

# Dynamic pragmatic view of negation processing

Y. Tian & R. Breheney (2016), in P. Larivée, *Negation and Polarity: Experimental Perspectives*, Cham: Springer

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# Research questions

- ◆ *This is not a hotel.*
  - ◆ Question under discussion (QUD): ‘what is at issue at any point of the conversation’
  - ◆ Negation is a cue for retrieving the prominent QUD:
    - ◆ *[The door] is not open vs. The door is [not open].*
- ◆ Why does negation allow us to infer background information?
- ◆ What can this process tell us about the often cited **difficulty** with negation process?
- ◆ A very good discussion of the current state of the art!

# Background

- ◆ General findings:
  - ◆ More difficult processing:
    - ◆ Longer reaction times, higher error rates, increased activation of brain areas responsible for language comprehension (Carpenter et al. 1999)
  - ◆ Memory:
    - ◆ Memory of negated material is worse than of positive material: low recall, misremembering, rephrasing in a positive form (Cornish & Watson 1970);
  - ◆ Reasoning:
    - ◆ Logical inference is more difficult when explicit or implicit negation is involved (Evans et al. 1996; Prado & Noveck 2006)
- ◆ Access to the positive representation in negation processing (Dale & Duran 2011; Kaup et al. 2007)
  - ◆ Not mandatory

# Background

- ◆ Rejection based approaches: *not(the door is open)*
  - ◆ **Advantages:** explain both *difficulty* and *positive representation*
    - ◆ 2 step processing: representing the positive representation, which is rejected and replaced with a consistent one
  - ◆ **Disadvantages:**
    - ◆ Representing the positive counterpart is not always mandatory
    - ◆ Not incremental meaning of negation
- ◆ Contextual approaches
  - ◆ **Advantages:**
    - ◆ Out of context negative sentences are infelicitous and under informative
  - ◆ **Disadvantages:**
    - ◆ *The door is not open = the door is closed*
    - ◆ Contextual treatment of negation > contextual treatment of positive sentences

# Dynamic pragmatic account of negation processing

## ◆ General principles:

- ◆ The meaning of an utterance is dynamic: it is analysed in terms of its potential in **updating** the context.
- ◆ The context can constrain the content and the structure of upcoming utterances.
- ◆ Processing an utterance:
  1. Process its semantic meaning
  2. Inferring contextual information: (i) presuppositional beliefs and (ii) its source of relevance: the QUD;
- ◆ The QUD can be explicit but most often implicit, hence inferred and accommodated (Carlson 1983; Roberts 2012).

## ◆ Negation:

- ◆ Negation is a cue for retrieving the most prominent QUD.
- ◆ *The door is not open* => QUD: 'whether the positive counterpart is true'
- ◆ QUD accommodation is incremental and automatic:
  - ◆ Out of context, the QUD triggered by negation is the positive representation.
  - ◆ In a context, the positive representation is no longer created.
  - ◆ The meaning of negation is incremental.

# Experiment 1: the representation of the positive argument (Tian et al. 2010)

- ◆ Similar paradigm as Kaup et al. (2007)
- ◆ Stimuli: simple and cleft negative sentences.
  - ◆ *John didn't iron his shirt.*
  - ◆ *It is John who did not iron his shirt.*
- ◆ Predictions:
  - ◆ **Rejection based approach:** shorter RT for simple negative sentences for mismatching pictures than for matching ones.
  - ◆ **Dynamic pragmatic approach:** Longer RT for cleft negative sentences for mismatching pictures than for matching ones.
- ◆ Results:
  - ◆ Replication of Kaup et al.'s results for simple negative sentences.
  - ◆ Longer RT for cleft negative sentences for mismatching pictures indicating that the positive representation is **not** created.
    - ◆ **The non-mandatory positive representation is due to QUD accommodation.**
    - ◆ **Simple negative sentences: QUD regards the truth of the positive argument.**
    - ◆ **The cleft structure projects a prominent QUD that is negative.**

# Experiment 2: when do we represent the positive (Tian et al., in prep. b)

- ◆ Visual-world eyetracking paradigm: participants listen to linguistic stimuli while looking at visual scenes.
  - ◆ Language mediated eye movements are anticipatory corresponding to a **dynamically changing representation of events**.
- ◆ Stimuli: simple and clef affirmative and negative sentences.
  1. *Mat has shut his dad's window.*
  2. *Mat hasn't shut his dad's window.*
  3. *It is Mat who has shut his dad's window.*
  4. *It is Mat who hasn't shut his dad's window.*
- ◆ Predictions:
  - ◆ **Rejection based approach**
    - ◆ 2 and 4 first represent the positive counterpart and then the negative one;
    - ◆ A delay in 2 and respectively 4 compared to 1 and, respectively 3;
  - ◆ **Dynamic pragmatic approach**
    - ◆ Represent the positive counterpart for 2 but not for 4;
    - ◆ A delay in 2 compared to 1, and a reduced or no delay in 4 compared to 3.



# Experiment 2: when do we represent the positive (Tian et al., in prep. b)

- ◆ Method: calculate the log ratios of percentages of looks to target over competitor from the offset of the verb to the offset of the noun (several segments).
- ◆ Results for simple sentences:
  - ◆ Different patterns for positives and negatives.
    - ◆ For positives, a bias towards target immediately after the verb.
    - ◆ For negatives, (i) equal number of looks immediately after the verb; (ii) a bias towards the target later on, however, still before the noun.
  - ◆ Evidence against a mandatory representation of the positive counterpart: they did not first focus on the competitor and then to the target.
  - ◆ Evidence against the processing of negation only after the verb's argument: the target biased was set before the onset of the noun.
- ◆ Results for cleft sentences:
  - ◆ No different patterns for positives and negatives.



# Conclusion

- ◆ Simple sentences:
  - ◆ Without a context, the most prominent QUD of a negative sentence is whether the positive counterpart is true.
    - ◆ More difficult to process because of the inconsistency between positive counterpart and negation consistent representation.
- ◆ Cleft sentences:
  - ◆ Negative clefts have a prominent negative QUD, which is consistent to the negation consistent representation.
  - ◆ Positive clefts have a prominent positive QUD, which is consistent to the negation consistent representation.
- ◆ QUD accommodation is incremental:
  - ◆ Prominent QUDs are represented as soon as we find cues for them.
  - ◆ In simple negative sentences, this process interferes with the representation of sentence meaning.
- ◆ Representing the positive counterpart is not mandatory. Rather, it is due to QUD accommodation. When other cues are available, the positive counterpart is not longer represented.

Thank you!

# Sentence verification

- ◆ Previous findings:

- ◆ 4 possibilities of polarity and truth-value status:

- ◆ *The plus is above the star.* TA

- ◆ *The star is above the plus.* FA

- ◆ *The star isn't above the plus.* TN

- ◆ *The plus isn't above the star.* FN



- ◆ TA, FA < TN, FN

- ◆ TA < FA ; FN < TN at 0ms and TN = FN at 1500ms (Kaup et al. 2005).

- ◆ Two strategies:

- ◆ Truth-functional strategy

- ◆ Conversion strategy

- ◆ Tian et al's (in prep a)