What do we know about demonstratives?

Collaborators:
Phil Cummins,
Boris Gutbrod,
Stefan Hinterwimmer,
Graham Katz,
Peter König,
Florian Krause,
Marlene Meyer,
Kyoung-ho Park,
Tom Rozario,
Carla Umbach,
Malte Wöstmann,
and Yufan Zhao.

The plan

1. General observations and focus of this talk
2. Antecedent parameters (grammatical relations) (corpus study, reading time, completion study)
3. Discussion of exceptions
4. Evidence for information-structural parameters (intuitions, eye-tracking study 1)
5. Eye-tracking experiment 2 comparing grammatical relations and information structure
6. Discussion of more exceptions & some speculations

The plan

1. General observations and focus of this talk
2. Antecedent parameters (grammatical relations) (corpus study, reading time, completion study)
3. Discussion of exceptions
4. Evidence for information-structural parameters (intuitions, eye-tracking study 1)
5. Eye-tracking experiment 2 comparing grammatical relations and information structure
6. Discussion of more exceptions & some speculations

Description vs. Demonstration

Referential expressions in NL single out their referent, either

by means of descriptive content (most typical for definite descriptions), but hardly ever without also relying on a variety of such as contextual domain restrictions or anaphora, or

by means of demonstration. Demonstratives rely mainly, at times exclusively, on demonstration, i.e., pointing of some kind, sometimes marginally supported by descriptive content.

The latter mechanism seems not yet very well understood.

This talk looks at those demonstratives that are poorest in their descriptive content: demonstrative pronouns.

Parameters of pointing

What is not very well understood either is

the difference in use or meaning between different forms of demonstrative pronouns, i.e, the parameters of pointing:

- English has the demonstrative pronouns *this* and *that* which are said to differ from each other with respect to proximity of the referent.

- Latin has *hic, ille, iste*, where *iste* brings in the addressee's location as an additional parameter.

- Turkish has *o, bu, şu*, again the first two associated with proximity. *şu* according to Özyürek (1998) brings in the new parameter speaker's assessment of addressee's attention state.
Focus of this talk

I will concentrate on what we've done most work on:

the specific case of how demonstrative pronouns (DPro) differ from personal pronouns (PPro) when both are used anaphorically.

And I will focus on the difference between the German DPro paradigm *der* vs. the PPro paradigm *er*.

Initial observation on DPro vs. PPro

Peter wanted to play tennis with Paul. But he was sick.

*Peter wollte mit Paul Tennis spielen. Doch er war krank.*

*Peter wollte mit Paul Tennis spielen. Doch der war krank.*

Clear intuitive judgement: *

- *er* refers to Peter and
- *der* refers to Paul

Corpus Study: German Demonstrative vs. Personal Pronouns

Pronoun interpretation is influenced also by discourse coherence, specifically *plausibility of predication*, and not only by grammatical constraints.

Why only preference? Why not 100 p.c.?

*Nora* scored the highest in the competition.

* could you take the ashtray off the table and put it on the window sill, please?

Could you take the ashtray off the table and push it into the corner, please?

So perhaps our corpus count is influenced by this factor too?
Reading time study & completion task

1. How strong are the preferences when plausibility interferes?

method: reading time + completion task
materials:
1. Der Chefarzt untersucht den Patienten. Der ist nämlich Herzspezialist. 
   [The head physician is examining the patient. He \(_{DP}\) is a heart specialist.]

world knowledge prefers: Der -> Chefarzt (subject bias of predicate) 
pronoun type prefers: Der -> Patient (non-subject bias of pronoun)

prediction:
(1) Conflict leads to longer reading time

\[
\begin{align*}
\text{der} + \text{subject bias} & \quad > \quad \text{er} + \text{subject bias} \\
\text{er} + \text{non-subject bias} & \quad > \quad \text{der} + \text{non-subject bias}
\end{align*}
\]

Results - Reading time

significantly longer reading time for der in a subject-biased sentence

Der Chefarzt untersucht den Patienten. Der ist nämlich Herzspezialist. > Er ist nämlich Herzspezialist
other comparisons not significant.

Completion Task - Stimulus Materials

headline
   Im Krankenhaus  [In hospital]

introduction of two antecedents
(2) (i) Der Chefarzt untersucht den Patienten. 
   [The head physician is examining the patient.]

target sentence
(3) (a) Er / Der ist nämlich Herzspezialist. 
   [He is a heart specialist.]
(b) Er / Der muß sofort operiert werden. 
   [He must be operated on immediately.]
(c) Er / Der ist gerade erst gekommen. 
   [He has just arrived.]

prediction:
(1) Conflict leads to longer reading time

\[
\begin{align*}
\text{der} + \text{subject bias} & \quad > \quad \text{er} + \text{subject bias} \\
\text{er} + \text{non-subject bias} & \quad > \quad \text{der} + \text{non-subject bias}
\end{align*}
\]
Completion Task - Predictions

(1) for subject-biased predicate: more errors for der than for er
   Der Chefarzt untersucht den Patienten. Der ist nämlich Herzspezialist.
   expected error: Der Patient ist nämlich Herzspezialist.

(2) for object-biased predicate: more errors for er than for der
   Der Chefarzt untersucht den Patienten. Er muss sofort operiert werden.
   expected error: Der Chefarzt muss sofort operiert werden.

for unbiased predicate:
(3) der shows preference for the object
   Der Chefarzt untersucht den Patienten. Der ist gerade erst gekommen.
   expected preference: Der Patient ist gerade erst gekommen.

(4) er shows preference for the subject
   Der Chefarzt untersucht den Patienten. Er ist gerade erst gekommen.
   expected preference: Der Chefarzt ist gerade erst gekommen.

Results from reading time & completion

Demonstrative pronouns prefer non-subject antecedents
Personal pronouns show less clear preference.

- reading time:
  der + subject bias > er + subject bias

- errors in completion task:
  der + subject bias > er + subject bias

- preference in completion task:
  der + unbiased predicate: object > subject antecedent

So far: Nice Agreement on DPro

Something roughly similar to a preference of DPro for objects and PPro for subjects has been suggested by Zifonun e.a. (1997), Abraham (2002), Winter (2003), for German

and by Comrie (1997), Kaiser & Trueswell (2004) for Dutch

But why did some of our experimental results not reach significance?
Hard exceptions to subject avoidance

Although DPro generally reject subject antecedents, they may also accept subject antecedents,
- at least when alternatives are grammatically excluded (gender agreement) (1c, 2c);

(1c) Woher ich das weiß? Peter hat es mir gesagt. (Deri / Er) war gerade hier.
[How do I know? Peter told me. He (DProi/PProi) has just been here.]

(2c) Woher Maria das weiß? Peter hat es ihr gesagt. (Der / Er) war gerade hier.
[How does Maria know? Peter told her. He (DPro/PPro) has just been here.]

- in (3c) even excluding the non-subject antecedent,

(3c) Woher Karl das weiß? Peter hat es ihm gesagt. (Deri / Er,ki) war gerade hier.
[How does Karl know? Peter told him. He (DPro,ki/PPro,ki) has just been here.]

- and in (4c) the DPro rejects the non-subject antecedent, although there is no alternative.

(4c) Woher Maria das weiß? Peter hat es ihr gesagt. (#Die / Sie) war gerade hier.
[How does Maria know? Peter told her. She (DPro / PProj) has just been here.]

Hard exceptions to subject avoidance

Conclusion:
Grammatical role of antecedent may be a fair corpus generalization, and was reasonably well supported experimentally, but cannot be the relevant parameter.

Consider the hard exceptions again

DPro prefer focussed referents and reject topics.

(1c) Woher ich das weiß? Peter hat es mir gesagt. (Deri / Er) war gerade hier.
[How do I know? Peter told me. He (DProi/PProi) has just been here.]

(2c) Woher Maria das weiß? Peter hat es ihr gesagt. (Der / Er) war gerade hier.
[How does Maria know? Peter told her. He (DPro/PPro) has just been here.]

(3c) Woher Karl das weiß? Peter hat es ihm gesagt. (Deri / Er,ki) war gerade hier.
[How does Karl know? Peter told him. He (DPro,ki/PPro,ki) has just been here.]

(4c) Woher Maria das weiß? Peter hat es ihr gesagt. (#Die / Sie) war gerade hier.
[How does Maria know? Peter told her. She (DPro / PProj) has just been here.]
If this new hypothesis is correct, then it follows that the earlier generalization in terms of grammatical roles had to be roughly correct: Subjects typically refer to discourse topics.

Our experimental results are indifferent to this change of hypothesis: They equally support the new hypothesis, since in the stimulus materials all topics were subjects and all non-topics were non-subjects.

The new hypothesis removes two further problems of the subject avoidance hypothesis:

Coverage
Our first hypothesis was formulated in terms of grammatical relations, hence could only cover pronouns with explicit antecedents.

Theory
Our first hypothesis incorrectly implied that anaphoric relations are relations between linguistic expressions rather than referential relations.

Discourse foci and discourse topics, on the other hand, are not expressions, but denotations. Hence we can now, in principle, also cover

- pronouns referring to discourse-new referents
- pronouns referring to complex referents
- pronouns with non-referential antecedents.

Perhaps the information-structural hypothesis is on the right track.

But the role of different factors in the interpretation – lexical preferences of pronouns vs. plausibility of predication – is still unresolved.

In intuitive judgements on the interpretations of sentences, and also in self-paced reading times and in error rates in completion tasks we could only see

**the results of comprehension processes**, but we had no evidence about the process itself.

Visual World Eye Tracking can tap the process online.
Eye tracking experiment 1

Eine Verwarnung. - Der Polizist redet gerade mit dem Autofahrer über das falsch geparkte Auto.
A traffic fine. - The policeman is talking to the driver about the illegally parked car.

(Der / Er) will 20 Euro für Falschparken kassieren und regt sich fürchterlich auf.
He wants a € 20 fine and is getting terribly annoyed.

PPro preference = plausibility bias

Er will 20 Euro für Falschparken kassieren und regt sich fürchterlich auf.
He wants a € 20 fine and is getting terribly annoyed.

PPro preference = plausibility bias
Eine Verwarnung. Der Polizist redet gerade mit dem Autofahrer über das falsch geparkte Auto.

A traffic fine. The policeman is talking to the driver about the illegally parked car.

Der ist ziemlich unhöflich, schreit ganz laut herum und regt sich fürchterlich auf.

He is rather impolite, starts shouting, and is getting terribly annoyed.

Ein Verwarnung. Der Polizist redet gerade mit dem Autofahrer über das falsch geparkte Auto.

A traffic fine. The policeman is talking to the driver about the illegally parked car.

Der will 20 Euro für Falschparken kassieren und regt sich fürchterlich auf.

He wants a € 20 fine and is getting terribly annoyed.

Ein Verwarnung. Der Polizist redet gerade mit dem Autofahrer über das falsch geparkte Auto.

A traffic fine. The policeman is talking to the driver about the illegally parked car.

Er ist mit der Verwarnung nicht einverstanden und regt sich fürchterlich auf.

He does not agree with the fine and is getting terribly annoyed.
The experiment supports previous evidence about the different preferences of DPro and PPro.

Additionally, we were able to tease apart the separate effects of pronoun preference and plausibility bias in the course of the comprehension process:

- The pronoun preference shows up at onset of the pronoun.
- While the plausibility effect comes in only later when the relevant information has become available.

Unfortunately, in the stimulus materials of our experiment all subjects are topics and all non-subjects are non-topics. Aficionados of grammatical relations will thus not be convinced by our experimental evidence.

A further experiment crosses the subject-object and topic-focus distinctions—and supports the generalisation that DPro avoid topics.

   
   Can you see the policeman with the stop sign? He's just talking to the car driver about the illegally parked car.

   (Der / Er) ist ziemlich unhöflich, schreit ganz laut herum und regt sich fürchterlich auf.
   
   He is rather impolite, starts shouting, and is getting terribly annoyed.

B: Siehst du den Autofahrer mit der braunen Weste? Der Polizist redet gerade mit ihm über das falsch geparkt Auto.
   
   Can you see the car driver with the brown vest? The policeman is just talking to him about the illegally parked car.

   (Der / Er) ist ziemlich unhöflich, schreit ganz laut herum und regt sich fürchterlich auf.
   
   He is rather impolite, starts shouting, and is getting terribly annoyed.
The experiment clearly supports the hypothesis that DPro are insensitive to the grammatical (subject or non-subject) status of their antecedents. The experiment supports intuitive evidence about the topic avoidance of DPro, but, like the reading time and completion study, it does not support the complementary hypothesis that PPro prefer topics; the current results rather seem to show a subject preference of PPro.

Can we now safely conclude that DPro avoid discourse topics? Unfortunately not. There is counter evidence also to this hypothesis: cases, where a DPro picks an antecedent that clearly refers to a discourse topic.
Counter evidence to topic avoidance

Karl is a clear case of a discourse topic:
- repeated previous reference,
- last reference by an unstressed anaphoric PPro,
but still naturally accessible to DPro!

*example due to Hans-Martin Gärtner, p.c.

Counter evidence to topic avoidance

Root evidence is not limited to anaphoric reference in texts. We also find cases where a situational topic becomes the referent of a DPro.

(5) [watching someone trying to move a book case full of books]:
Wenn Du die Bücher nicht rausnimmst, kriegst Du den nie von der Stelle.
[If you won't take the books out, you'll never be able to move it.]
Re-focusing

However, one may also point to something that already is the object of attention – for special purposes:

to express an implicit contrast ("this rather than any other one")

Wo war Peter? Keiner hatte ihn gesehen. Der sollte als nächster vortragen.
Where was Peter? Nobody had seen him. HE was supposed to be the next to give a talk.

to say that the current, already focussed, referent has an already familiar property, expressed in the predicate (characterizing the referent)

Peter war verspätet. Alle mussten auf ihn warten. Der war immer verspätet.
Peter was late. Everyone had to wait for him. HE was always late.

Attention

The proposal then is to explain the difference between PPro and DPro with reference to attention states, rather than in terms of grammatical relations or information structure.

Attention probably depends on a large number of interacting or competing processes – also linguistic ones, but only ceteris paribus.

The exciting next task then is to investigate some of these interactions.

Thank you!