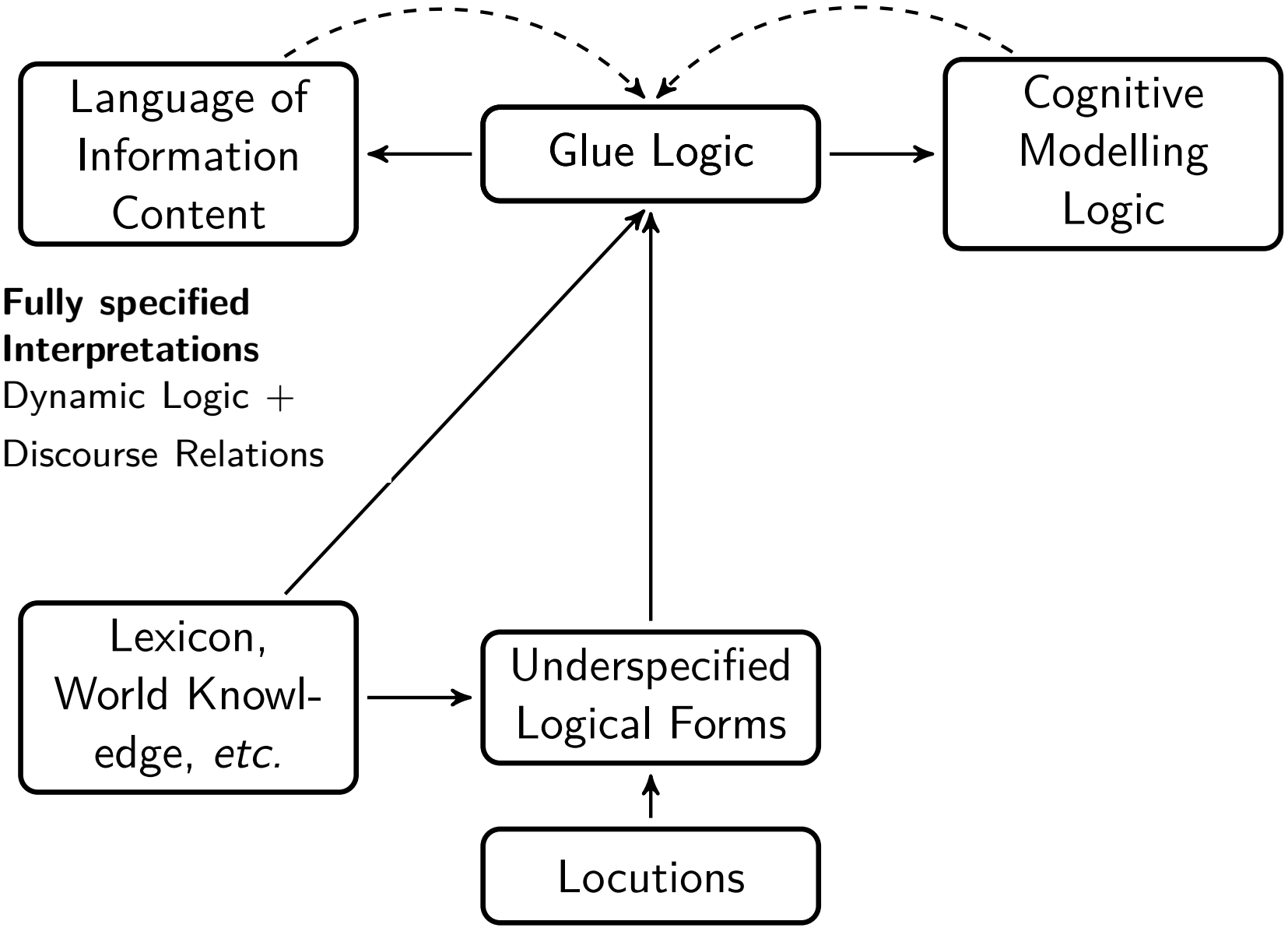

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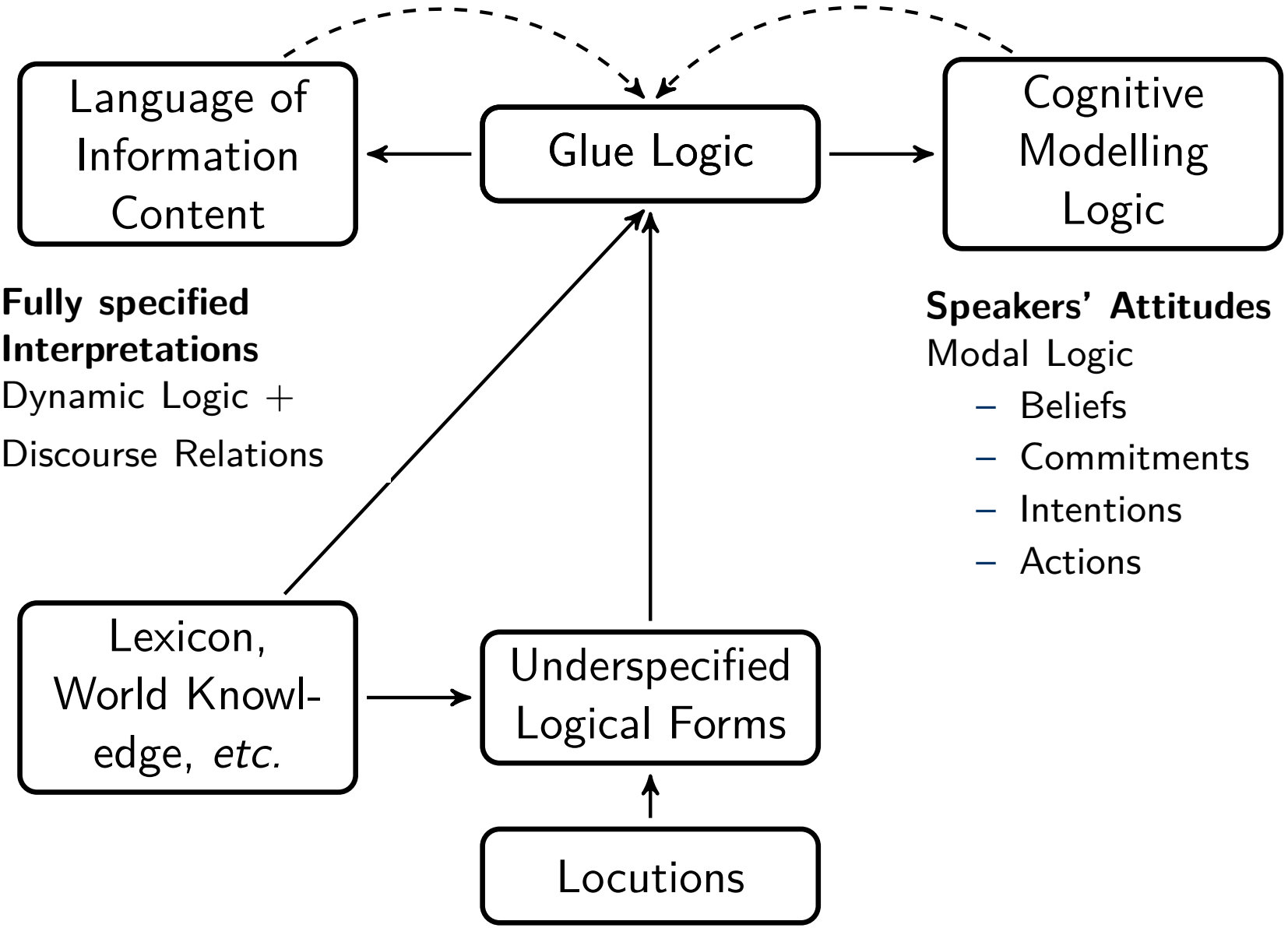

Fully specified Interpretations
Dynamic Logic +
Discourse Relations

Speakers' Attitudes
Modal Logic
- Beliefs
- Commitments
- Intentions
- Actions

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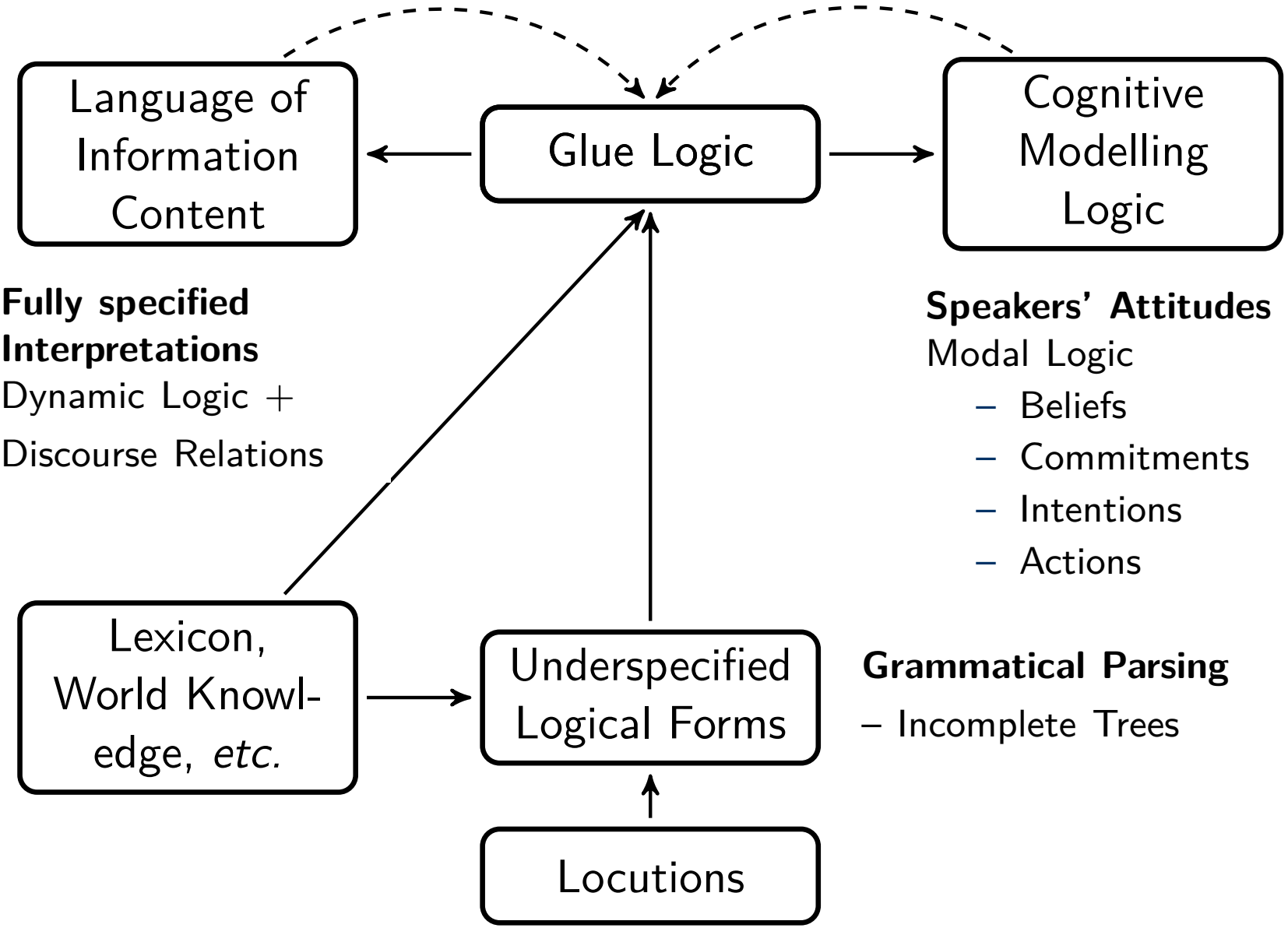

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Grammatical Parsing
– Incomplete Trees

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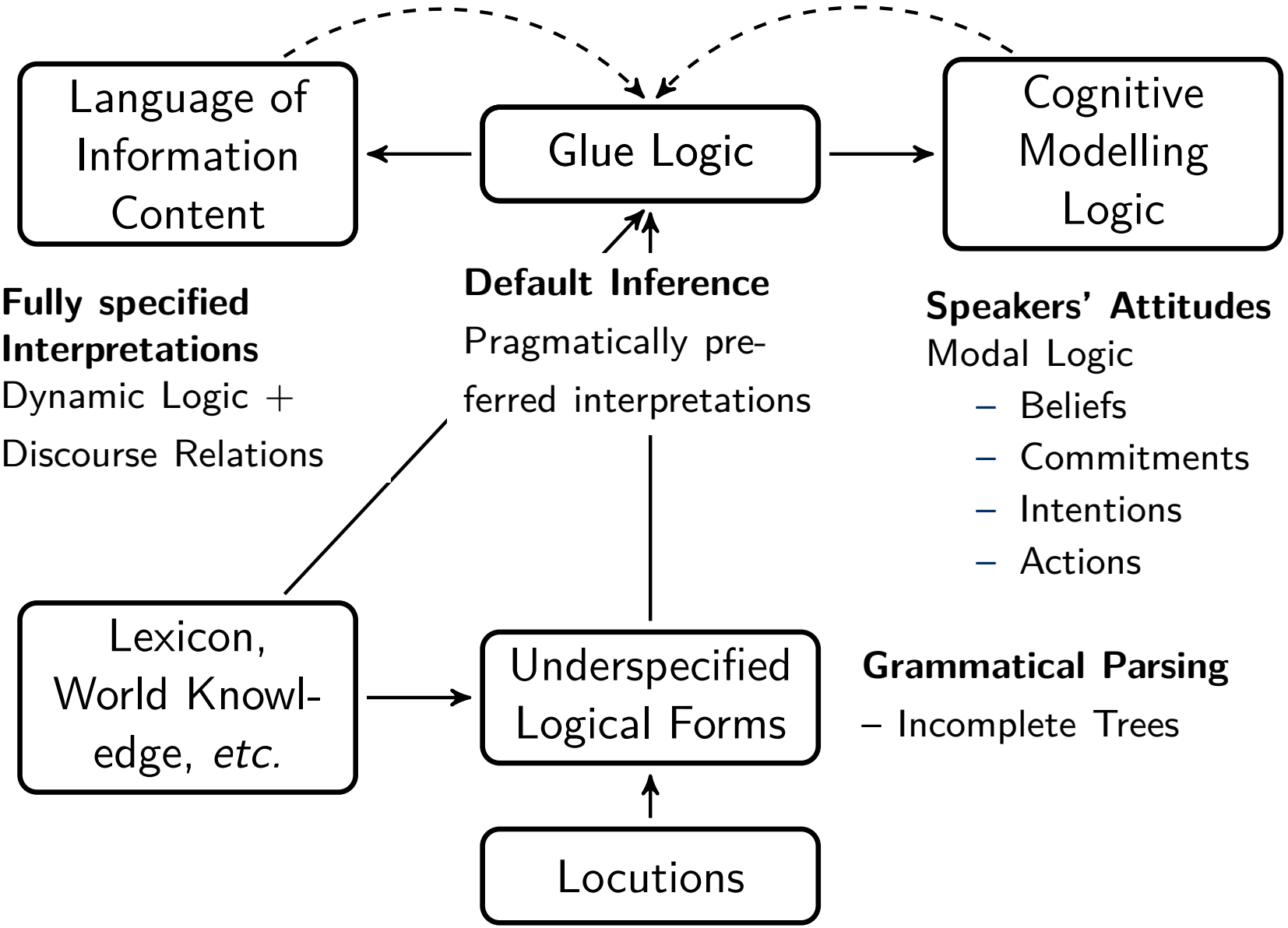

SDRT: Example

(7) A: Max fell.
B: John pushed him.

Information content:

Turn	A's SDRS	B's SDRS
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- $\mathit{Explanation}(\pi_1, \pi_2)$ entails π_1.

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Construction via Glue Logic Axioms:

Explanation Axiom.
$(\lambda : ?(\alpha, \beta) \wedge \mathit{cause}_D(\beta, \alpha)) > (\lambda : \mathit{Explanation}(\alpha, \beta))$.

Formal Model

Semantics

Semantics of the Final Rise.

$LH\%(\pi) \mapsto \exists R, \pi', \pi''\ (R(\pi', \pi'') \wedge \pi' \succeq \pi)$.

'This needs a follow-up.'

- The final rise segment π is part of a discourse segment π' that is projecting a discourse relation R.

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Axiom to infer Question Force.

$\big(\beta : LH\% \wedge \lambda : ?(\alpha, \beta) \wedge \Box(K_\alpha \rightarrow \mathit{prop}(K_\beta))\big) > \lambda : CR(\alpha, \beta)$.

'Are you sure?'

- $\Box(K_\alpha \rightarrow \mathit{prop}(K_\beta))$ is the appropriateness constraint.

Cognitive Contribution

Cognitive Contribution of the Final Rise.

$\pi : LH\% \wedge \lambda : R(\alpha, \pi) \wedge \neg\pi : ?prop(K_\pi) > P_S \neg B_S I_H P_H R(\alpha, \pi).$

'I'm not sure you are going to accept this.'

- The speaker displays uncertainty regarding the uptake of their speech act.
- In a cooperative conversation, this uncertainty needs to be addressed.

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- The speaker displays uncertainty regarding the uptake of their speech act.
- In a cooperative conversation, this uncertainty needs to be addressed.
- Note that Question Force and Uncertainty are mutually exclusive.

Public Commitments

(2) A: You're a millionaire.
b. B: I'm a MILLIONAIRE. $\rightsquigarrow$ *'Am I?'*
H* LH%

- The appropriateness constraint for Inferring Question Force is satisfied.
- We infer that B is asking a question, hence making no commitment.

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(3) A: Are you rich?
b. B: I'm a MILLIONAIRE. ⇝ *'Does that count?'*
H* LH%

- The appropriateness constraint for Inferring Question force is not satisfied.
- We infer that B is making a commitment, but is uncertain if A will accept it as an answer.

Underspecified Follow-Ups

(4) a.A: Where are you from?

b.B: I'm from SKOKIE.
H* LH%

	A's SDRS	B's SDRS
1	$\pi_1 : K_{\pi_1}$ $\pi_{1H} : \exists \pi_1'$ QAP(π_1, π_1')	$\emptyset$
2	$\pi_1 : K_{\pi_1}$ $\pi_{1H} : \exists \pi_1'$ QAP(π_1, π_1')	$\pi_2 : K_{\pi_2}$ $\pi_{1H} : \exists \pi_1'$ QAP(π_1, π_1') $\pi_{2S} : \exists R, \pi_2', \pi_2'' \; R(\pi_2', \pi_2'') \wedge (\pi_2' \succeq \pi_2)$

I'm from Skokie (c)

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c.B: That's in Illinois.

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	Resolution: π_2' is π_2, π_2'' is π_3 and R is Elaboration.	
3	$\pi_1 : K_{\pi_1}$ $\pi_{1H} : \exists \pi_1'$ QAP(π_1, π_1')	$\pi_2 : K_{\pi_2}$ $\pi_{1H} :$ QAP(π_1, π_{3S}) $\pi_{2S} :$ Elaboration(π_2, π_3) $\pi_3 : K_{\pi_3}$ $\pi_{3S} :$ Elaboration(π_2, π_3)

I'm from Skokie (c')

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c.'A: Okay, good.

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- Informally, we give a unified account of some major discussions of the final rise.
- We formalize this account in the SDRT framework.
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  $\rightarrow$ In fact, the predictions are strong enough to infer incoherence.

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