

Models of text production and comprehension

How can the relationship between linguistic knowledge and world knowledge be specified?

- Declarative knowledge
- Procedural knowledge

Mental Models:

- blueprint /abstraction of aspects of the physical world
- representations in the mind of real or imaginary situations
- mind constructs "small-scale models" of reality
- models used to anticipate events
- can be constructed from perception, imagination, or **comprehension of discourse**
- underlie visual images
- can be abstract, representing situations that cannot be visualised

Strategies in text comprehension 1

- relevance of causal knowledge structures: reader establishes a causal field
- contains specific circumstances of the story
- explicit identification of conditions perhaps only implicitly mentioned

He sat in the waiting room, his cheeks bloated. After a while, a nurse called him up. Reluctantly, he followed her next door.

- representation updates world knowledge.
- stored for recall (on specific cues)
- storage format can vary

Strategies in text comprehension 2

constraints of causality: A causes B

1. temporal constraint (A precedes B)
 2. counterfactuality constraint (if A had not happened, B would not have happened)
 3. sufficiency constraint
- If B occurs after A, circumstances for A are still prevailing

steps of comprehension:

1. identification of clauses corresponding to events
2. identification of causal relations
3. establishment of causal chains

- linguistic means for causality: causative verbs
- knowledge of causal relations between points: "belief function" -
- assigns degree of belief (can be between 0 and 1)
- story comprehension: finding a most probable **trajectory** in situation-state space with respect to a belief function.

Causal chaining in text comprehension



- 1 hear(M,truck)
- 2 want(M,ice-cream)
- 3 be(ice-cream,expensive)
- 4 go(M,money)
- 5 buy(M, ice-cream)
- 6 eat(M,ice-cream)
- 7 sleep(M)

surface anaphora

"deep" anaphora

Mary heard the ice-cream truck. Mary wanted to buy ice-cream. Ice-cream is expensive. Mary goes home for the money. She buys the ice-cream. John has also chilled drinks. Mary is eating ice-cream. Mary is sleeping.

Micro- and macrostructures: The Kintsch/van Dijk approach

- surface structure of a discourse: set of propositions, ordered by semantic relations

2 levels:

A microstructures – the local level of discourse, individual propositions (eat(Mary,ice-cream))

B macrostructure – the global discourse structure

- sets global constraints (topic, title)
- establishes the "meaningful whole"

Micro- and macrostructures: rules

Generation of microstructures from macrostructures: via paraphrasing reduction

- sequences of propositions are transformed into equivalent, more general sequences of propositions

1. Omitting of non-essential information

A man with a cane and broad-brimmed hat walked down the street
macrostructure: A man walked down the street

2. Selecting of propositions not implied by world knowledge

Sue made coffee. She took a filter size 4 and 3 spoons of coffee. Then she filled the tank with water and turned the power on.
macrostructure: Sue made coffee

3. Generalizing via replacing propositions with novel, conceptually more general propositions

Geese, egrets and cormorants flew over our house.
macrostructure: Birds flew over our house

4. Construing of a novel proposition without selection or replacement

He sat in the waiting room, his cheeks bloated. After a while, a nurse called him up. Reluctantly, he followed her next door.
macrostructure: He was at the dentist's