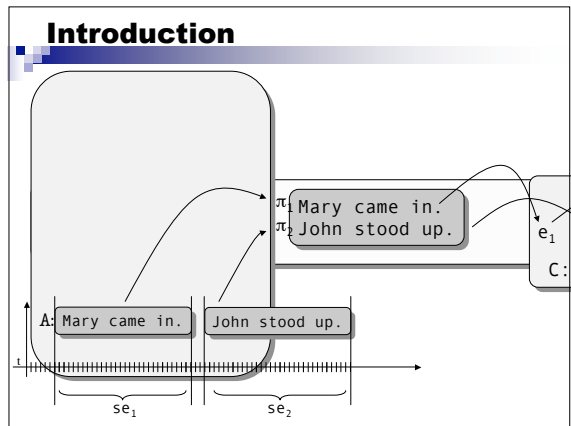
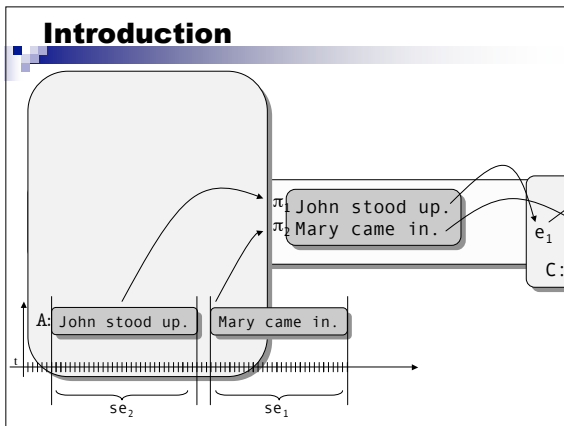
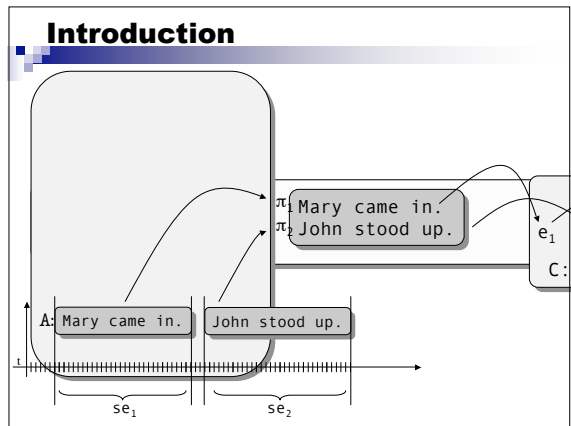
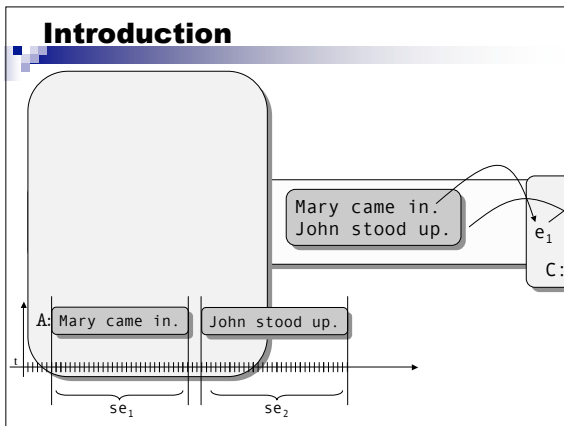
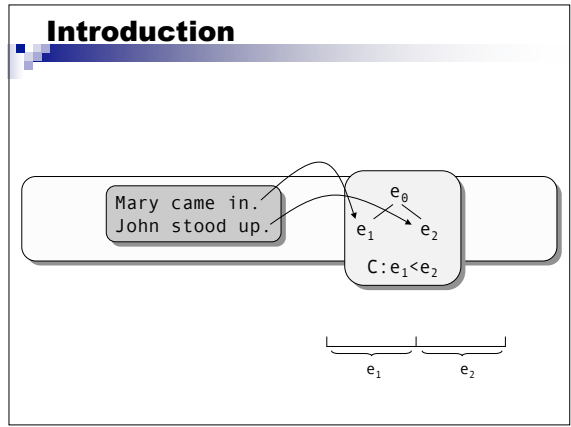
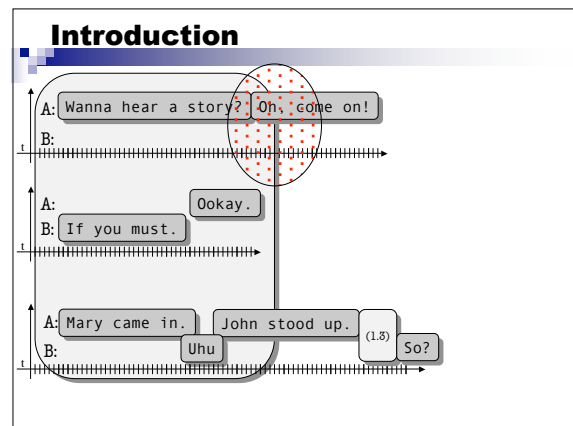
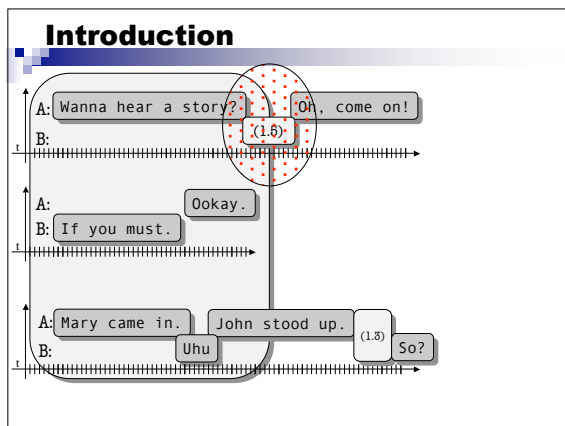
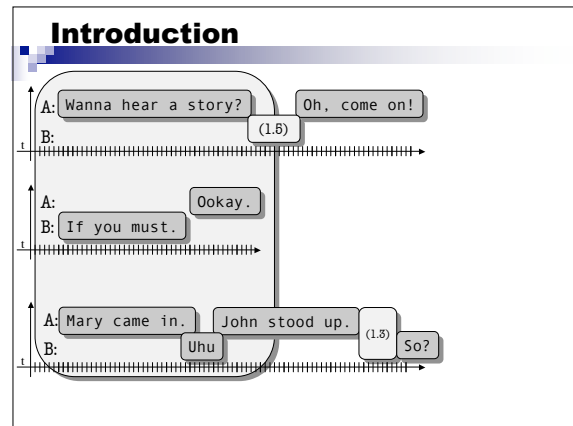
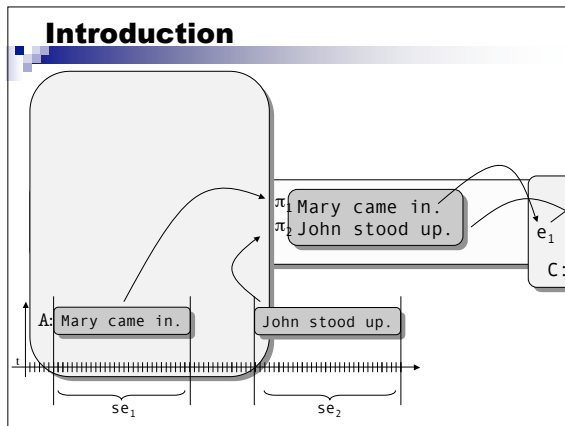


Temporal Constraints in Discourse

David Schlangen
Universität Potsdam

Workshop "Constraints in Discourse", June 3rd - 5th





Introduction

- Does timing matter for discourse meaning? (overlaps, gaps, silences...)
- If so, how can we represent timing information, and how can we derive its meaning?
- How much info do we need about the discourse situation when building DS?

- ### Overview
1. Some Background
 1. **Turn Taking Rules**
 2. **Overlaps**
 3. **"In time": No overlap, no gap**
 4. **Gaps**
 2. Data: The Discourse Contribution of Silence
 1. **refusal-type silence**
 2. **time-out silence**
 3. Formalisation
 4. Summary, Conclusions, Implications, Questions

Background - Turn Taking

- Observations:
 - overlaps between turns are rare
 - gaps between turns are short
 - "ideal": no overlap, no gap

A: Sandy was there *as well.*
 B: *Yeah I* saw her too.

Background - Turn Taking

- Observations:
 - overlaps between turns are rare
 - gaps between turns are short
 - "ideal": no overlap, no gap

A: Sandy was there as well. (2.1)
 B: Yeah I saw h

Background - Turn Taking

- Observations:
 - overlaps between turns are rare
 - gaps between turns are short
 - "ideal": no overlap, no gap

A: Sandy was there as well.
 B: Yeah I saw her too.

Background - Turn Taking

- Sacks, Schegloff & Jefferson, 1978
 - **Local Management System for Turn Taking.**
 - **Turn Units:** identified by syntax, prosody, gesture
 - **Transition Relevance Place (TRP):** end of a turn unit



- The rules operate on the turn units (C = current speaker, N = next speaker).

Background - Turn Taking

- Sacks, Schegloff & Jefferson, 1978
 - **Rule 1. applies at the first TRP of any turn**
 - 1. If C selects N in current turn, then C must stop speaking and N must speak next. The transition occurs at the first TRP after N-selection

A: Did you see Sandy?
 B: Yeah, I saw her.

has been applied by C, at the next TRP, Rules 1.1-3 apply, and recursively at the next TRP until speaker change is effected.

Background - Turn Taking

- Sacks, Schegloff & Jefferson, 1978
 - **Rule 1. applies at the first TRP of any turn**
 - 1. If C selects N in current turn, then C must stop speaking and N must speak next. The transition occurs at the first TRP after N-selection
 - 2. If C does not select, then any other party may self-select, first speaker gaining right to the next turn.
 - 3. If C does not select N and no other party self-selects, then C may continue.

A: Sandy was there as well.
 B: Really? Why?

Background - Turn Taking

■ Sacks, Schegloff & Jefferson, 1978

- **Rule 1. applies at the first TRP of any turn**
 - 1. If C selects N in current turn, then C must stop speaking and N must speak next. The transition occurs at the first TRP after N-selection
 - 2. If C does not select, then any other party may self-select, first speaker gaining right to the next turn.
 - 3. If C does not select N and no other party self-selects, then C may continue.

A: Did you see Sandy? Huh?
 B:

Background - Turn Taking

■ Sacks, Schegloff & Jefferson, 1978

- **Rule 1. applies at the first TRP of any turn**
 - 1. If C selects N in current turn, then C must stop speaking and N must speak next. The transition occurs at the first TRP after N-selection
 - 2. If C does not select, then any other party may self-select, first speaker gaining right to the next turn.
 - 3. If C does not select N and no other party self-selects, then C may continue.

A: Did you see Sandy? Huh?
 B: (2.3)
 significant silence

Background - Turn Taking

■ Sacks, Schegloff & Jefferson, 1978

- **Rule 1. applies at the first TRP of any turn**
 - 1. If C selects N in current turn, then C must stop speaking and N must speak next. The transition occurs at the first TRP after N-selection
 - 2. If C does not select, then any other party may self-select, first speaker gaining right to the next turn.
 - 3. If C does not select N and no other party self-selects, then C may continue.

A: Sandy was there as well. (0.8)
 B: Hm, yeah.
 gap

Overview

1. Some Background
 1. Turn Taking Rules
 2. Overlaps
 3. "In time": No overlap, no gap
 4. Gaps
2. Data: The Discourse Contribution of Silence
 1. refusal-type silence
 2. time-out silence
3. Formalisation
4. Summary, Conclusions, Implications, Questions

Background - Overlaps

A: and I talked with Steve a bit and *then wi-
 B: *Steve? He*

- One function of overlaps: signal "I want turn really badly!"

A: and I talked with Steve a bit and *then* with
 B: *uhu*

- ... or use special type of utterance that avoids this.

Background - "In time"

A: and what sort of rates do you pay for this sort of thing,
B: { . u:m - } well, {u:h - - - } I'm sorry, { . } I ought to know this, I think it's about one fifty an hour.

- Device that allows to fulfil "maxim" even if content isn't ready: *signalled delays*.
- (Clark & Fox Tree, 2002):
 - "uh" to signal upcoming minor delay
 - "um, u:m, u:h" to signal upcoming major delay

Background - Summary

- Model that allows us to distinguish different types of "non-speech intervals"
- Device for taking floor w/o producing content

Part II

- The Discourse Contribution of Silence

A word on the examples

- constructed examples, "distilled" from:
 - (Levinson 1983)
 - (Davidson 1984)
 - (Pomerantz 1984a; 1984b)
 - (Jefferson 1989)
 - (Clark 2002)
 - (Clark & Fox Tree 2002)
 - own study of NIST meeting corpus & ISL corpus
 - ...



Part II

- The Discourse Contribution of Silence
 - II.a Refusal-type silence

Examples

A: What are X's qualifications? OK, next candidate.
B: (1.6)

- B has obligation to reply (and this is mutually known)
- B produces silence of certain "form" (continued attention, but no "thinking activity", etc.): *refusal-type silence*
- A interprets this as conveying "X has no qualifications worth mentioning"

Examples

A: What are X's qualifications? OK, next candidate.
B: (1.6)

A: Can you help Sandy? Fine! Then I'll do it again!
B: (1.9)

Examples

A: What are X's qualifications? OK, next candidate.
B: (1.5)

A: Can you help Sandy? Fine! Then I'll do it again!
B: (1.0)

A: Peter is such an idiot. You don't agree?
B: (1.3)

Examples - TS & DS?

A: What are X's qualifications? OK, next candidate.
B: (1.5)

A: Can you help Sandy? Fine! Then I'll do it again!
B: (1.0)

A: Peter is such an idiot. You don't agree?
B: (1.3)

• Does this have to be represented in DS?

Examples - TS & DS?

A: What are X's qualifications? OK, next candidate.
B:

A: Can you help Sandy? Fine! Then I'll do it again!
B:

A: Peter is such an idiot. You don't agree?
B:

• Does this have to be represented in DS?

Examples - Context for Silence

A: What are X's qualifications? OK, next candidate.
B: (1.5)

A: Can you help Sandy? Fine! Then I'll do it again!
B: (1.0)

A: Peter is such an idiot. You don't agree?
B: (1.3)

• Is silence enough? Do these situations have anything else in common?

Examples - Context for Silence

B: My car has broken down. Can you help me?

A: Where are you?

B: (2.4)

A: Hu? Can you hear me?

A: Do you want marshmallows?

B: (2.2)

A: Hu?

Examples - Context for Silence

A: What are X's qualifications? OK, next candidate.
B: (1.5)

A: Can you help Sandy? Fine! Then I'll do it again!
B: (1.0)

A: Peter is such an idiot. You don't agree?
B: (1.3)

• Is silence enough? Do these situations have anything else in common? --- **salient dispreferred reply**

Dispreferred Replies

- CA: structural notion of preference (Levinson 1983):

Request	Offer/Invite	Assessment	Question
Acceptance	Acceptance	Agreement	expected answer
Refusal	Refusal	Disagreement	unexpected answer

Summary - refusal-t sil. -> dispr.

A: What are X's qualifications? OK. Next candidate.
B: (1.6)

Silence can be interpreted as discourse contribution (of a certain type), if:

- it is attributable;
- is mutually understood as *refusal* to reply;
- context supports assumption that there is a dispreferred reply.

Sketch of Gricean Calculation

A: What are X's qualifications? OK. Next candidate.
B: (1.6)

Silence violates ... (at least) Quantity and Relevance...

- S has said *nothing*
- there is no reason to think S is not observing maxims, or at least the **co-operative principle**
- in order for S to say *nothing* and be indeed observing maxims or co-operative principle *and other principles like "be polite / avoid dispreferred replies"*, **S must think that q (X has no qualifications)**.
- S must know that it is mutual knowledge that q must be supposed if S it to be taken to be co-operating
- S has done nothing to stop H thinking q
- therefore, S intends H to think that q, and in saying *nothing* has implicated q

Part II

The Discourse Contribution of Silence

- II.a Refusal-type silence
- II.b Letting turn time out-type silence

Letting turn time out-silence

A: What is an SDRS? OK. What is a DRS?
B: u:m . uh (1.6)

A: Where are you? What was the last exit?
B: u:m . uh (1.3)

- B takes up obligation,
- but *delays*, and ultimately lets turn time out.
- A interprets this as *inability* (not enough information) to reply.

Letting turn time out-silence

A: What is an SDRS? OK. What is a DRS?
B: u:m . uh (1.6)

A: Where are you? What was the last exit?
B: u:m . uh (1.3)

- Does this have to be represented in DS?

Letting turn time out-silence

A: What is an SDRS? OK. What is a DRS?

B:

A: Where are you? What was the last exit?

B:

• Does this have to be represented in DS?

Letting turn time out-silence

A: What is an SDRS? OK. What is a DRS?

B: u:m . uh (1.5)

A: Where are you? What was the last exit?

B: u:m . uh (1.3)

• Is this not just dispreferred reply?

Letting turn time out-silence

B: My car has broken down. Can you help me?

A: Where are you?

B: (2.4)

A: Hu? Can you hear me?

A: Where are you? What was the last exit?

B: u:m . uh (1.5)

• Is this not just dispreferred reply?

Letting turn time out-silence

A: What is an SDRS? OK. What is a DRS?

B: u:m . uh (1.5)

A: Where are you? What was the last exit?

B: u:m . uh (1.3)

• B is obeying Quality, and so violates Relevance.
Implicates NEI.

A problem: Symptom, not Signal?

A: What is an SDRS? OK. What is a DRS?

B: u:m . uh (1.6)

A: Where are you? What was the last exit?

B: u:m . uh (1.3)

• Is this really signalled in the same way as previous type?

A problem: Symptom, not Signal?

A: What is an SDRS? OK. What is a DRS?

B: u:m . uh

A: Where are you? What was the last exit?

B: u:m . uh

• Is this really signalled in the same way as previous type?
What if A simply decides that there's no time for thinking?
Result looks the same...

A problem: Symptom, not Signal?

A: Do you know his remarks on Hamlet?
B: (1.5) yes, I have read them, sir,
A: m, . what are they?
B: (1.0)
A: *will you give me the gist of the approach*
B: *u:h (.5) uh . * he . he believes that
 (London-Lund Corpus, in (Clark & Fox Tree 2002))

- Is this really signalled in the same way as previous type?
 What if A simply decides that there's no time for thinking?
Result looks the same...

A problem: Symptom, not Signal?

A: Can you do me a favour? Ah, it's not important
 B: u:m . uh

- Thinking can be taken to be *symptom* of preparation of dispreferred reply.

A problem: Symptom, not Signal?

A: Can you do me a favour? Ah, it's not important
 B: u:m . uh

A: What is an SDRS? OK. What is a DRS?
 B: u:m . uh

- If this is just a symptom (i.e., not intended to be interpreted), Gricean reasoning doesn't work!

Part III

■ The Discourse Contribution of Silence

- II.a Refusal-type silence
- II.b Letting turn time out-type silence

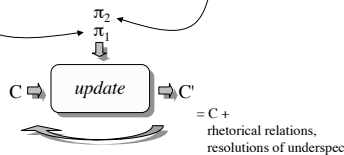
■ Formalisation

(SDRT-style;
 Asher & Lascarides 2003)

- Timing Module
- Representing Silence
- Dispreferred Replies
- Rules for interpreting refusal-type silence
- Rules for interpreting time out-type silence

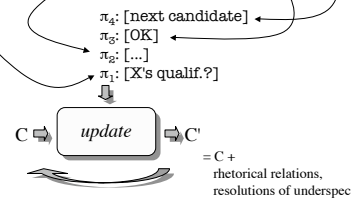
SDRT in a (way too small) nutshell

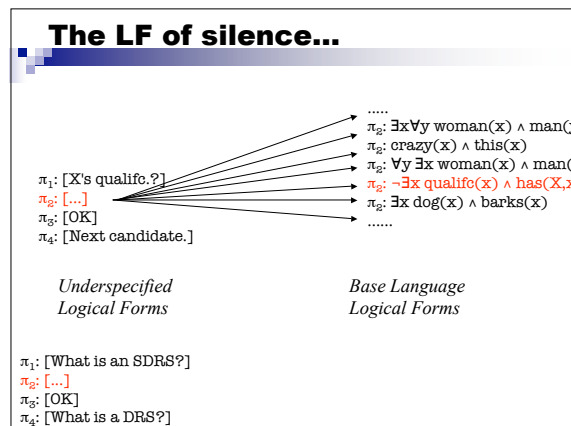
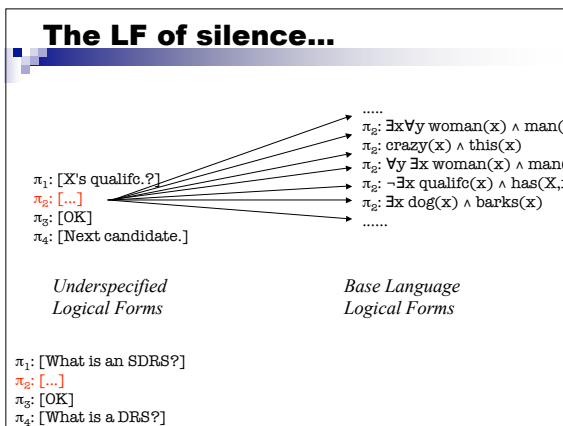
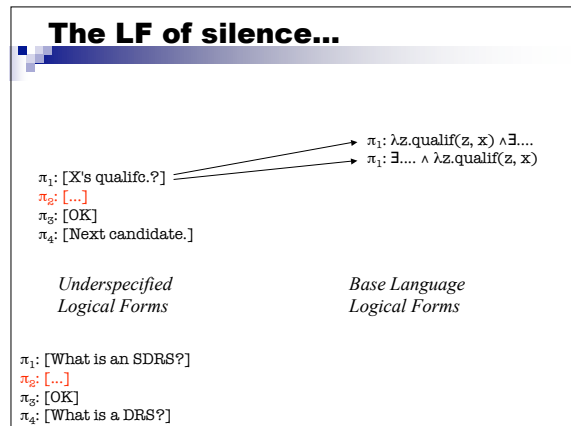
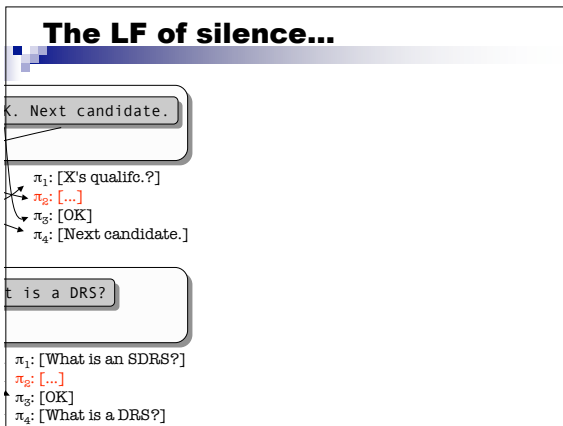
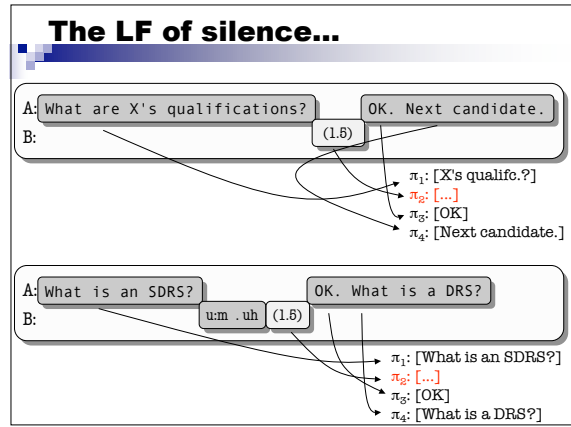
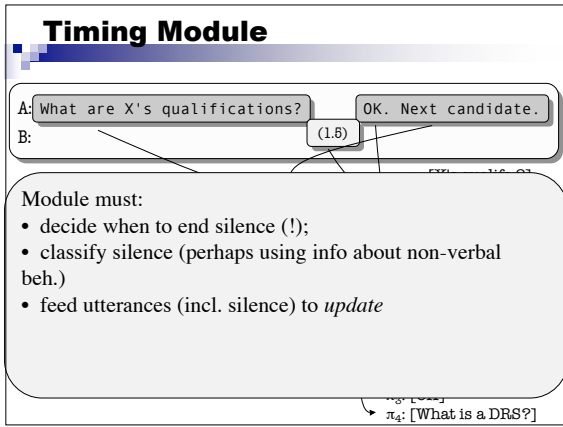
A: Where is the treasure?
 B: There's a man downtown you can ask



Timing Module

A: What are X's qualifications?
 B: (1.5) OK. Next candidate.





The LF of silence...

π_1 : [X's qualife.?
 π_2 : [...]
 π_3 : [OK]
 π_4 : [Next candidate.]

π_2 : $\exists x \forall y \text{ woman}(x) \wedge \text{man}(y) \wedge \text{crazy}(x) \wedge \text{this}(x)$
 π_3 : $\forall y \exists x \text{ woman}(x) \wedge \text{man}(y) \wedge \text{qualife}(x)$
 π_4 : $\exists x \text{ dog}(x) \wedge \text{barks}(x)$

Underspecified Logical Forms

For details of semantics: (Schlangen 2003)

A: Who came to the party?
B: Peter.

π_1 : [What is an SDRS?]
 π_2 : [...]
 π_3 : [OK]
 π_4 : [What is a DRS?]

Dispreferred Replies

- CA: structural notion of preference

Levinson 1983:

Request	Offer/Invite	Assessment	Question
Acceptance	Acceptance	Agreement	expected answer
Refusal	Refusal	Disagreement	unexpected answer

Some default rules:

- cancelling presuppositions is dispreferred:
 - **A: When did Peter leave?**
 - **B: (1.4)**
 - **A: He didn't leave at all!**

Dispreferred Replies

- CA: structural notion of preference

Levinson 1983:

Request	Offer/Invite	Assessment	Question
Acceptance	Acceptance	Agreement	expected answer
Refusal	Refusal	Disagreement	unexpected answer

- conflicting principles:

- **A: Does your husband even lift a finger around the house?**
- **B: (1.4)**
- **A: See! I don't understand why you like him!**

Dispreferred Replies

- CA: structural notion of preference

Levinson 1983:

Request	Offer/Invite	Assessment	Question
Acceptance	Acceptance	Agreement	expected answer
Refusal	Refusal	Disagreement	unexpected answer

Reasoning about context, including cognitive states, seems required.

Interpreting refusal-t silence

$C \Rightarrow \text{update} \Rightarrow C'$
 = C + rhetorical relations, resolutions of underspec

- glue-logic rule for inferring rhetorical relation for refusal-type silence:

$?(\alpha, \beta, \lambda) \wedge \alpha : ? \wedge \beta : \dots \wedge \text{Top}(\sigma, \alpha) \wedge \text{disp}_{D+M}(\sigma, \alpha, \beta) > \text{QAP}(\alpha, \beta, \lambda)$

Interpreting refusal-t silence

- glue-logic rule for inferring rhetorical relation for refusal-type silence:

$?(\alpha, \beta, \lambda) \wedge \alpha : ? \wedge \beta : \dots \wedge \text{Top}(\sigma, \alpha) \wedge \text{disp}_{D+M}(\sigma, \alpha, \beta) > \text{QAP}(\alpha, \beta, \lambda)$

A: What are X's qualifications? OK. Next candidate.

B: (1.5)

π_1 : [X's qualife.?
 π_2 : [...]
 π_3 : [OK]
 π_4 : [Next candidate.]

π_2 : $\exists x \forall y \text{ woman}(x) \wedge \text{man}(y) \wedge \text{crazy}(x) \wedge \text{this}(x)$
 π_3 : $\forall y \exists x \text{ woman}(x) \wedge \text{man}(y) \wedge \text{qualife}(x)$
 π_4 : $\exists x \text{ dog}(x) \wedge \text{barks}(x)$

Interpreting refusal-t silence

- glue-logic rule for inferring rhetorical relation for refusal-type silence:

$$?(\alpha, \beta, \lambda) \wedge \alpha: ? \wedge \beta: \dots_p \wedge Top(\sigma, \alpha) \wedge disp_{D-HR}(\sigma, \alpha, \beta) > QAP(\alpha, \beta, \lambda)$$

$$?(\alpha, \beta, \lambda) \wedge (\alpha: ! \vee \alpha: |) \wedge \beta: \dots_p > QAP(\alpha, \beta, \lambda)$$

Interpreting time out-t silence

- glue-logic rule for inferring rhetorical relation for letting turn time out-type silence:

$$?(\alpha, \beta, \lambda) \wedge \alpha: ? \wedge \beta: \dots_{t_0} > NEI(\alpha, \beta, \lambda)$$

A: What is an SDRS?
 B: u:m .uh (1.6) OK. What is a DRS?

π_1 : [What is an SDRS?]
 π_2 : [...]
 π_3 : [OK]
 π_4 : [What is a DRS?]

Problems

- these rules can't handle "symptom"-interpretations
- overgeneration? can you really use silence anytime you want to convey dispreferred reply?

Part IV

- **The Discourse Contribution of Silence**
 - II.a Refusal-type silence
 - II.b Letting turn time out-type silence
- **Formalisation**
- **Summary, Conclusions, Implications, Questions**

Summary

- **We have shown that:**
 - **There are situations where timing matters for discourse meaning, and where DPs mean something by being silent (Significant Silence).**
 - **This can be handled with current discourse theories.**
 - **There are situations where DPs interpret things that aren't intended to be interpreted.**

The Wider Context

- **Two directions beyond classic semantics/pragmatics:**
 - What is the best way to interface models of discourse with models of *interaction management*? (function of disfluencies, overlapping backchannels, delays, etc.)
 Use interpretation of symptoms to manage dialogue?
 --- other functions of speech acts.
 - What is part of the discourse? Are silences *linguistic* actions? What about other actions?
 --- other acts than speech acts.

The End

Thanks for your attention!

Acknowledgements:
Thanks to Stefanie Dipper
and the
Potsdam Discourse Colloquium
for helpful discussions

The End

Thanks for your attention!

Acknowledgements:
Thanks to Stefanie Dipper
and the
Potsdam Discourse Colloquium
for helpful discussions

Now, what is the meaning of this?
Chair: Any questions?
Audience: (3.4)