Information Structure

- partitioning of utterance meaning into what speaker means to address vs. what she wants to say about it:
  Theme - **Rheme**
- partitioning of utterance meaning according to what is the same vs. what discriminates between similar entities:
  Background - **Focus**
  (within both Theme and Rheme)

Information Structure
First Dimension

- Partitioning of utterance meaning into what speaker means to address vs. what she wants to say about it

Theme	*Rheme*

Information Structure
First Dimension

- what speaker means to address vs. what she wants to say about it

(What is the status of the kitchen light?)

The kitchen light	is switched on.
Theme	*Rheme*

Information Structure
First Dimension

- what speaker means to address vs. what she wants to say about it

(Which devices are switched on?)

The kitchen light	is switched on.
Rheme	*Theme*

Information Structure

- partitioning of utterance meaning into what speaker means to address vs. what she wants to say about it:
  Theme - **Rheme**
- partitioning of utterance meaning according to what is the same vs. what discriminates between similar entities:
  Background - **Focus**
  (within both Theme and Rheme)

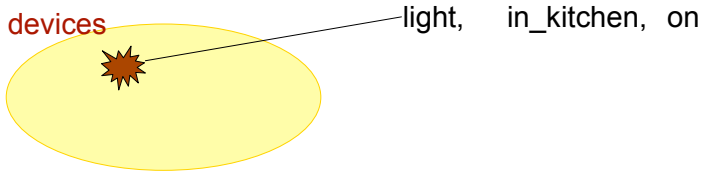
Information Structure First Dimension

- Partitioning of utterance meaning according to what is the same vs. what discriminates among similar entities

Background	*Focus*

Information Structure Second Dimension

- what is the same vs. what discriminates among similar entities

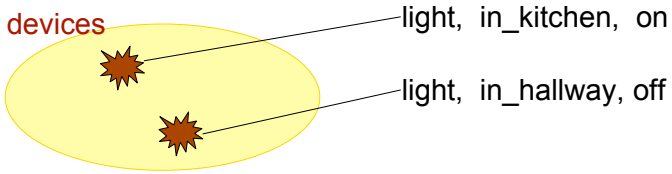


the light in the kitchen

no partitioning

Information Structure Second Dimension

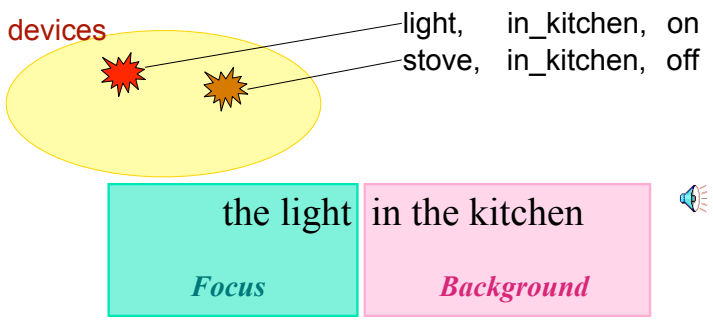
- what is the same vs. what discriminates among similar bits of information



the light	in the kitchen
Background	*Focus*

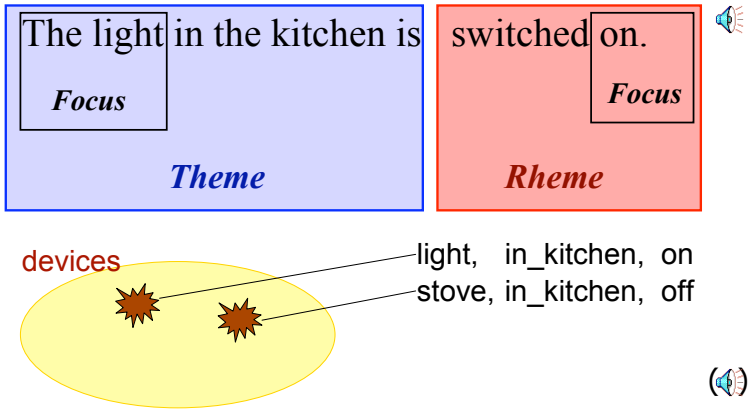
Information Structure
Second Dimension

- what is the same vs. what discriminates among similar bits of information



Information Structure

(What is the status of the kitchen light?)



Question Test

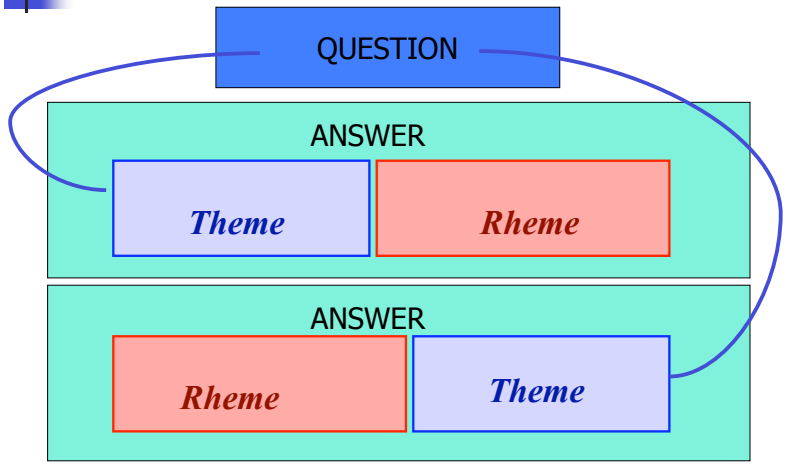
(1) Was ist der Status der Küchenleuchte?
Die Küchenleuchte ist EINGESCHALTET.

The kitchen light is switched ON.

(2) Welche Geraete sind eingeschaltet?
Die KÜCHENLEUCHTE ist eingeschaltet.

The KITCHEN LIGHT is switched on.

Question Test



Question Test

(1) Was ist der Status der Küchenleuchte?
Die Küchenleuchte ist EINGESCHALTET.

The kitchen light is	switched ON.
Theme	*Rheme*

(2) Welche Geraete sind eingeschaltet?
Die KÜCHENLEUCHTE ist eingeschaltet.

The KITCHEN LIGHT	is switched on.
Rheme	*Theme*

Question Test

(1) I know the status of the bathroom light.
But what is the status of the kitchen light?

The KITCHEN light is	switched ON.
Focus *Theme*	*Focus* *Rheme*

(2) I know the status of the kitchen stove.
But what is the status of the kitchen light?

The kicthen LIGHT is	switched ON.
Focus *Theme*	*Focus* *Rheme*

Question Test vs. Natural Dialogue
How do humans speak?

- Map Task dialogue:

G(iver): where are you in relation to the top of the page just now?

F(ollower): about four inches

- Cf.

F': I am about four inches from the top of the page just now

How do humans speak?

- Continued dialogue

G: four inches?

F: yeah

- Cf.

G': Are you about four inches from the top of the page just now?

F': Yes. I am about four inches from the top of the page just now

Returning to Example

Which devices are switched on?

The KITCHEN light	is switched on.
Rheme	*Theme*

Another possibility:

Which devices are switched on?

The KITCHEN light.
Rheme

Contextually Appropriate Realization of Spoken Output in a Dialog System

Based on work done in the SIRIDUS project

www.ling.gu.se/projekt/siridus/

www.coli.uni-sb.de/cl/projects/siridus/

The Challenges of Contextual Appropriateness

- In order to make dialogue system utterances sound natural and appropriate, it is important
  - to control intonation of spoken output
  - to control other aspects of realization

- This poses challenges
  - to dialogue management
  - to generation
  - to speech synthesis

Varied Intonation in Context

U: What is the status of the kitchen light?

S: The kitchen light is switched ON.

Die Küchenleuchte ist EINGESCHALTET.

U: Which devices are switched on?

S: The KITCHEN LIGHT is switched on.

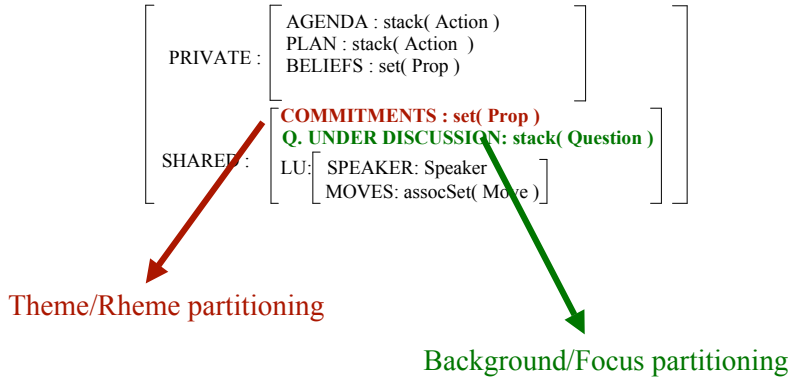
Die KÜCHENLEUCHTE ist eingeschaltet.

One Function of Intonation

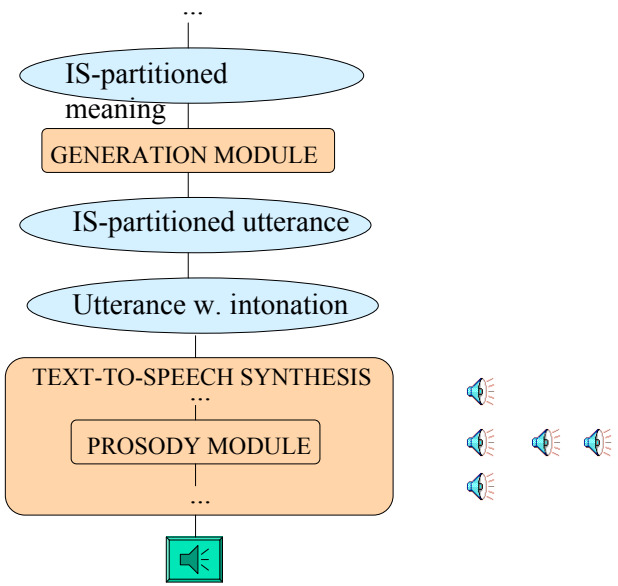
- Intonation is a means to realize information structure
  - Differences in intonation (often) reflect differences in information structure
  - Differences in information structure (often) result in differences in intonation

Using the Information State

... to determine the information structure of system moves:



Producing Varied Spoken Output



Information Structure Realization

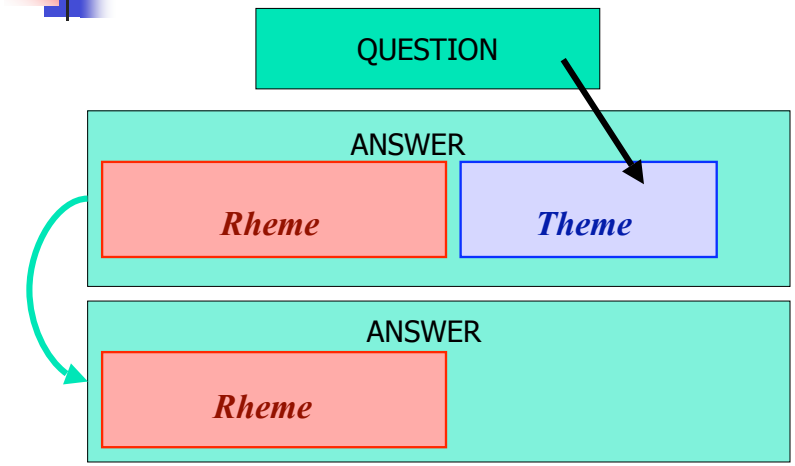
- Other means than intonation can be used, for example, short utterances.

U: Which devices are switched off?

S: The KITCHEN LIGHT.
Die KÜCHENLEUCHTE .

U: What is the status of the kitchen light?

S: Switched OFF.
Ausgeschaltet.



Conclusions

- To improve system output it is important
  - to control intonation of spoken output
  - to control other aspects of realization
    e.g., short utterances
- We use one mechanism to control both.
- We are ready to face the arising challenges
  - to dialogue management: context modelling
  - to generation: select realization and intonation
  - to speech synthesis: realize chosen intonation