Experimental evidence concerning the exhaustivity of wh-interrogatives embedded under German wissen (‘know’)

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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]

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 exh-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 question 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

Introduction

“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.”
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.

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.

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

The neighbour knows who went to the party

→ 'wissen' allows for IE (but not lower readings)

→ Descriptive replication of Cremers & Chemla (2016)
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**

De re

John knows the King of Spain

De dicto

John knows the King of Spain

**John’s beliefs**

De re

[[ Philip VI ]]  
[[King of Spain]] \[^0, 2018\]

De dicto

[[ Philip VI ]]  
[[King of Spain]] \[^0, 2018\]

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

\[
[[ \text{ANS who went to the party}] ] = [[ \text{the unique maximally informative answer to Q } ]] = \lambda w. \text{go-to-party (mary + alex)}
\]

Dayal 1996
De dicto & De re: Questions

**Speaker**

**De re**

John knows the maximally informative answer

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

???

\[ \text{up. } p = \text{maximally informative answer} \]

**De dicto**

John knows the maximally informative answer

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

[Diagram]

\[ \text{up. } p = \text{maximally informative answer} \]
De dicto & De re: Questions

**De re**

John knows the 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.

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

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

$\rightarrow \text{IE reading!!}$
De dicto & De re: Questions

**De dicto**

John knows [the maximally informative answer in \( w^0 \)]

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

\[ \uparrow \phi. \ p = \text{maximally informative answer} \]

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.

\[ \rightarrow \text{SE reading} \]
De dicto & De re: Questions

**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\textsuperscript{rd}, 1\textsuperscript{st}

• **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)
Anna, Barbara and Caroline sing, but Denise and Emilia don’t sing.

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

Who sang in w₀?

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.
Based on the story can you say the following sentence?  

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

Imagine that you are Peter. It’s the following morning and you are at home. Can you say this from his perspective?

*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