

# Experimental evidence concerning the exhaustivity of wh-interrogatives embedded under German *wissen* ('know')

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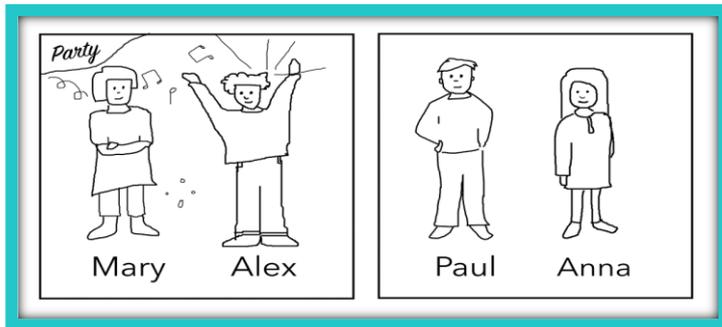
# Outline

1. Background
2. Pilot study 1: exhaustive readings under *wissen*
3. Pilot study 2: *de re/de dicto* ambiguity
4. Discussion

# Background

# Background: Exhaustiveness of embedded questions

(1) John knows [who went to the party]



Evaluation world

## Different levels of exhaustivity: John's beliefs

**Strong**

Only Mary and Alex went to the party.

**Intermediate**

Mary and Alex went to the party, no false beliefs about the others.

**Weak**

Mary and Alex went to the party (and perhaps also Paul or Anna)

**Non-Exhaustive** Mary went to the party.

# Background: Theoretical debate

## **SE hard-coded in question semantics**

Partition semantics (Gronendijk & Stokhof 1985)

### **“Flexible” views**

- WE interpretation of embedded questions, SE reading stems from semantics of ‘know’ (Heim 1994)
- Interpretation depends of ex-operators (Klinedinst & Rothschild 2011)
- ...

→ **Various theoretical analyses with different empirical predictions**

→ **Unclear semantic/pragmatic status of readings**

# Background: Unclear empirical basis

- Limited set of examples
- Barely any systematic study

## **Previous study by Cremers & Chemla (2016)**

- picture matching task
- attested IE reading for English *know*

# Pilot Study I

Exhaustive readings under *wissen*

# Pilot study I

**Research question:** Which interpretations of a questions embedded under *wissen* are available in a given context?

**Task:** Truth-value judgment in context

**Method:**

- Software OnExp
- 1 item + 4 controls/participant

# Pilot study I: Setting

Five friends living together & a curious neighbor listening in on them

## Einleitung

*Bitte lesen Sie sich den Einleitungstext genau durch!*

Anna, Björn, Caroline, Dennis und Emilia wohnen zusammen in einer WG, in der sie gerne Dinge zusammen unternehmen.

Ihre Altbauwohnung ist sehr hellhörig und nebenan wohnt eine neugierige alte Dame, deren liebste Beschäftigung es ist, abends zu horchen, was die fünf machen.

Vor dem Schlafengehen schreibt sie dann immer in ihr Tagebuch, was sie mitbekommen hat.

*Sie werden jetzt fünf Szenarien zu dieser Geschichte lesen. Zu jedem Szenario wird Ihnen eine Frage gestellt.*

Ich habe die Anweisungen verstanden.

## Introduction

Clear domain  
restriction



“Anna, Björn, Caroline, Dennis and Emilia are flatmates. They like to do things together.

The walls of their flat are very thin. A curious old lady lives next door, whose favourite occupation it is to listen to what the five friends are doing.

Before going to bed, she writes down in her diary what she has heard.”

# Pilot study I: Sample item

## 1. Evaluation world

Today there was a **game night**. Anna, Björn and Caroline played but the other two didn't, because they had to study for an exam.

## 2. Belief state

The neighbor writes in her diary:  
*I heard that Anna, Björn and Caroline played, and that Dennis didn't play. Otherwise I didn't hear anything else.*

Heute war Monopoly-Abend in der WG. Anna, Björn und Caroline haben gespielt, aber die anderen zwei nicht, weil sie für eine Prüfung lernen mussten.

Die Nachbarin schreibt in ihr Tagebuch:

*Ich habe mitbekommen, dass Anna, Björn und Caroline gespielt haben und dass Dennis nicht gespielt hat. Weiter habe ich nichts mitbekommen.*

Ist folgende Aussage richtig?

Die Nachbarin weiß, wer gespielt hat.

ja

nein

Begründung:

## 3. Target

Is the following statement correct?  
**The neighbor knows who played.**

# Pilot study I: Design

**Evaluation world:** A, B & C cooked; D & E didn't cook

**The neighbour believes that ...**

A, B and C cooked, and D and E didn't **SE**

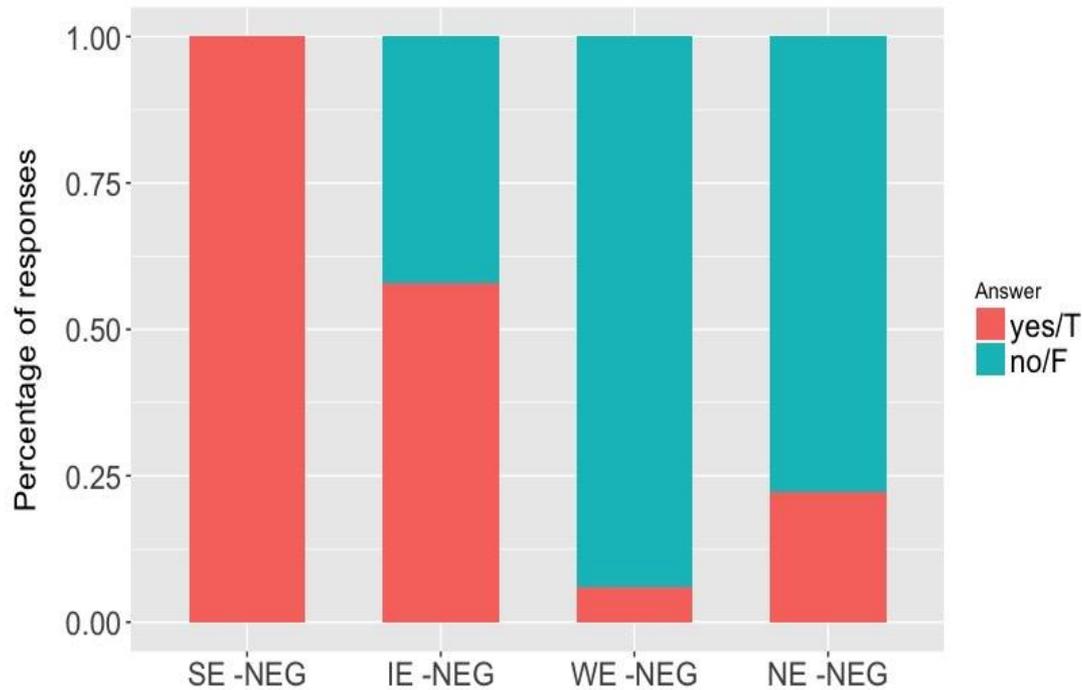
A, B and C cooked, and does not think  
that D and E did **IE**

A, B, C and D cooked **WE**

A and B cooked **NE**

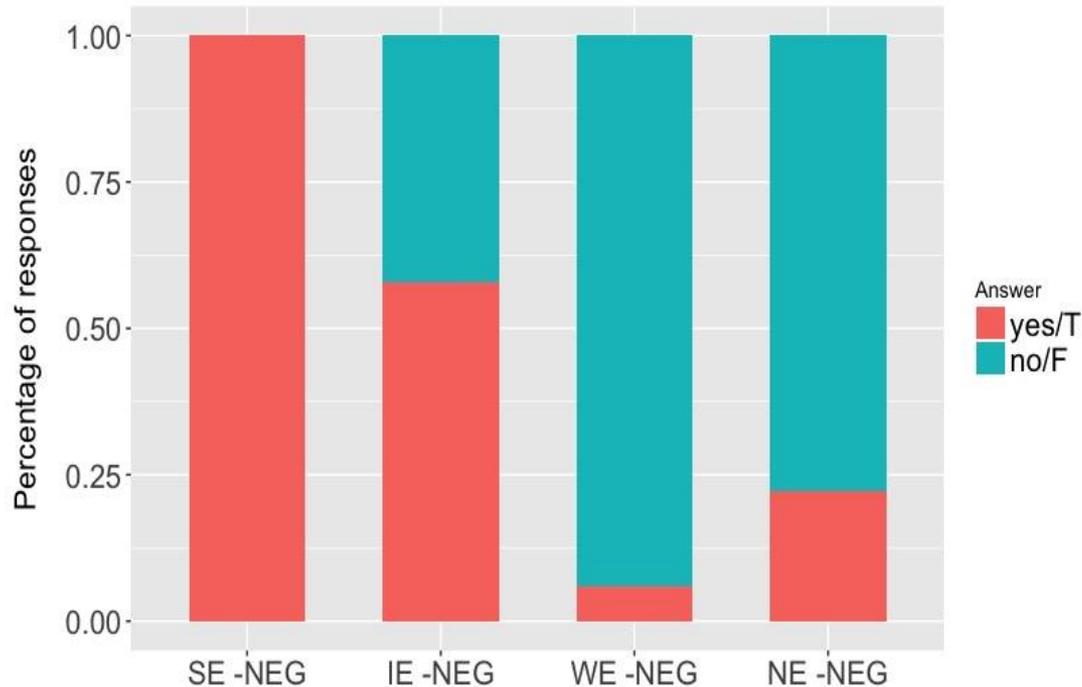
**Target sentence:** The neighbor knows who cooked.

# Pilot study I: Results



The neighbour knows who went to the party

# Pilot study I: Results



→ ‚wissen‘ allows for IE (but not lower readings)

→ Descriptive replication of Cremers & Chemla (2016)

The neighbour knows who went to the party

# Pilot study I: Discussion

Linking hypothesis?      True → reading, or weaker, available  
False → stronger reading needed



IE    “A, B, and C sang”

Comment True:    *She knows who sang, but she  
doesn't know who didn't sang.*  
Comment False:    *She doesn't know about the other  
people.*



WE    “A, B, C, D sang, and E didn't”

Comment True  
and False:        *She says that Dennis sang,  
although he didn't.*

# Pilot study I: Conclusion

**Method:** Use of **text** (rather than pictures)

Worked well!

**Empirical:** How exhaustive are interrogatives under *wissen*? **German**

SE / IE available (like English – C&C )

WE / NE more problematic

# Pilot Study II

SE and IE as a *de re* - *de dicto* ambiguity

Dayal 2016  
Gronendijk & Stokhof 1984

# De dicto & De re

(2) John knows the King of Spain.

## De re

John meets a tall, elegantly dressed man on the streets of Madrid. This man is Philip VI, the King of Spain, but John doesn't know this.

1. **Paraphrase:** John knows the King of Spain but he doesn't know that he is the King of Spain.

1. **John:** # *I know the King of Spain.*

# De dicto & De re

(2) John knows the King of Spain.

## De dicto

John meets a tall, elegantly dressed man on the streets of Madrid. This man is Philip VI, the King of Spain, and John knows this.

1. **Paraphrase:** John knows the King of Spain and he knows that he is the King of Spain

1. **John:** *I know the King of Spain.*

# De dicto & De re

**Speaker**

**John's beliefs**

**De re**

John knows the King of Spain



[[ Philip VI ]]

???



[[King of Spain]]<sup>w0, 2018</sup>

**De dicto**

John knows the King of Spain



[[ Philip VI ]]

=



[[King of Spain]]<sup>w0, 2018</sup>

# De dicto & De re: Questions

- (3) John knows the unique maximally informative answer to the question “Who went to the party?”.

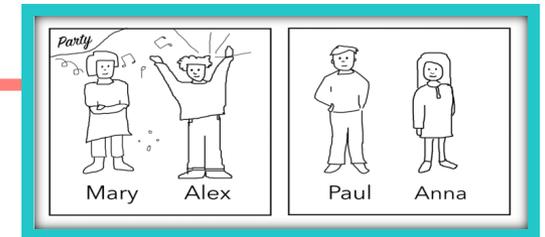
[[ ANS who went to the party]]

=

[[ the unique maximally informative answer to Q ]]

=

$\lambda w. \text{go-to-party} (\text{mary} + \text{alex})$



Dayal 1996

# De dicto & De re: Questions

**Speaker**

**John's beliefs**

**De re**

John knows the maximally informative answer

$\lambda w. \text{Mary and Alex went to the party } (w^0) = 1$

???

$\uparrow p = \text{maximally informative answer}$

**De dicto**

John knows the maximally informative answer

$\lambda w. \text{Mary and Alex went to the party } (w^0) = 1$

$\uparrow p = \text{maximally informative answer}$

# De dicto & De re: Questions

## *John's beliefs*

### De re

John knows the maximally informative answer in  $w^0$

$\lambda w. \text{Mary and Alex went to the party } (w^0) = 1$

???

$\uparrow p = \text{maximally informative answer in } w^0$

A: Who went to the party?

J: Well, Mary did, Alex also did...

1. **Paraphrase:** John knows the unique maximally informative answer to the question (Mary and Alex went to the party) but he doesn't know that this is the maximally informative answer.

→ **IE reading!!**

# De dicto & De re: Questions

## *John's beliefs*

### De dicto

John knows [the maximally informative answer in  $w^0$ ]

$\lambda w. \text{Mary and Alex went to the party } (w^0) = 1$

=

$\iota p. p = \text{maximally informative answer}$

A: Who went to the party?

J: Only Mary and Alex did.

1. **Paraphrase:** John knows the maximally informative answer to the question (Mary and Alex went to the party) and he knows that this is the maximally informative answer.

→ SE reading

# De dicto & De re: Questions

1<sup>ST</sup> PERSON

De re

John: # I know who went to the party



De dicto

John: I know who went to the party



# Pilot II: Design

- **Design: 2x2**
  - Exhaustivity: SE, IE
  - Person: 3<sup>rd</sup>, 1<sup>st</sup>
  
- **Task**
  - Truth-value judgement in context
  - Justification for answer

# Pilot II: Design

- **Method**

- web-based (OnExp platform)
- Ca. 30 responses/condition
- **Between subjects:** each participant sees...
  - 1 item (context + target sentence)
  - 4 comprehension questions (exclusion)
    - 2 checking world state and attitude holder's knowledge
    - 2 distractor questions

# Pilot II: Design

## General context

- **5 flatmates** (Anna, Barbara, Caroline, Denise, Emilia)
- **Activities** in the flatshare (karaoke, fishing, ...)

Domain  
restriction

Item  
Manipulation  
(4 activities)

# Pilot II: SE/IE manipulation

Anna, Barbara and Caroline sing, but Denise and Emilia don't sing.

Who sang in  $w^0$ ?

Peter is aware of all this.  
(er bekommt dies genau mit)

Who sang according to Peter?

SE/de dicto  
Complete knowledge

Peter stays until the end.

IE/de re:  
Incomplete knowledge

Peter leaves early.  
The karaoke continues and D and E don't sing.

# Pilot II: Person manipulation

3rd Based on the story can you say the following sentence? **IE**

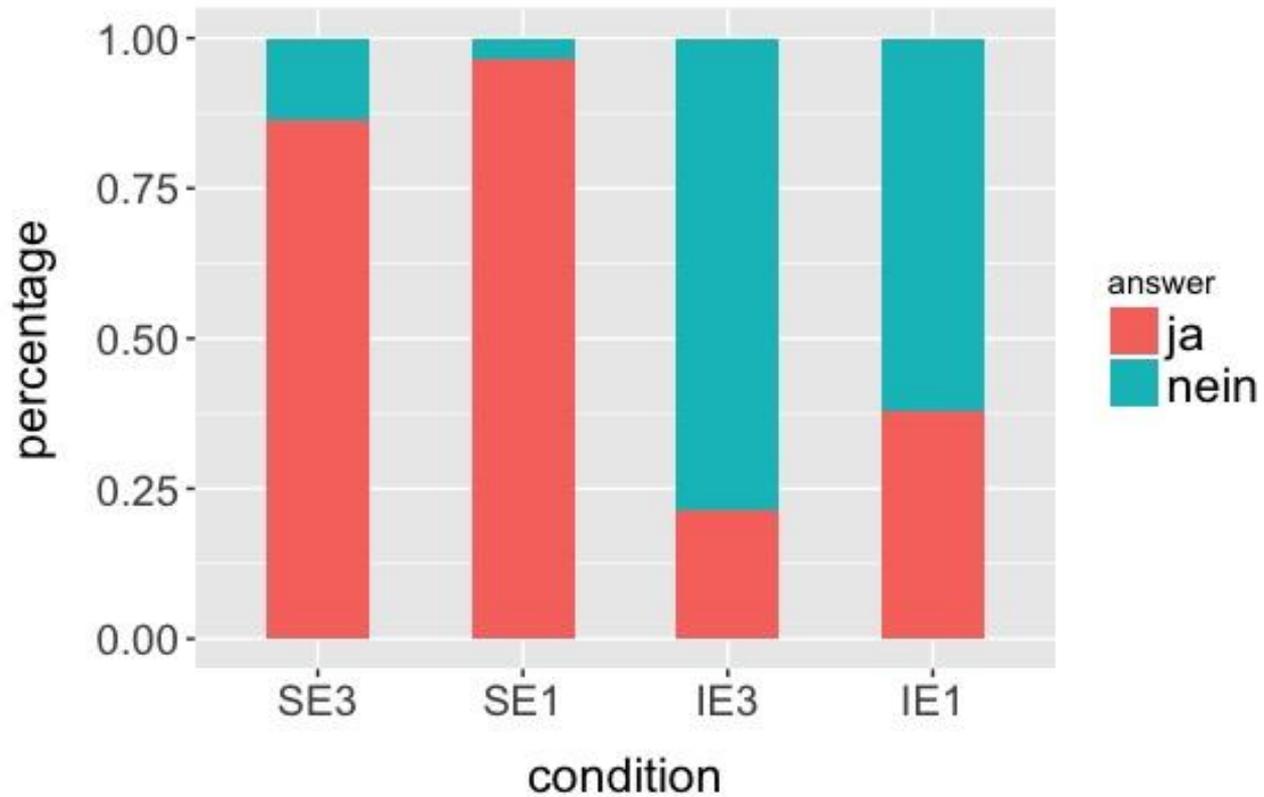
*Peter knows who out of the five flatmates sang at the karaoke*

1st Imagine that you are Peter. It's the following morning and you are at home. Can you say this from his perspective?  **IE**

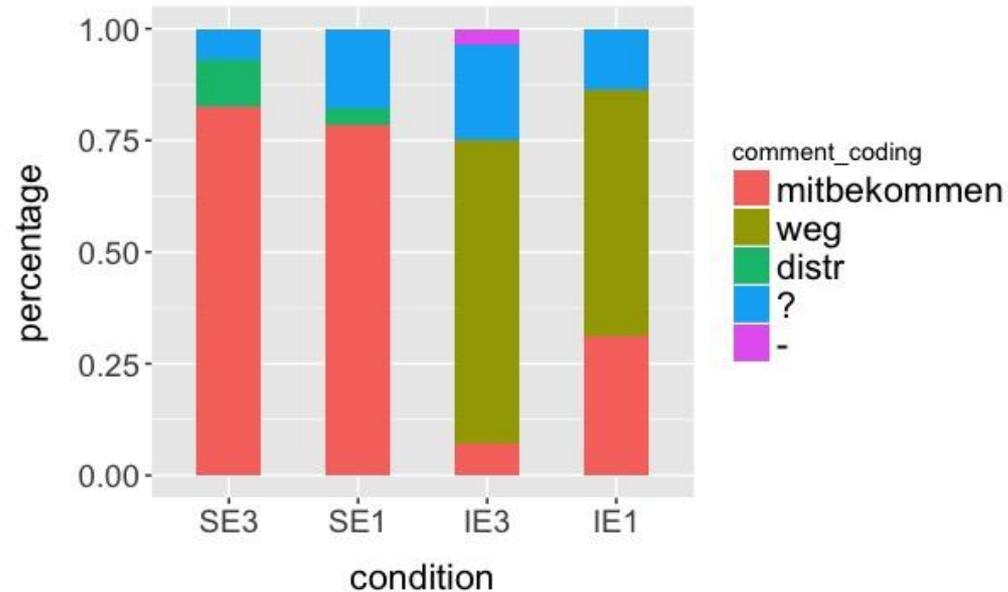
*I know who out of the five flatmates sang at the karaoke.*

*Peter/ich weiß wer von den fünf Mitbewohnerinnen beim Karaokeabend gesungen hat.*

# Pilot II: Results



# Pilot II: Comments



mitbekommen:

*Peter is aware of all this.*

→ YES responses

weg:

*D and E could have sang after Peter left.*

→ NO responses