Restrictive relative clause constructions as implicit coherence relations

Jet Hoek & Hannah Rohde – Joint work with Jacqueline Evers-Vermeul & Ted J.M. Sanders

SLE 2017, 12 September 2017
Before eating many fruits and some vegetables, some people – bad, or perhaps ignorant people – do something which renders the produce less tasty, less colorful, less texturally interesting, and much less nutritious. The worst of these offenses involves one of my favorite fruits: the kiwi. ¹
Introduction

Before eating many fruits and some vegetables,

some people – bad, or perhaps ignorant people – do something which renders the produce less tasty, less colorful, less texturally interesting, and much less nutritious.

The worst of these offenses involves one of my favorite fruits: the kiwi.
Before eating many fruits and some vegetables,

some people – bad, or perhaps ignorant people – do something which renders the produce less tasty, less colorful, less texturally interesting, and much less nutritious.

The worst of these offenses involves one of my favorite fruits: the kiwi.
Discourse segments

Discourse segments are minimally (ellipted) clauses.

However, some types of clauses tend to be excluded as candidate discourse segments.
Discourse segments

Discourse segments are minimally (ellipted) clauses.

However, some types of clauses tend to be excluded as candidate discourse segments.

Most discourse annotation approaches distinguish between restrictive and non-restrictive relative clauses.
Discourse segments

Discourse segments are minimally (ellipted) clauses.

However, some types of clauses tend to be excluded as candidate discourse segments.

Most discourse annotation approaches distinguish between restrictive and non-restrictive relative clauses.

- Non-restrictive RCs are discourse segments
  - John’s new couch, which he bought at last week’s rummage sale, is extremely comfortable.
Discourse segments

Discourse segments are minimally (ellipted) clauses.

However, some types of clauses tend to be excluded as candidate discourse segments.

Most discourse annotation approaches distinguish between restrictive and non-restrictive relative clauses.

- Non-restrictive RCs are discourse segments
  - John’s new couch, which he bought at last week’s rummage sale, is extremely comfortable.

- Restrictive RCs are not
  - The painting that John bought yesterday is beautiful.

The function of restrictive RCs is taken to be restricting its referent.
Before eating many fruits and some vegetables, some people – bad, or perhaps ignorant people – do something which renders the produce less tasty, less colorful, less texturally interesting, and much less nutritious.

The worst of these offenses involves one of my favorite fruits: the kiwi.
Coherence relation-like restrictive RC constructions

See also: Rohde, Levy, & Kehler 2011; Hoek et al. 2017

**Causal**

The teacher scolded the student who came in late
→ The teacher scolded a student because they came in late
Coherence relation-like restrictive RC constructions

See also: Rohde, Levy, & Kehler 2011; Hoek et al. 2017

Causal
The teacher scolded the student who came in late
→ The teacher scolded a student because they came in late

Negative causal / Concessive
Jane fired the guy who was making a lot of money
→ Jane fired someone, even though he was making a lot of money
Coherence relation-like restrictive RC constructions

See also: Rohde, Levy, & Kehler 2011; Hoek et al. 2017

Causal

The teacher scolded the student who came in late
\[ \rightarrow \] The teacher scolded a student because they came in late

Negative causal / Concessive

Jane fired the guy who was making a lot of money
\[ \rightarrow \] Jane fired someone, even though he was making a lot of money

Conditional

I will yell at anyone who whistles
\[ \rightarrow \] If someone whistles, I will yell at them
Research question

Can and do language users indeed infer a coherence relation between restrictive RCs and their matrix clauses?

→ Can restrictive RCs influence expectations about upcoming discourse?
Research question

Can and do language users indeed infer a coherence relation between restrictive RCs and their matrix clauses?

→ Can restrictive RCs influence expectations about upcoming discourse?

Syntax:
The teacher scolded the student who came in late.

Discourse:
The teacher scolded the student who came in late.
Implicit causality

Implicit causality verbs:

- Causal continuation expected
- Bias toward continuation about either the subject or direct object
  - NP1 Tracy annoyed Tom because she kept complaining
  - NP2 Tracy fired Tom because he kept complaining

Solstad & Bott 2013, p.2: IC verbs are “underspecified with respect to certain properties of the situation described which are (causally) contingent on one of the two participants.”

→ Restrictive relative clauses

Hoek & Rohde
Restrictive RCs
SLE 2017 9 / 26
Implicit causality

Implicit causality verbs:

- Causal continuation expected
- Bias toward continuation about either the subject or direct object
  - **NP1** Tracy annoyed Tom because she kept complaining
  - **NP2** Tracy fired **Tom** because **he** kept complaining

**Solstad & Bott 2013, p.2:**
IC verbs are "underspecified with respect to certain properties of the situation described which are (causally) contingent on one of the two participants."
Implicit causality

Implicit causality verbs:

- Causal continuation expected
- Bias toward continuation about either the subject or direct object
  - NP1 Tracy annoyed Tom because she kept complaining
  - NP2 Tracy fired Tom because he kept complaining

Solstad & Bott 2013, p.2:
IC verbs are "underspecified with respect to certain properties of the situation described which are (causally) contingent on one of the two participants."

→ Restrictive relative clauses
Continuation experiment 1

3 conditions:
- Causal (*because*)
- Neutral
- Negative causal / Concessive (*even though*)

Main clauses:
- NP2 IC verbs

Connectives:
- *because*
- *even though*
Continuation experiment 1

Example prompts:

**Causal:**
We sued the neighbor *who dropped our newly inherited vase* because/even though . . .

**Neutral:**
We sued the neighbor *who stopped by on Tuesday night* because/even though . . .

**Negative causal / Concessive:**
We sued the neighbor *who brought over a fruit basket* because/even though . . .
Hypotheses - Next mention

What is the subject of the continuation?

Default: object of the main clause / referent of the RC (NP2 IC)
What is the subject of the continuation?
Default: object of the main clause / referent of the RC (NP2 IC)

Because:
- In the causal condition, the IC bias is expected to be fulfilled, leading to fewer NP2 continuations
  - cf. Rohde & Kehler 2015, Solstad & Bott 2013
Hypotheses - Next mention

What is the subject of the continuation?
**Default:** object of the main clause / referent of the RC (NP2 IC)

**Because:**
- In the causal condition, the IC bias is expected to be fulfilled, leading to fewer NP2 continuations
  - cf. Rohde & Kehler 2015, Solstad & Bott 2013
- A concessive relation signals that something unexpected happens. This discrepancy warrants an explanation.
  - There are multiple relevant candidates to focus on → reduced NP2 bias in the concessive condition
Hypotheses - Next mention

What is the subject of the continuation?
Default: object of the main clause / referent of the RC (NP2 IC)

Because:
- In the causal condition, the IC bias is expected to be fulfilled, leading to fewer NP2 continuations
  - cf. Rohde & Kehler 2015, Solstad & Bott 2013
- A concessive relation signals that something unexpected happens. This discrepancy warrants an explanation.
  - There are multiple relevant candidates to focus on → reduced NP2 bias in the concessive condition

Even though:
- Overall reduced NP2 bias
Continuation experiment 1

- 30 target items
- 40 fillers
- 6 lists
- Participants recruited through Amazon MTurk
- 56 participants - Native speakers of English
- 1680 continuations
Mrs. Thompson loathed the gardener who never took off his muddy shoes because . . .

- NP2
  - he tracked dirt all through the house.
- NP1
  - she had to clean up after him.
- Other
  - it made the house dirty.
Results experiment 1 – Next-mention

![Bar chart showing results for Causal, Concessive, and Neutral categories with NP2, NP1, and Other categories.](image)
Results experiment 1 – Next-mention

(Bar chart showing the distribution of Next-mention for different types of clauses: Causal, Concessive, Neutral. The chart includes bars for NP2, NP1, and Other categories.)

Hoek & Rohde
Restrictive RCs
SLE 2017
Results experiment 1 – Next-mention

![Bar chart showing results for restrictive RCs](chart.png)

- **Because**
  - Causal: 0.55
  - Concessive: 0.75
  - Neutral: 0.88

- **Even though**
  - Causal: 0.50
  - Concessive: 0.35
  - Neutral: 0.60
Results experiment 1 – Next-mention

Hoek & Rohde

Restrictive RCs

SLE 2017 18 / 26
Results experiment 1 – Next-mention

![Bar chart showing the results of experiment 1 for Next-mention, comparing 'Because' and 'Even though' with different relationship types (Causal, Concessive, Neutral) and sentence types (NP2, NP1, Other). The chart highlights statistical significance with asterisks (*) for the comparison between 'Because' and 'Even though'.]
Attachment

High:

We sued the neighbor who came by on Tuesday night because he assaulted our son.

Low:

We sued the neighbor who dropped our newly inherited vase because his hands were slippery.
Attachment

High:

We sued the neighbor who came by on Tuesday night because he assaulted our son.

Low:

We sued the neighbor who dropped our newly inherited vase because his hands were slippery.

**Hypothesis:** Fewer high attachments in the causal + because condition
Continuation experiment 2

3 conditions:
- Causal (because)
- Neutral
- Negative causal / Concessive (even though)

Main clauses:
- NP2 IC verbs

Connectives:
- because
Continuation experiment 2

- 30 target items
- **40 fillers → Attachment bias**
  - John said that if Jenny wanted to become famous . . .
- 3 lists

- Participants recruited through Amazon MTurk
- 55 participants - Native speakers of English
- 1650 continuations
Results experiment 2 – Attachment

Causal: 0.8
Concessive: 0.9
Neutral: 1.0
Results experiment 2 – Attachment
Conclusions + next steps

- Restrictive RCs can affect discourse level phenomena
  - **Coreference** - The referent about which a continuation is expected
  - **Discourse structure** - The part of the text to which a connective is expected to attach

Next steps
- Test whether people make discourse-level inferences when reading restrictive RCs online
  - Self-paced reading experiment
  - Eye-tracking experiment
Conclusions + next steps

- Restrictive RCs can affect discourse level phenomena
  - Coreference - The referent about which a continuation is expected
  - Discourse structure - The part of the text to which a connective is expected to attach

- Restrictive RCs can have a function at the discourse level (?)
  - There can be a coherence relation between a restrictive RC and its matrix clause (?)
  - Restrictive RCs can be discourse segments (?)

Next steps
- Test whether people make discourse-level inferences when reading restrictive RCs online
- Self-paced reading experiment
- Eye-tracking experiment
Conclusions + next steps

- Restrictive RCs can affect discourse level phenomena
  - Coreference - The referent about which a continuation is expected
  - Discourse structure - The part of the text to which a connective is expected to attach

- Restrictive RCs can have a function at the discourse level (?)
  - There can be a coherence relation between a restrictive RC and its matrix clause (?)
  - Restrictive RCs can be discourse segments (?)

Next steps

- Test whether people make discourse-level inferences when reading restrictive RCs online
  - Self-paced reading experiment
  - Eye-tracking experiment
Thank you!

j.hoek@uu.nl