Eye Tracking as a tool for investigating the comprehension of referential expressions

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Making up Reference…

Study Aim:

Investigation of comprehension processes of referential expressions

- What is reference?
    - The connection between an expression and the object it is denoting
- Why is eye tracking a good way to measure comprehension processes
    - Gives us a huge amount of data of unconscious decisions

What Can Eye Tracking Teach us about Language Comprehension?

- **Eye Tracking during Reading**
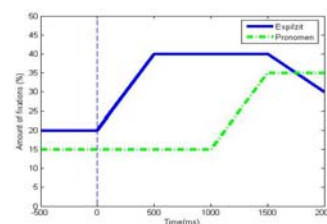 - Orientation of the reader in the text

- **Eye Tracking in the Visual World Paradigm**
  - Auditory presentation of linguistic stimuli paired with visual presentation of pictures or objects
  - Give evidence about the comprehension of spoken language under natural conditions

Resolution of Referential Expressions- Two Hypotheses:
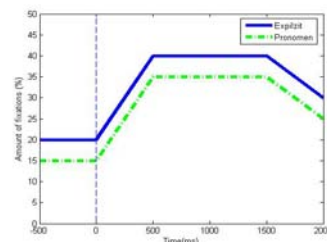
- **Gernsbacher (1989)**
  - Pronoun resolution is delayed, since the pronoun must, first, find its antecedent in the text, and then the referent of the antecedent must be recovered.

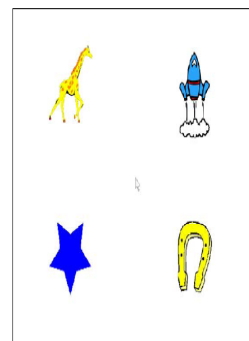- **Tyler and Marslen-Wilson (1982)**
  - Pronoun resolution is immediate. Pronouns are interpreted referentially just like definite full NPs

Research Questions:

- At what time in the comprehension process are referential expressions resolved?

- Are there any interesting differences between the interpretation processes of different types of referential expressions?

Natural Stimuli vs. Line Drawing :

Playmobil figures are a good trade-off between the naturalness and the controllability of the stimuli
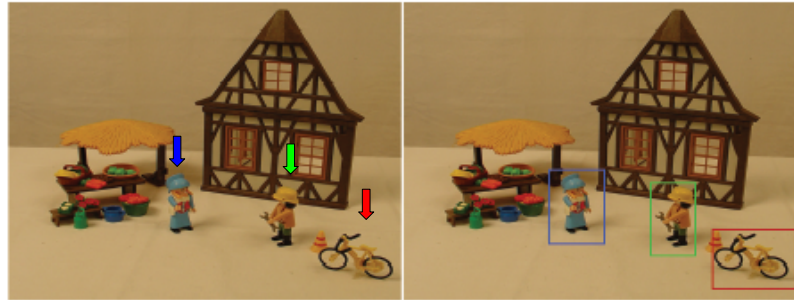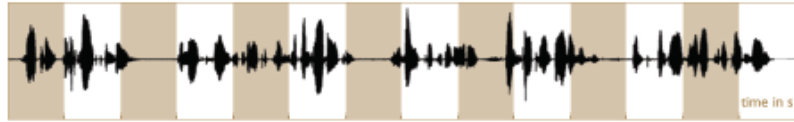
Visual Stimuli :

Auditory Stimuli:

Heute ist Markt im Dorf.	Die Marktfrau streitet sich mit dem Arbeiter	Sie	sagt jetzt gerade, dass	er		keinen Ärger machen und	das neue Fahrrad zurückgeben soll/willl, das	er	sich geliehen hat.
				sie					
				er	ihr				
				sie	ihm				

It's marketday in the village.	The market-woman is quibbling with the worker	She	is saying, that	he		no trouble make and	should/ would give back the new bike that	he	borrowed.
				she					
				he	her				
				she	him				

Stimulus Materials:

Time Course of Fixations
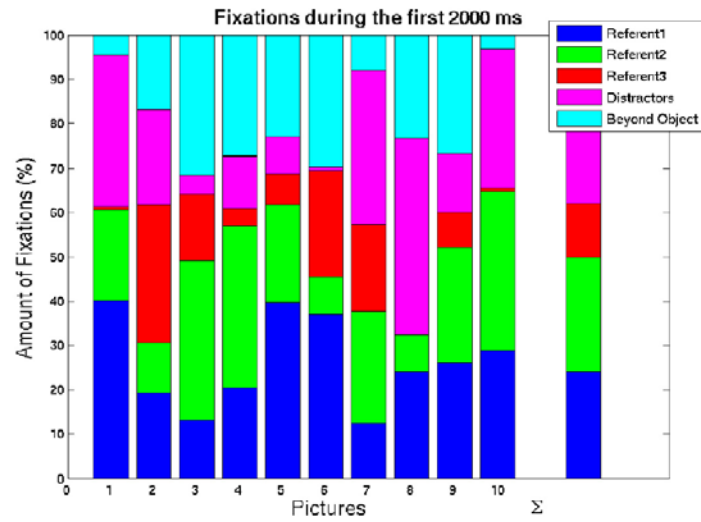
Stimulus Validity:

Fixation Probabilities

Es ist Markt im Dorf. Die Marktfrau streitet mit dem Arbeiter. Sie sagt jetzt gerade, dass er keinen Ärger machen und das Fahrrad zurück geben soll, das er sich geliehen hat.
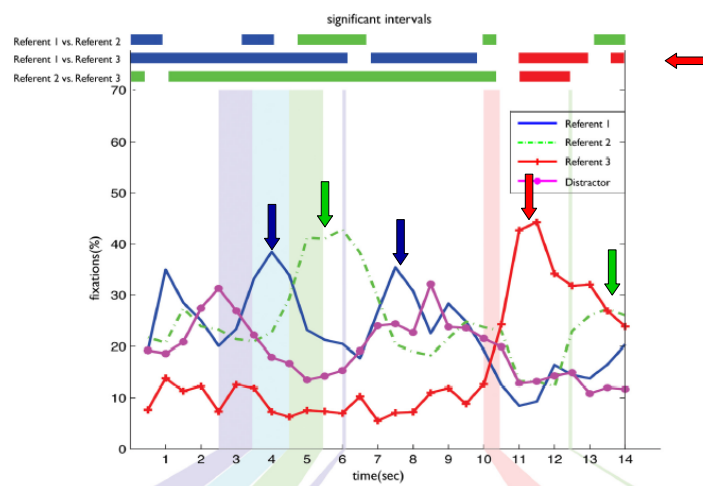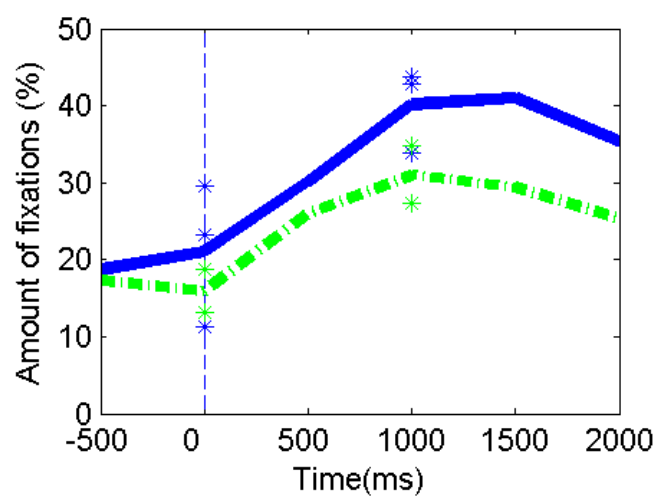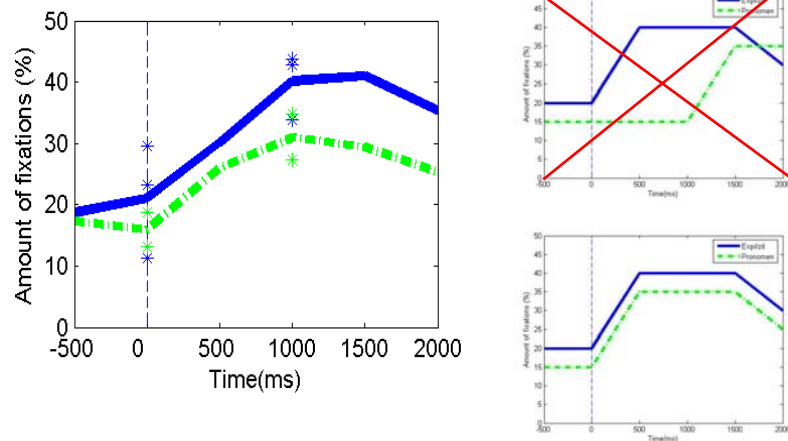
Results I :

- Both full NPs and pronouns cause increased fixations on the matching referent
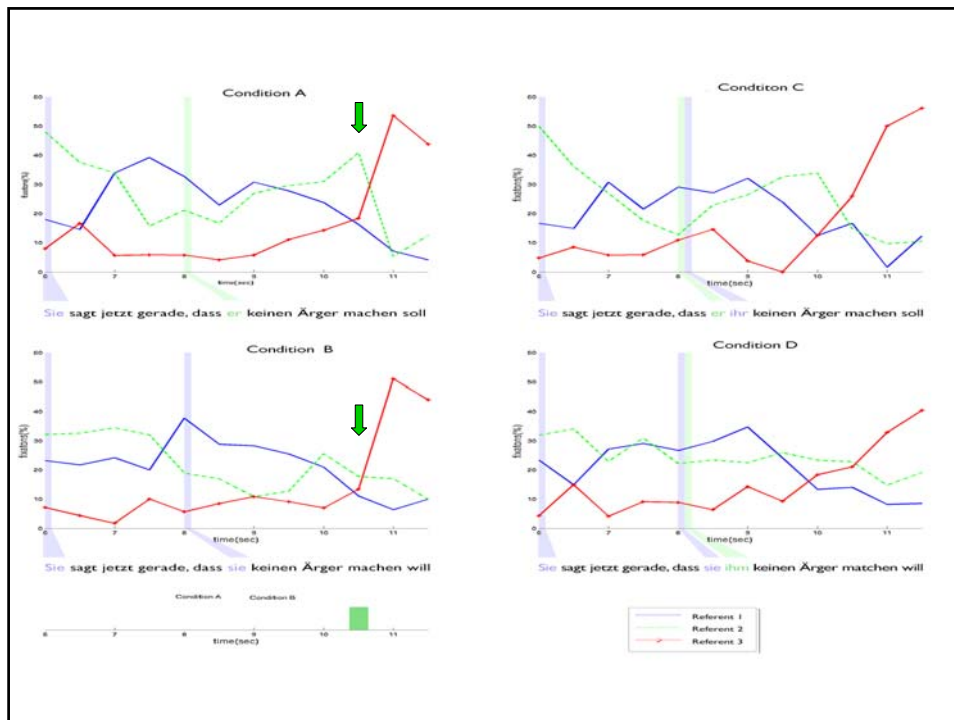
Temporal Delay for Fixation Peaks

Temporal Delay for Fixation Peaks:

Results II:

- Both full NPs and pronouns cause increased fixations on the matching referent

- The temporal resolution of pronouns in unambiguous texts is as fast as NP resolution
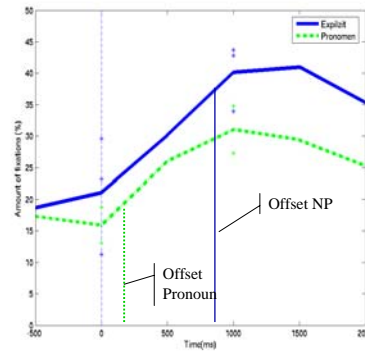
Results III :

- Both full NPs and pronouns cause increased fixations on the matching referent

- The temporal resolution of pronouns in unambiguous texts is as fast as NP resolution

- A few pronouns do not elicit higher fixation probabilities for their matching referent
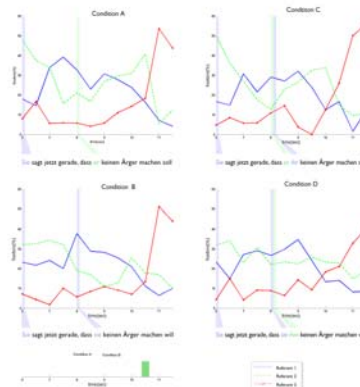
Discussion: When are Referential Expressions Resolved?

- No difference in processing time for full NPs and pronouns in an unambiguous context

- In contrast to other studies (Gernsbacher, 89) we measured from the onset of the word

- Anticipation effects have to be taken into account

Discussion: Differences in the Interpretation of Different Referential Expressions

- General difference:
  - Can be due to the fact that pronouns pick up a referent previously introduced
- The difference between pronouns :
  - No fixation peak because no attention shift occurs?
  - Due to a difference in the syntactic relation to the antecedence → Not interpreted referentialy

Outlook:

- Closer investigation of the difference in referentiality between different pronouns
- Improvements of conditions
  - Re-design of material
  - More data in each condition