

“On the one hand” as a Cue in the Comprehension of Discourse Structure

Vera Demberg^a, Hannah Rohde^b, Merel Scholman^c,
Chris Cummins^b, Emily Nicolet^b

^aSFB1102, Universität des Saarlandes

^bPPLS, The University of Edinburgh

^cUiL OTS, Universiteit Utrecht

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Anticipation in Language Comprehension

Prediction during language comprehension:

- ample evidence for anticipation within sentence
- **prediction of sounds**: prediction of onset sound given constraining context (DeLong et al., 2005)
- **prediction of words**: anticipatory eye-movements (Kamide et al.)
- **prediction of structure**: structural prediction (Staub and Clifton, 2006)

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Empirical Evidence for Incrementality and Prediction

Visual world experiment: **anticipatory eye-movements** show that people predict subsequent input (Kamide et al. 2003)

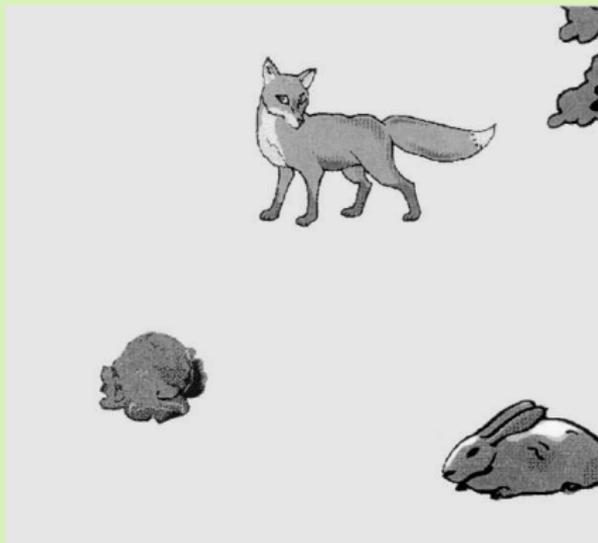
Experimental Findings: Incrementality and Prediction

“Der Hase frisst gleich den Kohl.”

The Hare-nom will eat soon the cabbage-acc.

“Den Hasen frisst gleich der Fuchs.”

The Hare-acc will eat soon the fox-nom.



Empirical Evidence for Incrementality and Prediction

Either...or processing: faster reading at or-NP (Staub & Clifton, 2006)

Experimental Finding: Prediction

- **processing facilitation** through prediction
- The presence of “either” leads to shorter fixation times on “or” and the second conjunct.

*Peter read **either** a book **or an essay** in the school magazine.*

*Peter read a book **or an essay** in the school magazine.*

Prediction of Discourse Relations

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- discourse is structurally not as constraining as syntax

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On the one hand ... on the other hand.

Questions:

- Is there evidence for prediction of “on the other hand” specifically?
- Is there evidence for prediction of CONTRAST more generally?
- Do people construct fine-grained expectations of the scope of contrast?

What we know:

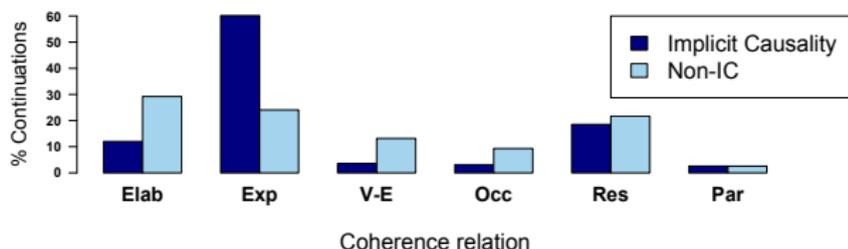
- local cues can affect anticipation of discourse relations
(Kehler et al., 2008; Rohde & Horton, 2014)
- discourse connectors can constrain expectations on upcoming content
(Köhne & Demberg, 2013; Drenhaus et al, 2014; Xiang & Kuperberg, 2014)

Local Cues drive expectations of discourse relations

Verb semantics

Implicit causality /
non-IC contexts:

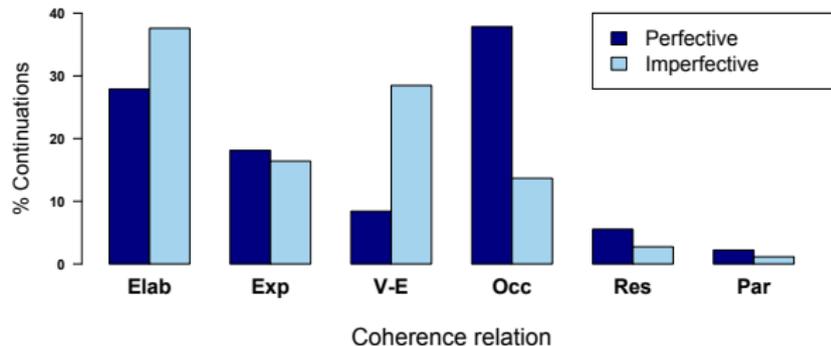
*John detested /
babysat Mary*



Verb aspect

Transfer-of-
possession
contexts:

*John handed / was
handing a book to Bob*



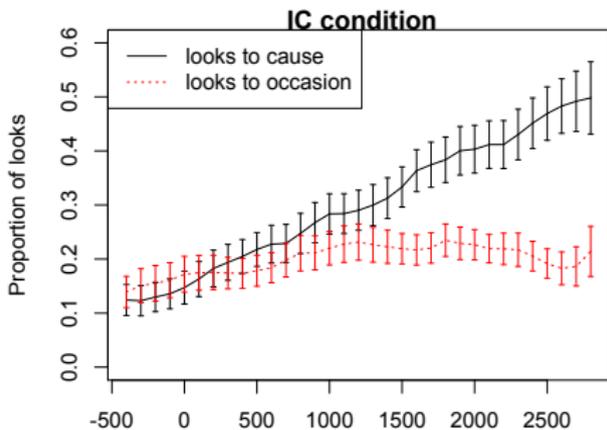
(Kehler, Kertz, Rohde, & Elman, 2008)

Evidence of expectations during online processing

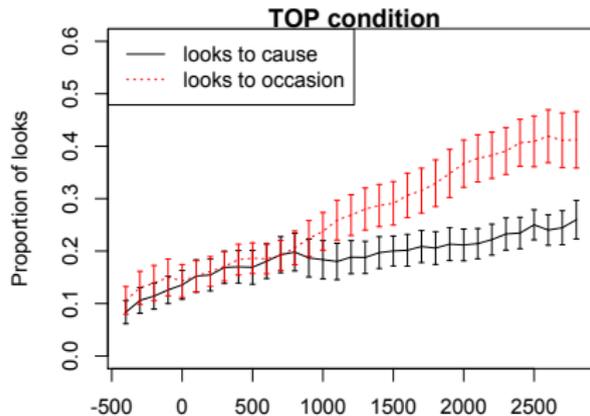
Rohde & Horton 2014:

- Eyetracking paradigm with one region=Explanation and other region=Occasion
- Cause-favoring verbs (Implicit causality) vs Occasion-favoring (transfer-of possession)

John detested Mary.



Joe handed a book to Sue.



Discourse Connectors affect anticipations



Steffen would like a small snack. He'd like something sweet/salty. **Therefore** / **However**, he gets from the kitchen a yummy waffle / cake / cheese / pretzel.

(Köhne and Demberg, 2013)

Materials

Mr. Brown was planning to look for new glasses and shoes today.
The glasses really are more urgent.

Causal

- **Therefore**, he now heads towards an optician / a shoe shop

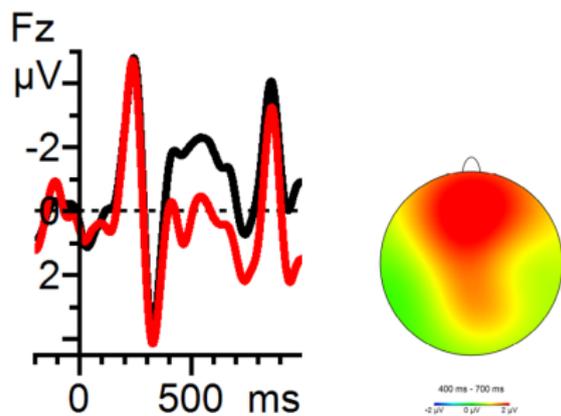
Concessive

- **However**, he now heads towards a shoe shop / an optician that a friend recommended.

(Drenhaus, Demberg, Köhne, Delogu 2014)

ERPs on *connector* (0 – 1200ms)

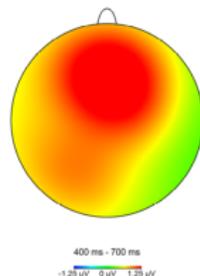
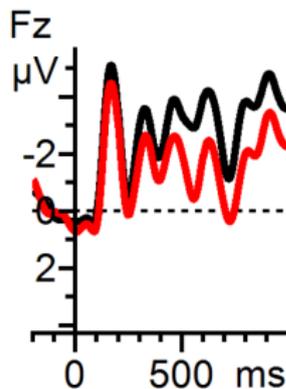
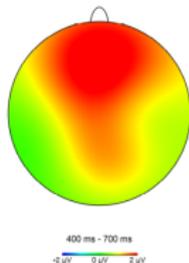
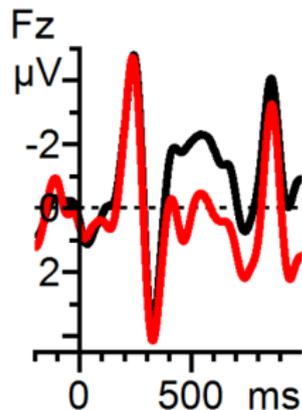
concessive vs. **causal** condition on discourse connector.



Late positivity at **concessive connector** compared to causal connector.

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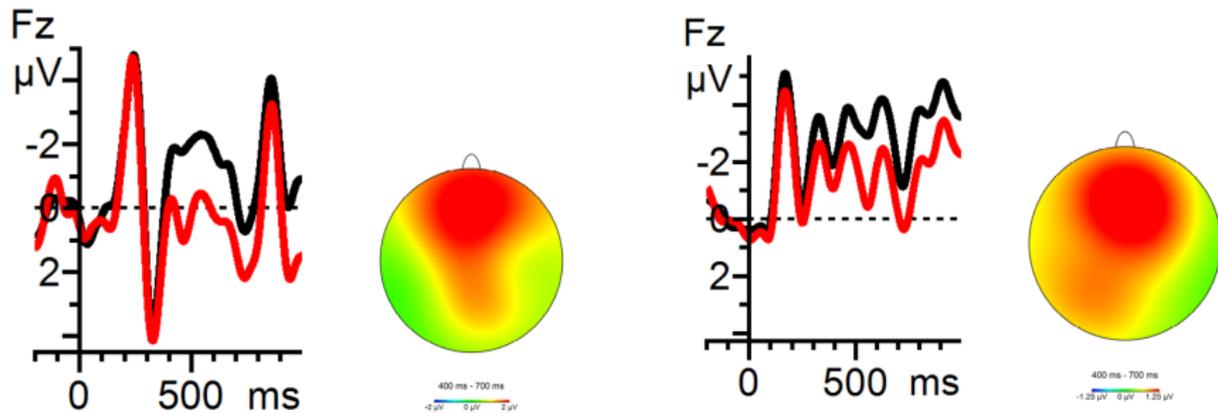
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ERPs on *connector* (0 – 1200ms)

concessive vs. **causal** condition on discourse connector.



Late positivity at **concessive connector** compared to causal connector.

- re-interpretation / reconstruction of inner representation
- search for alternatives

Experiment 1: Self-paced reading

Objectives

- Does “On the one hand” predict “On the other hand”?
- If there is a non-OTOH contrast in between, what happens to the prediction?

- 1) Introduction** Joe was interested in a car.
- 2) OT1H** On the one hand, he would like to buy it,
a) Cause because it looks flashy.
b) Contrast but he might try leasing it first.
- 3) OTOH** On the other hand, it doesn't get very good milage.

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critical region ↑

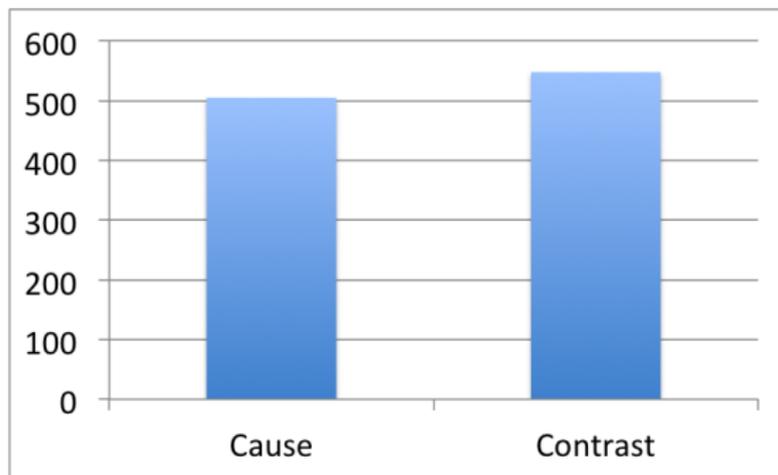
Method and Results

- region-by-region self-paced reading
- 60 participants, 20 items, each participant saw 6 items
- IbexFarm

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Longer reading times on “on the other hand” if preceded by contrast.



RT effect on “on the other hand”, signif. at $p < 0.05$

Conclusions and Open Questions

- longer reading times of “on the other hand” following a contrast
→ expectation of contrast already satisfied.

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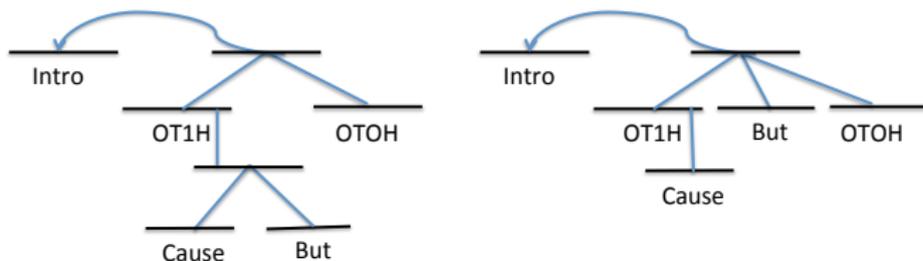
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Open Questions:

- **Structural detail of contrast prediction:**
Would we find higher difficulty for a global contrast than a local contrast?
- **Prediction of “On the other hand”:**
Do we find faster reading times when “On the one hand” is present?

Experiment: Global vs. local intervening contrast

- 1) Introduction** Jon is from Spain and is considering going to a Scottish ceilidh, to dance and listen to music.
- 2) OT1H** On the one hand, he thinks it might be a lot of fun,
Cause because he's heard great stories about these parties from his brother.
- a) But local** But he does not have the same taste in music as his brother.
- b) But global** But he doesn't know anybody else who will be there.
- c) Also** Also, he would like to learn more about Scottish culture.
- 3) OTOH** **On the other hand**, he's really worried about other people seeing his underwear when dancing with a kilt.



Experiment: Global vs. local intervening contrast

- 1) Introduction** Jon is from Spain and is considering going to a Scottish ceilidh, to dance and listen to music.
- 2) OT1H Cause** On the one hand, he thinks it might be a lot of fun, because he's heard great stories about these parties from his brother.
- a) But local** But he does not have the same taste in music as his brother.
- b) But global** But he doesn't know anybody else who will be there.
- c) Also** Also, he would like to learn more about Scottish culture.
- 3) OTOH** **On the other hand**, he's really worried about other people seeing his underwear when dancing with a kilt.

Predictions for **On the other hand**

if structural prediction of contrast: But global > But local = Also

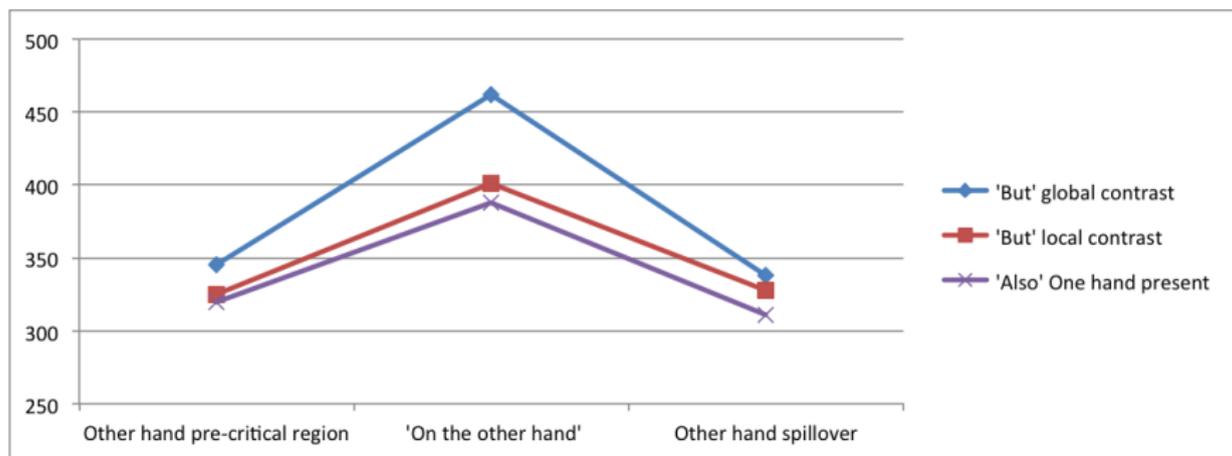
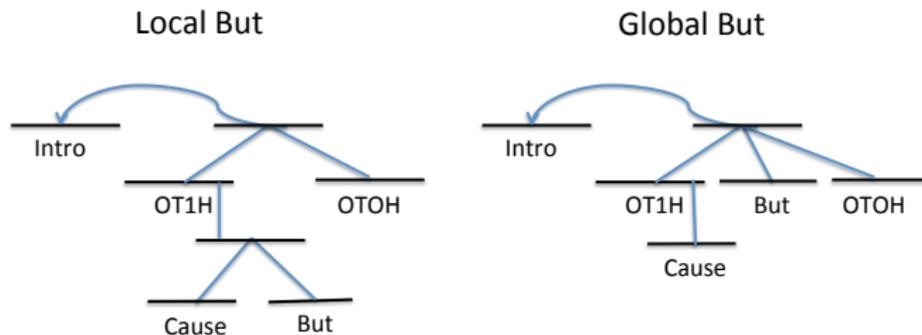
if structure-agnostic prediction of contrast: But global = But local > Also

Method, Participants



- Eye-tracking with Eyelink 1000 tracker
- at the University of Edinburgh
- 39 participants (7 excluded before analysis)
- 24 items

Results: Global / Local contrast



Prediction of OTOH based on OT1H?

1) Introduction

Jon is from Spain and is considering going to a Scottish ceilidh, to dance and listen to music.

2a) OT1H present

On the one hand, he thinks it might be a lot of fun,

2b) OT1H absent

He thinks it might be a lot of fun,

Cause

because he's heard great stories about these parties from his brother.

Also

Also, he would like to learn more about Scottish culture.

3) OTOH

On the other hand, he's really worried about other people seeing his underwear when dancing with a kilt.

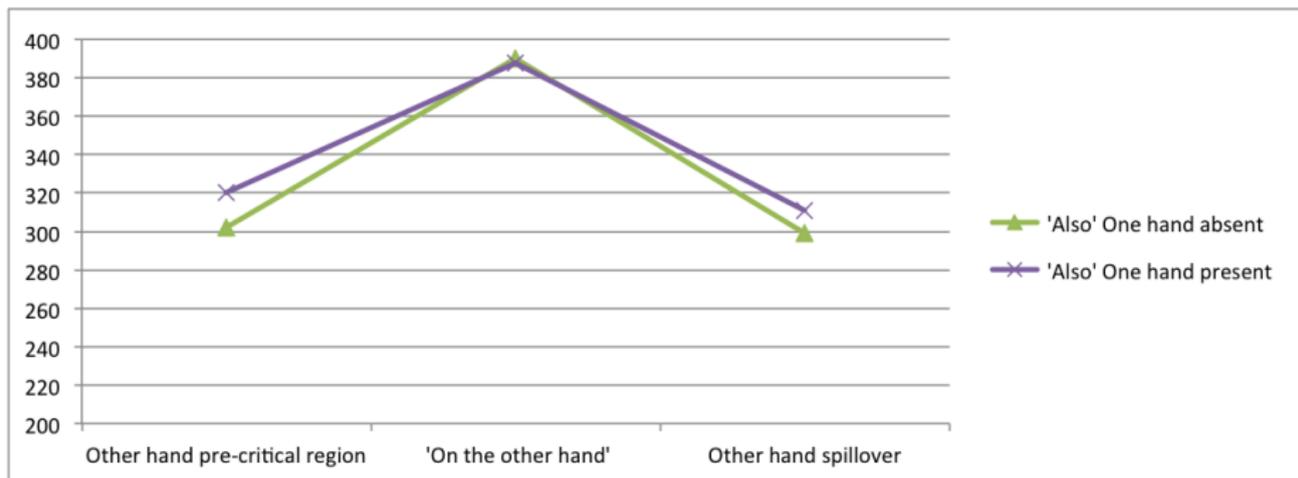
Prediction of OTOH based on OT1H?

- 1) Introduction** Jon is from Spain and is considering going to a Scottish ceilidh, to dance and listen to music.
- 2a) OT1H present** On the one hand, he thinks it might be a lot of fun,
- 2b) OT1H absent** He thinks it might be a lot of fun,
- Cause** because he's heard great stories about these parties from his brother.
- Also** Also, he would like to learn more about Scottish culture.
- 3) OTOH** **On the other hand**, he's really worried about other people seeing his underwear when dancing with a kilt.

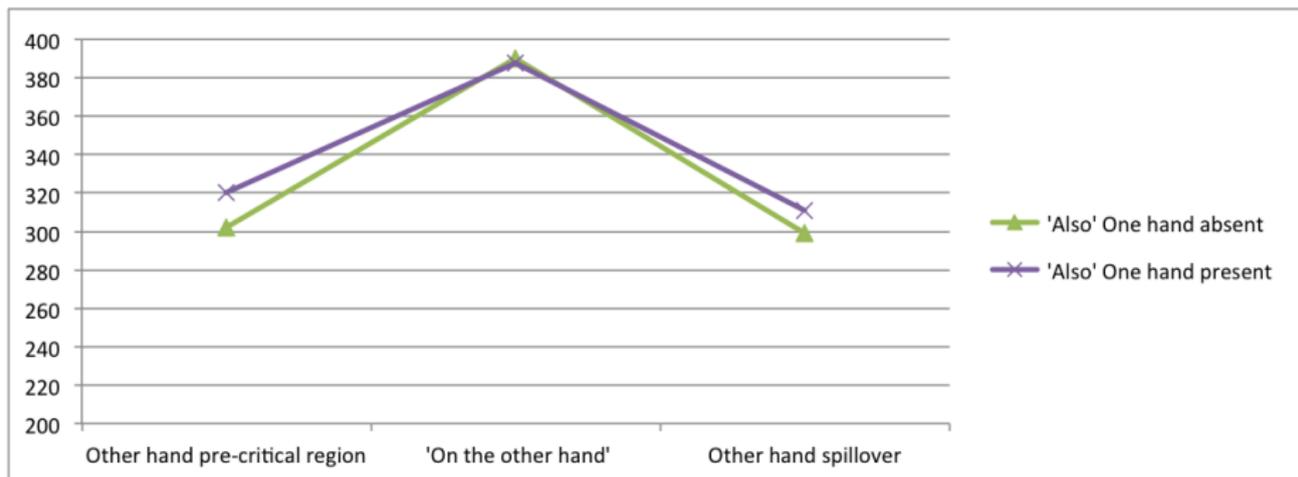
Predictions

if prediction of OTOH at OT1H:	OT1H present < OT1H absent
if no prediction of OTOH at OT1H:	OT1H present = OT1H absent

Results Eye-tracking Expt Prediction



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Result:

No evidence for facilitation of OT1H when readers get to OTOH.

Questions we wanted to answer:

- Prediction from OT1H for OTOH?
- Prediction of Contrast relation given OT1H?
- Online discourse structure processing: flat expectations or structure-sensitive?

Results:

- SPR study: prediction of contrast relation, which is satisfied by encountering some contrast (even if not marked with OTOH).
- ET study: structure-sensitive: local “but” does not interfere with OT1H expectation.
- ET study: no evidence for facilitation on OTOH given OT1H (null effect).

Thank you!



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