# Definite reference is not always based on salience

**Peter  Bosch, Sascha Alexeyenko, Kerstin Brukamp,
Maria Cieschinger, Xiaoye Deng, Peter König**

**pbosch@uos.de**

---

## semantics of the definite determiner: uniqueness

Definite referential expressions (*the so-and-so*) are often thought of as referring to <u>unique instances</u> of the kind denoted by the NP.

*The current German President is a lawyer.*



would thus refer to Christian Wulff, implying that there is <u>currently exactly one German President</u>.

But when I say

*The microphone is black.*

I am <u>not</u> assuming that there is <u>exactly one microphone</u> in the whole world. Rather, it seems that the <u>discourse context</u> restricts the uniqueness condition to the limited domain of our picture, and that, <u>within that domain</u>, there is exactly one microphone.

## semantics of the definite determiner: uniqueness

Discourse context may mean

- the situational context, as in the microphone example, or

- the linguistic context, as in cases of anaphora:

    *John has a son and a daughter. The boy is eight.*

In both cases the uniqueness condition holds, even though in a limited domain.

---

## semantics of the definite determiner: uniqueness

If the uniqueness condition is not satisfied, the use of the definite determiner leads to incoherence :

    *John has two sons. #The boy is eight.*

Cf. also

    *His failure to meet the target was not a reason for his dismissal; it was the reason.*

meaning that there were no other reasons for his dismissal.

**In sum:        definite reference is based on uniqueness within an appropriate domain of reference.**

## semantics of the definite determiner: uniqueness questioned

In some situations, though, there is clearly <u>more than one referent</u> that satisfies the descriptive content of the NP, but the use of the definite determiner is still entirely appropriate.

Consider somebody talking about the family dog, saying (perfectly acceptably and comprehensibly):

> *<u>The dog</u> got in a fight with another dog. – I'll have to see to it that <u>the dog</u> doesn't get near that other dog again.*
>
> *(McCawley 1979)*

Here the discourse domain would seem to contain two dogs.

**How does the uniqueness condition apply here?**

## semantics of the definite determiner: uniqueness ⇒ salience

Perhaps the idea of "***uniqueness within a restricted domain***" may, after all, not be feasible, and another idea may be required.

David Lewis (*1979:178)* proposed the notion of **salience** to replace the uniqueness idea:

> *It is not true that a definite description "the F" denotes x if and only if x is <u>the one and only F in existence</u>.*
>
> *Neither is it true that "the F" denotes x if and only if x is <u>the one and only F in some contextually determined domain of discourse</u>.*
>
> *The proper treatment of descriptions must be more like this: "the F" denotes x if and only if x is <u>the most salient F in the domain of discourse</u>, according to some contextually determined salience ranking.*

## semantics of the definite determiner: uniqueness ⇒ salience

A fair number of theories have been developed in linguistics (e.g., Ariel 1985, Gundel et al. 1993, Grosz et al.1995, von Heusinger 1996, Roberts 2003) that provide parameters or algorithms for the ranking of discourse referents for their salience or prominence.

But although there is the clear intention to cover also situational uses, there is no explicit theory except for narrowly linguistic parameters.

It is therefore unclear if the overall reduction of definite reference to salience, as proposed by Lewis, can succeed. It is at least conceivable that definiteness may have more than one source, salience (in whatever exact sense) being just one of them.

## experiment: salience vs. uniqueness

We wanted to know about the role <u>salience</u> plays in the process of identifying the referent of a definite NP – independently of, and in comparison with, <u>anaphora</u> and <u>situational uniqueness</u>.

We designed an eye-tracking experiment to compare the role of these three factors for short spoken texts vis-a-vis a visually represented situation.

## experiment: modifed visual world / materials

Subjects were viewing photographs of Playmobil® sceneries on a computer screen and simultaneously listened to short narratives related to the pictured scenery.

The narratives consisted of

- a headline-type introduction, followed by
- a sentence starting with an NP that introduced an animate referent and, later on, another NP introducing a further animate referent.
- The final sentence started with a definite NP (the target), followed by further material.

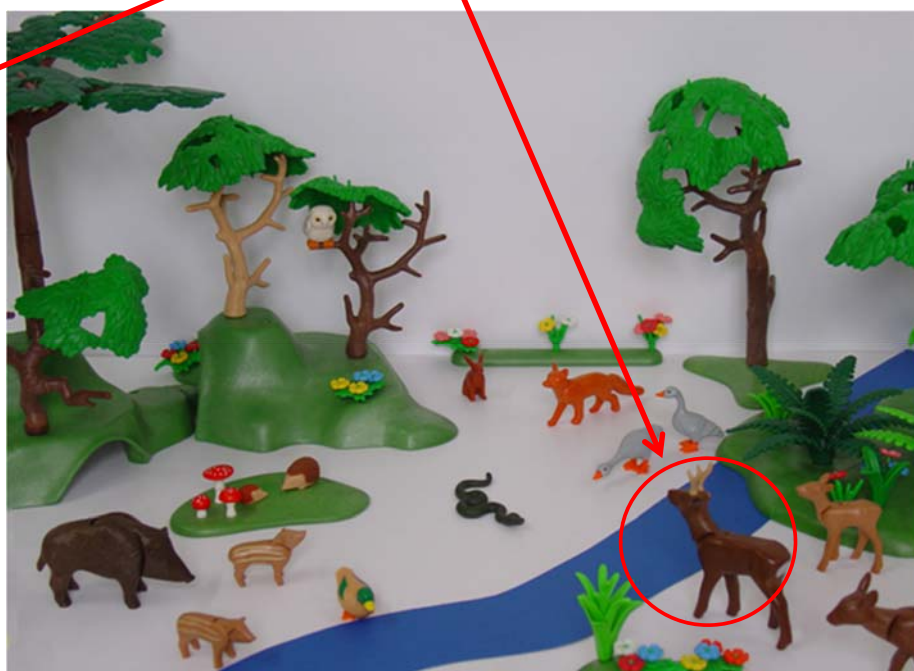## experiment: modified visual world / technicalities

- 27 participants, University of Osnabrück students, paid or course credits, age 22 average
- 32 stimulus sets, 4 per condition
- visual stimuli presented via 30' Apple Cinema HD display
- auditory stimuli via ER-4B Earphones
- eye movements recorded (Eye Link II, head-mounted) at 250 Hz
- randomized presentation
- ROI defined manually
- time course of fixations in slots of 100 ms
- stimulus validity controlled

**Condition 1a:**      **[previous mention, unique reference]**



*In the wood.*

*<u>A stag</u> is standing at the bank of the river and is carefully watching the snake on the other side.*

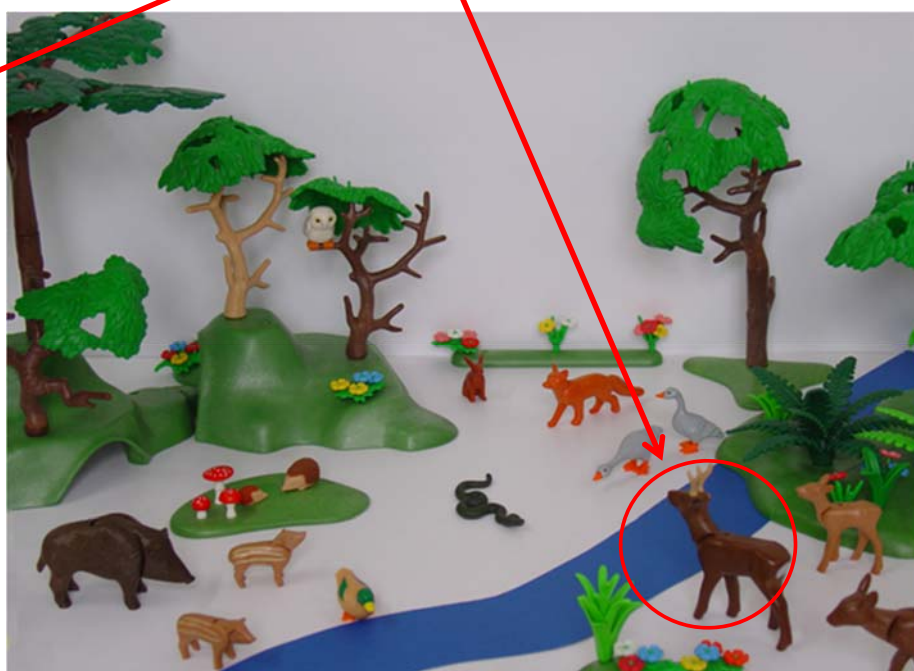*<u>The stag</u> is frightened because the snake is dangerous.*

Bosch et al.      Definite reference is not always based on salience      11/22

---

## materials: the original in German

**Condition 1a:**      **[previous mention, unique reference]**



*Im Wald.*

*<u>Ein Hirsch</u> steht am Flußufer und beobachtet gespannt die Schlange auf der anderen Seite.*

*<u>Der Hirsch</u> hat Angst, weil die Schlange gefährlich ist.*

Bosch et al.      Definite reference is not always based on salience      12/22

*In the wood.*

*A stag is standing at the bank of the river and is care-fully watching the snake on the other side.*

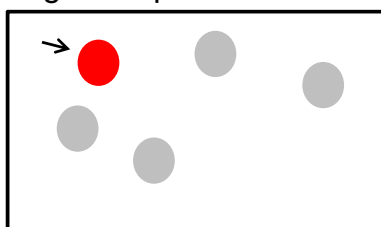*The stag is frightened because the snake is dangerous.*
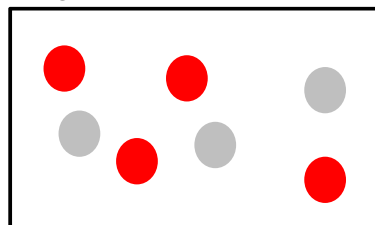
---

# design: the parameters

**apart from <u>previous mention</u> of the target, we varied the following parameters:**
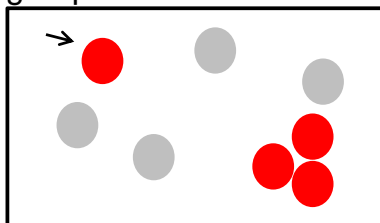
**uniqueness :**

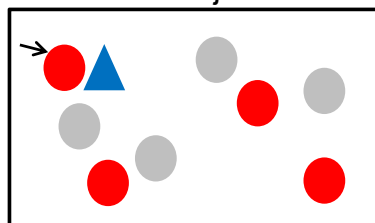(a)  target unique



(b)  target one of several competitors



**visual salience :**

(c)  target isolated, competitors grouped



(d)  target close to previously mentioned object

**Condition 2c:**     [no previous mention, non-unique reference,
target isolated & competitors grouped]



*In the park.*

*A park keeper has just checked the pond and has been watched by the grandmother.*

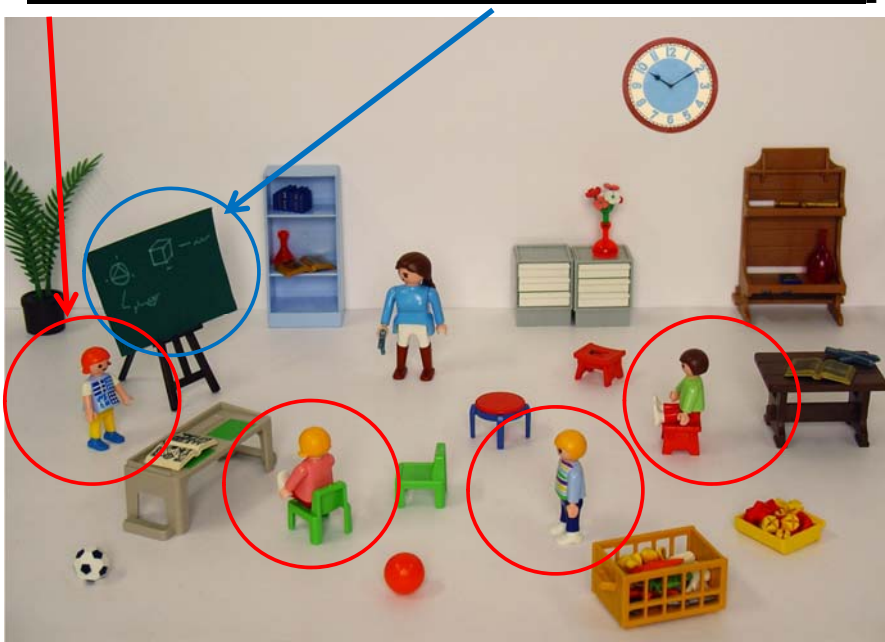*The child is getting ready to go home with its grandmother.*

**Condition 2d:**     [no previous mention, non-unique reference,
target close to previously mentioned object]



*In the classroom.*

*There is an exercise on the blackboard that the teacher wrote up there.*

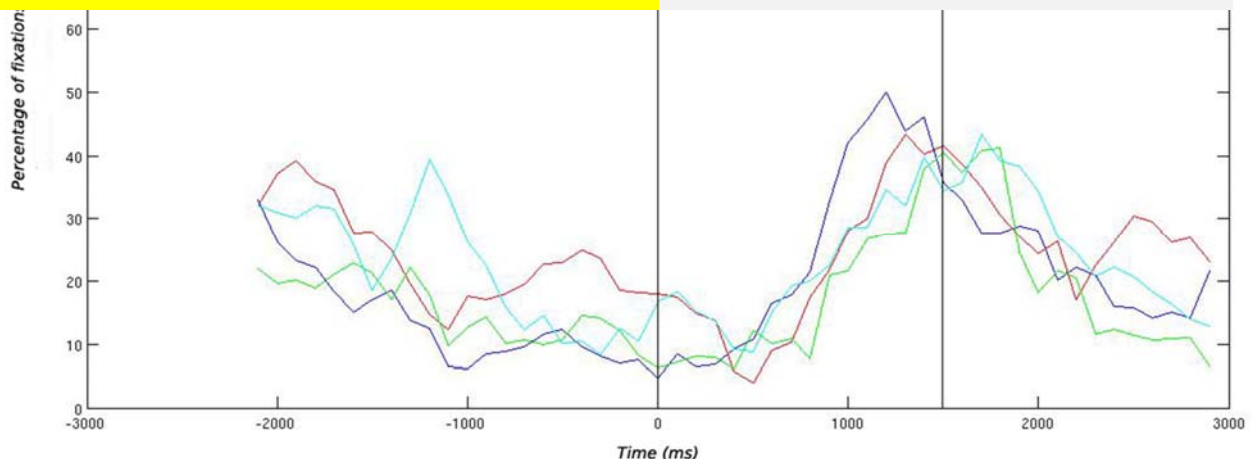*The child has quickly found the solution and is glad about the praise.*

# design: combination of parameters

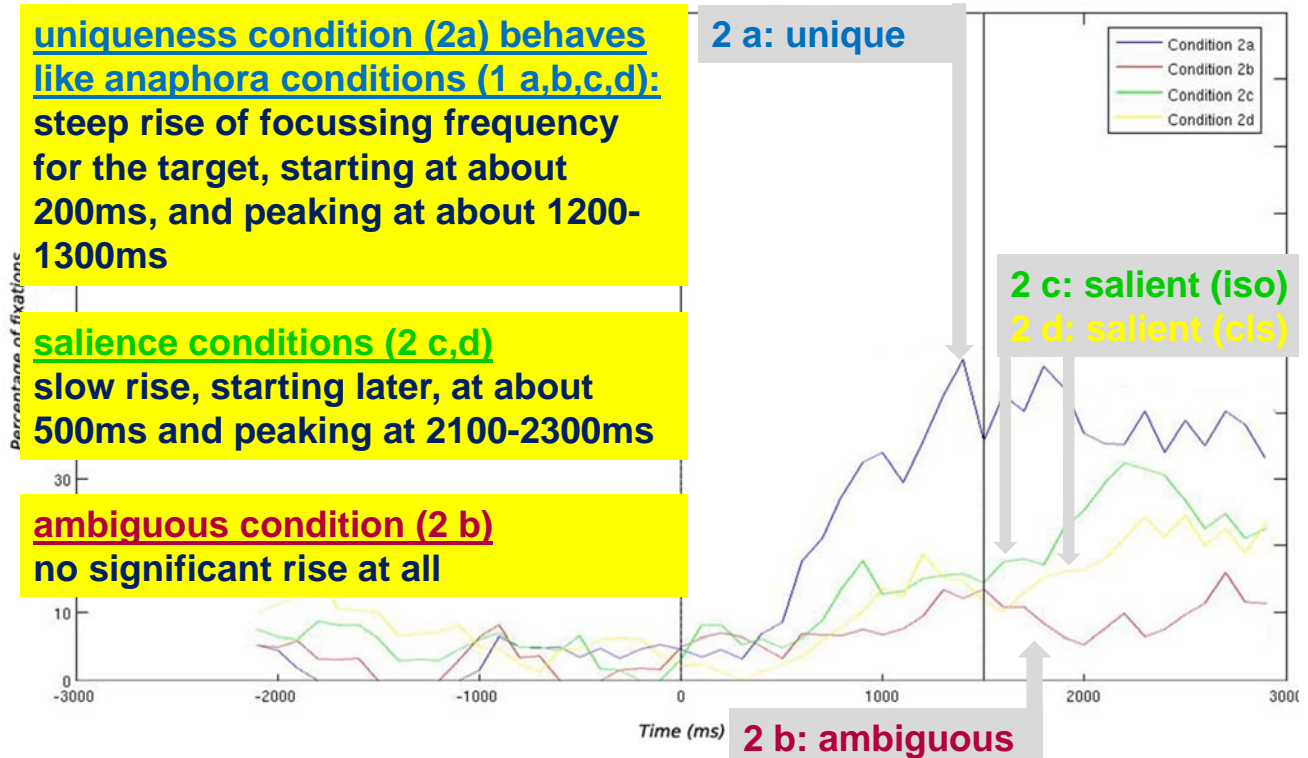| | a | b | c | d | |
|---|---|---|---|---|---|
| **1** | unique referent<br><br>**prev. mention** | non-unique ref.<br><br>**prev. mention** | non-unique ref.<br><br>**prev. mention**<br><br>**salience by isolation** | non-unique ref.<br><br>**prev. mention**<br><br>**salience by closeness** | **anaphora** |
| **2** | unique referent<br><br>1st mention | non-unique ref.<br><br>1st mention | non-unique ref.<br><br>1st mention<br><br>**salience by isolation** | non-unique ref.<br><br>1st mention<br><br>**salience by closeness** | **1st mention** |
| | **uniqueness** | | **salience** | | |

---

# results for anaphora conditions 1 a,b,c,d

**anaphora conditions (1 a,b,c,d):**
**steep rise of focussing frequency for the target, starting at about 200ms, and peaking at about 1200-1300ms**

conditions 1
a. **anaphoric, unique** ——
b. **anaphoric** ——
c. **anaphoric, salient** ——
d. **anaphoric, salient** ——

# results for 1st mention conditions 2 a,b,c,d

**uniqueness condition (2a) behaves like anaphora conditions (1 a,b,c,d):** steep rise of focussing frequency for the target, starting at about 200ms, and peaking at about 1200-1300ms

**salience conditions (2 c,d)** slow rise, starting later, at about 500ms and peaking at 2100-2300ms

**ambiguous condition (2 b)** no significant rise at all

2 a: unique

2 c: salient (iso)
2 d: salient (cls)

2 b: ambiguous

---

# results: significant differences

**Comparison between conditions, using ANOVA**

| Conditions | p-value | |
|---|---|---|
| 1a - 1b | 0.417 | |
| 1a - 1c | 0.051 | |
| 1a - 1d | 0.286 | all anaphoric |
| 1b - 1c | 0.256 | |
| 1b - 1d | 0.756 | |
| 1c - 1d | 0.454 | |
| | | |
| 1a - 2a | 0.799 | anaph/unique vs unique |
| 1b - 2b | 0.000 | anaph vs ambiguous |
| 1c - 2c | 0.033 | anaph vs salient |
| 1d - 2d | 0.001 | anaph vs salient |
| | | |
| 2a - 2b | 0.000 | unique vs. ambiguous |
| 2a - 2c | 0.000 | unique vs. salient |
| 2a - 2d | 0.000 | unique vs. salient |
| 2b - 2c | 0.510 | ambiguous vs. salient |
| 2b - 2d | 0.889 | ambiguous vs. salient |
| 2c - 2d | 0.585 | salient vs. salient |

## discussion

The focussing behaviour shows that

- the <u>uniqueness of a referent</u> and its <u>previous mention</u> each on their own effect the same ease of comprehension of a definite NP in the situation of the experiment.

- <u>No significant enhancement</u> was found, where these conditions are <u>supplemented by visual salience</u>.

- Where <u>neither previous mention nor uniqueness</u> support the comprehension, <u>salience factors</u> still support the comprehension process, although in a degraded fashion.

## Conclusions

### Two distinct cognitive processes involved

**A**      **Discourse anaphora and unique reference in the discourse domain**, where the discourse domain is fixed by preceding discourse and visual information.

**B**      **Visual salience** (visually isolated position or visual closeness to an already salient object)

### Definiteness is <u>not</u> primarily based on salience:

**Degraded results for B** in conditions 2 c,d where only **B** operates, compared to conditions 1 a,b,c,d and 2a, where **A** operates: later and slower rise in focussing, later and and lower peaks.

**No facilitation through B** in conditions 1 c,d where both **A** and **B** operate, compared to conditions 1 a,b, where only **A** operates.

# Thanks