

*How are pragmatic differences between positive and negative sentences captured in the processes and representations in language comprehension*

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# Plan

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- What are the differences between positive and negative sentences
  
- How the difference between negative and positive sentences is captured
  - during **processing**
    - what is the impact of the **context** for positive and negative sentences
  
  - during **comprehension**
    - what are the differences between the meaning **representation** created for positive and negative sentences  
→ ***two-simulations hypothesis***

# Differences between positive et negative sentences

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- (1) The door is open
- (2) *The door is not closed*

- (1) and (2) seem to differ with respect to the contexts in which they can be uttered felicitously
- (2) seems to be felicitous in the following contexts
  - the negated proposition (*The door is closed*) was explicitly mentioned as a possibility
  - negated proposition constitutes a plausible assumption
  - thus, (2) says that
    - the door is open
    - the speaker has reasons to assume that the comprehender may have expected the door to be closed

# What kind of information do the negative sentences provide?

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- Negative sentences provide information not only about the **actual state of affairs** but also about **plausible alternatives**
- Negative sentences are usually used for **correcting false assumptions**

(e.g. Givon 1978, Glenberg, Robertson, Jansen & Johnson-Glenberg 1999, Horn 1989, Wason 1965, for a different view Giora 2006)

# How the difference between negative and positive sentences is captured during the **processing**

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- Are the negative sentences more easily processed in a pragmatically felicitous contexts?
- Pragmatically felicitous contexts are the ones in which the negated proposition was
  - explicitly mentioned  
(i.e. negating an explicitly mentioned proposition)  
OR
  - constitutes a plausible assumption for the given situation  
(i.e. negating an inferred proposition)

# 1st study – negating an explicitly mentioned proposition

Schindele, Lüdtke & Kaup (2008)

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- Participants read the stories that introduced a particular target entity
  - e.g., water
- The final sentence either affirmed or negated that a particular attribute applied to this entity
  - The water was / was not warm
- The propositions that was affirmed or negated was either explicitly mentioned or not in a prior context
- Prediction: the processing of the **negative** target sentences but not (or not as much) the processing of positive ones should be **facilitated in the 'mentioned'** condition wrt the 'not-mentioned' condition

# 1st study - negating an *explicitly mentioned* proposition

Schindele, Lüdtke & Kaup (2008)

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Setting	Danielle was glad that summer break finally started. Today she was meeting her friend Karen at the local swimming pool.
Variation mentioned not-mentioned	On her way to the pool, Danielle wondered whether <u>the water would be warm</u> what the water would be like
Filler	She sat down at the edge of the pool and carefully lowered her foot onto the water.
<b>Target</b>	<b>The water was (not) warm.</b>
Question	Were the girls meeting at the lake?

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# 1st study → results

Schindele, Lüdtke & Kaup (2008)

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- Results: processing times for the negative target sentences were **significantly shorter** in the 'mentioned' condition.
- No difference for the positive target sentences was observed.

# 2nd study - negating an *inferred* proposition

Lüdtke & Kaup (2006)

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- Participants were presented with narrative stories that suggested an inference concerning a particular property of a target entity
  - that a boy's T-shirt is dirty after he played outside in the backyard
- This inference was denied
  - either by means of an affirmative statement (the T-shirt was clean)
  - or by means of an explicit negation (the T-shirt was not dirty).
- The stories differed with respect to how strongly they implied the respective inference (strongly vs. weakly implying stories).

# 2nd study - negating an *inferred* proposition → strongly-implying

Lüdtke & Kaup (2006)

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**Strongly**-implying context, negated proposition constitutes a highly plausible assumption

Setting	<i>During the wedding reception the kinds of the guests were playing in the backyard of the hotel</i>
Context 1 (dirty expected)	<i>Betty's young son was not shy and participated in any non-sense that the kids could come up with. Just before dinner, Betty summoned her son. She was going to change his clothes because she wanted him to look neat during the banquet.</i>
<b>Target Sen</b> <b>Neg/Aff</b>	When her son came running up to her, Betty was astonished to see that his T-shirt was not dirty / was clean.

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# 2nd study - negating an *inferred* proposition → weakly-implying

Lüdtke & Kaup (2006)

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**Weakly**-implying context, negated proposition does not constitute a highly plausible assumption

Setting	<i>During the wedding reception the kinds of the guests were playing in the backyard of the hotel</i>
Context 1 ( <i>clean</i> expected)	<i>Only Betty's young son was sitting inside the corner reading books by himself. Just before the dinner, Betty summoned her son. She was going to put a bib on him, because she wanted him to look neat even after the banquet.</i>
<b>Target Sen</b> <b>Neg/Aff</b>	When her son came running up to her, Betty was astonished to see that his T-shirt was not clean / was dirty.

## 2nd study - negating an *inferred* proposition → results

Lüdtke & Kaup (2006)

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- Residual reading times for negative sentences were longer than those for positive sentences
  - ONLY for the weakly-implying stories
  - but NOT for strongly-implying stories

# 3rd study – negating an *inferred* proposition in individuals with autism

Schindele, Lüdtke & Kaup (2008)

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- Readers with autism have problems with Theory of mind, that is, they do not take into account the mental state of the speaker
  - A similar study was conducted with a group of individuals with Asperger disorder or high functioning autism (HA/AS) and a control group of healthy readers
  - Results:
    - for healthy readers negative sentences were harder to process only in the pragmatically infelicitous context
    - for HA/AS participants – processing times of negative sentences were prolonged to those of positive **independent** of whether the context was pragmatically felicitous
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# Meaning representation

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- **Experiential-simulations** account of language comprehension
  - comprehenders are assumed to mentally simulate the situations and events described by the sentences
  - the mental simulations are assumed to be experiential in nature as they are grounded in perception and action (cf. Barsalou 1999, Glenberg 1997, Zwaan 2003)

# Meaning representation of negative sentences

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## □ **Two-simulations hypothesis**

(e.g., Kaup & Zwaan 2003; Kaup, Zwaan & Lüdtke 2007)

- when processing a negative sentence, comprehenders create two simulations
  - 1<sup>st</sup> step – they mentally simulate the state of affairs that is being negated
  - 2<sup>nd</sup> step – attention is focused away from this simulation and they mentally simulate the state of affairs that is actually the case
  - negation is implicitly represented in the deviations between the two simulations

# Predictions of experimental-simulations account

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- When **processing a negative sentence** the comprehender first focuses on the negated state of affairs and then on the actual state of affairs.
  
- Therefore, after processing a negative sentence, both, negated and actual states of affairs should be available
  - the negated state of affairs should be highly available **shortly** after processing
  - the actual state of affairs should be more available at **later** point in time

# Simulation of negated state of affairs

Kaup, Yaxley, Madden, Zwaan and Lüdtke (2007)

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- Evidence for the view that simulations of the negated state of affairs are present in the comprehender's mind
  
- Participants saw depicted objects and were presented with the sentences as
  - *There was no eagle in the sky / nest*
  
- the task: decide whether a depicted object has been mentioned in the sentence or not

# Simulation of negated state of affairs

Kaup, Yaxley, Madden, Zwaan and Lüdtke (2007)

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*There was no eagle in the sky / nest*

- the answer was always 'yes' but the shape of the object either matched or mismatched the shape of the target entity
  - match condition
    - eagle with its wings outstretched for ... *sky*
    - eagle with its wings drawn for ... *nest*
  - mismatch condition
    - eagle with its wings outstretched for ... *nest*
    - eagle with its wings drawn for ... *sky*
  
- Results: responses were **significantly shorter** when there was a **match** with respect to the negated state of affairs.
- It suggests that participants had available a mental simulation of the negated state of affairs when being probed with the picture

# Conclusions

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- Negative sentences are preferably processed in pragmatically felicitous contexts
    - the negated proposition was either explicitly mentioned or constituted a particularly plausible assumption
  
  - Differences between positives and negative sentences are captured in the meaning representations created during comprehension
    - the meaning of positive sentence is captured by a mental simulation of the described state of affairs
    - the meaning of negative sentence is captured by two simulations
      - a simulation of the **negated** state of affairs
      - a simulation of the **actual** state of affairs
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