Inverse Linking and Telescoping as Polyadic Quantification

Manfred Sailer

Goethe University, Frankfurt a.M.

September 15–17, 2014

Overview

Overview

Inverse Linking and Telescoping

(1) Inverse Linking: **every** > **some**
[A candidate [from every city]] supported the proposal.

Clause-boundedness of inverse scope readings:

(2) Rodman (1976): no **every** > **some** reading
Guinevere has [a bone [that is in every corner of the house]].

Exception:

(3) Telescoping: **every** > **the**
[The picture of his$_i$ mother [that every$_i$ soldier kept wrapped in a sock]] was not much use to him$_i$. (Safir, 1999)

Argumentation

If [Det_1 ... [... Det_2 ...]] can have reading $\textbf{Det}_2 > \textbf{Det}_1$,

then the two Det behave neither like the Det_1 nor like Det_2

$\Rightarrow$ polyadic analysis: $\langle \textbf{Det}_2, \textbf{Det}_1 \rangle \langle y, x \rangle \langle \phi_1, \phi_2 \rangle (\psi)$

Overview

Inverse Linking: *except*-phrases

A Det_1Det_2 sequence behaves like Det_2:

Moltmann (1995): [The wife of [every president]] behaves like a universal quantifier

(4) a. [The wife of [every president]] except Hillary has no political ambitions.

b. Every president except Carter hated peanuts.

c. *The wife except HIlary has no political ambitions.

Inverse linking: *there*-sentences

A Det_1Det_2 sequence behaves like Det_2:

(5) Woisetschlaeger (1983)

a. There is [the proof of [a difficult theorem]] on page 433.

b. There is [a difficult theorem] on page 433.

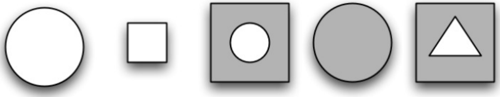
c. *There is [the proof] on page 433.

Inverse linking: Haddock's puzzle

Det$_2$ is relativized to Det$_1$'s restrictor.

- Det$_2$ does not autonomously presuppose

(6) Champollion & Sauerland (2011)
[The circle in [the square]] is white.



(There is more than one square, but: only one square with a circle.)

- Only talking about baskets with apples.

(7) [An apple in [every basket]] is rotten.

Does not mean require that there be an apple in every basket
$(\forall y(\mathbf{basket}(y) \rightarrow \exists x(\mathbf{apple}(x) \wedge \mathbf{in}(y, x) \wedge \mathbf{rotten}(x))))$

Inseparability of the two Det

No quantifier may intervene between Det_2 and Det_1

(8) Larson (1985): ***Every** $<$ **Two** $<$ **Some**
Two policemen spy on [someone from [every city]].

Inverse linking: Summary

[Det_1 ... [Det_2 ...]]:

- does not behave logically like a [Det_1 ...]-DP (*except*, *there*)
- does not behave logically like a [Det_2 ...]-DP (Haddock's puzzle)
- does not allow for a separation of **$\mathbf{Det}_1$** and **$\mathbf{Det}_2$**.

$\Rightarrow$ behaves like something else, and like a unit.

Telescoping

(9) [The picture [that every$_i$ soldier kept]] didn't bring him$_i$ much luck.

- Embedded quantifier takes scope outside the embedded clause.
- Diagnostics (Barker, 2012): Quantifier in an embedded clause binds a pronoun in a higher clause.
- Telescoping traditionally not assumed to be grammatical (Rodman, 1976),
- but naturally occurring data (Barker, 2012) and experimental evidence (Konietzko et al., t.a.)
- (Mainly German data from now on;
  no grammaticality judgements for the English translations)

Telescoping: *except*

(10) [Die Frau, [die jeder$_i$ Präsident geheiratet hat]],
the woman that every president married has
außer Hillary, unterstützt ihn$_i$ ohne eigene politische
except Hillary supports him without own political
Ambitionen.
ambitions
'[The woman that every$_i$ president married]], except Hilllary,
supports him$_i$ without own political ambitions.'

Telescoping: *there/es war einmal*

(11)
a. *?Es war einmal [die Königin].
there was once the queen
'Once upon a time there was the queen.'

b. Es war einmal [die Königin, [die über ein großes Reich herrschte]]
there was once the queen who over a big empire reigned
'Once upon a time there was the queen [that reigned a big empire].'

Telescoping: Haddock's puzzle

Champollion & Sauerland (2011): Weaker presupposition also with embedded *the*.

(12) a. [The circle in [the/a square]] is white. (85.5% *the*)
b. [The circle [that is in the/a square]] is white. (76.2% *the*)

Analogous data for *every*:

(13) [Die Frau, [die jeder$_i$ Präsident geheiratet hat]], unterstützt ihn$_i$.
the woman that every president married has supports him

Allows for presidents not married to a woman.

Telescoping: Inseparability of the Det

(14) [Die meisten Fans, [die jeder$_i$ Popstar hat]], hören mindestens zweimal am Tag seinen$_i$ aktuellen Hit.
most fans that every pop star has listen-to at least twice a day his current hit
'Most of the fans that every$_i$ pop star has, listen to his$_i$ current hit at least twice a day.'

Natural reading: **Every** $>$ **Most** $>$ **Two**
No reading: # **Every** $>$ **Two** $>$ **Most**

Telescoping: Restriction

No telescoping from clauses depending on V:

(15) *[That Mary seems to know every boy] surprised someone. (Barker, 2012)

(16) Subject clause:
* [Dass jeder_i Student die Püfung bestanden hat], überrascht seine_i Dozenten.
'[That every_i student passed the exam] surprises his_i teachers.'

(17) Complement clause:
* [Dass jeder_i Student die Prüfung bestanden hat], teilte ihm_i die Dekanin mit.
'[That every_i student passed the exam], the dean told him_i.'

Telescoping requires the presence of a c-commanding Det_1!

Telescoping: Summary

- Data analogous to those of inverse linking
- Telescoping requires c-commanding Det_1
- Cross-sentential formation of a complex determiner?

Overview

"Classical" QR account

- If inverse linking is derived by QR to an S node:
  - non-Det_1-like behavior hard to capture
  - inseparability of Dets hard to derive
- If inverse linking is derived by DP-internal QR:
  binding of a pronoun by Det_2 hard to derive (Heim & Kratzer, 1998)
- Wrong readings (Haddock's puzzle, Champollion & Sauerland (2011))
- Clause-boundedness of QR excludes telescoping.
- If cross-clausal QR is permitted, then QR out of V-dependent clauses is hard to prevent.

Champollion & Sauerland (2011)

- Analysis:
  - QR of embedded DP_2 to S node
  - intermediate accommodation of the restrictor of Det_1
- Advantages:
  - Standard mechanisms
  - Right readings for Haddock's puzzle
- Problems:
  - QR as a "weak island" to allow for telescoping
  - QR-to-S related problems

Continuations (Barker, 2012; Sternefeld, t.a.)

- Analysis: Extended scope domain through type-shifting/unrestrained β-reduction
- Advantages:
  - Inverse linking and telescoping follow directly from the basic mechanism.
  - Inseparability captured
- Problems:
  - Unclear how to handle the *except* and *there* data.
  - Haddock's puzzle
  - Overgeneralization: Telescoping from V-dependent clauses cannot be excluded.

Overview

Polyadic quantification

- General: Keenan & Stavi (1986), Keenan & Westerståhl (1997)
- Usually discussed case: *different*
- For *except* phrases: Moltmann (1995)
- For negative concord: de Swart & Sag (2000), Iordăchioaia (2009)

Example semantic representation

- [An apple in [every basket]] is rotten.
- Det_1 and Det_2 form a complex polyadic quantifier.
- The restrictors of both quantifiers are restrictors of the new quantifier.
- Semantic representation:
  $\langle \textbf{Every}, \textbf{Some} \rangle \langle y, x \rangle \langle \textbf{basket}(y), (\textbf{apple}(x) \wedge \textbf{in}(y, x) \rangle (\textbf{rotten}(x))$
- Same truth conditions as:
  $\textbf{Every}\, y[\textbf{basket}(y) \wedge \exists x(\textbf{apple}(x) \wedge \textbf{in}(y, x))]$
  $(\textbf{Some}\, x[\textbf{apple}(x) \wedge \textbf{in}(y, x)](\textbf{rotten}(x)))$

Semantics of the polyadic quantifier

- Truth conditions similar to Champollion & Sauerland (2011)
- For n quantifiers in scope order $Q_1 > \ldots > Q_n$:
  Q$_i$ restricted to existence of elements in restrictors of $Q_{i+1}, \ldots, Q_n$.

For determiners $Q_1, \ldots, Q_n$, variables $x_1, \ldots, x_n$,
and formulæ $\phi_1, \ldots, \phi_n, \psi$,

- $\langle Q_1, \ldots Q_n\rangle\langle x_1, \ldots, x_n\rangle\langle \phi_1, \ldots, \phi_n\rangle(\psi)$ is a formula, and
- $\langle Q_1, \ldots Q_n\rangle\langle x_1, \ldots, x_n\rangle\langle \phi_1, \ldots, \phi_n\rangle(\psi)$
  $$\begin{aligned}\equiv Q_1 x_1[\phi_1 \wedge \exists x_2 \ldots \exists x_n(\phi_2 \wedge \ldots \wedge \phi_n)]\\ (Q_2 x_2[\phi_2 \wedge \exists x_3 \ldots \exists x_n(\phi_3 \wedge \phi_n)]\\ (\ldots(Q_n[\phi_n](\psi)\ldots))\end{aligned}$$

With two determiners: An apple in every basket is rotten.
$\langle \textbf{Every}, \textbf{Some}\rangle\langle x, y\rangle\langle \textbf{bask}(x), (\textbf{ap}(y) \wedge \textbf{in}(y,x))\rangle(\textbf{rott}(y))$
$\equiv$
$\textbf{Every}x[\textbf{bask}(x) \wedge \exists y(\textbf{ap}(y) \wedge \textbf{in}(y,x))](\textbf{Some}y[\textbf{ap}(y) \wedge \textbf{in}(y,x)](\textbf{rott}(y)))$

Logical properties of the polyadic quantifier: Existentials

$\langle \textbf{Some}, \textbf{Det} \rangle$ can occur in existential sentences because it is non-presuppositonal (Zucchi, 1995):

(18) There is [the proof [of a theorem]] on page 423.
$\langle \textbf{Some}, \textbf{The} \rangle \langle x, y \rangle \langle \textbf{theorem}(x), \textbf{proof}(y, x) \rangle (\textbf{p423}(y))$

$\equiv \textbf{Some} x[\textbf{theorem}(x) \wedge \exists y(\textbf{pr}(y, x))](\textbf{The} y[\textbf{pr}(y, x)](\textbf{p423}(y)))$

Logical properties: Exception phrase

Moltmann (1995):
The quantifier in an exception phrase must be a universal (or negative universal)

(19) [The wife [of every president]] is popular.
$\langle \textbf{Every}, \textbf{The} \rangle \langle x, y \rangle \langle \textbf{president}(x), \textbf{wife}(y, x) \rangle (\ldots)$
$\equiv \forall x[\textbf{president}(x) \wedge \exists y(\textbf{wife}(y, x))](\textbf{The} y[\textbf{wife}(y, x)](\textbf{pop}(y)))$

Example with telescoping

(20) [The picture [that every soldier kept]] didn't bring him much luck.

$$\langle \textbf{Every}, \textbf{The} \rangle \langle x, y \rangle \langle \textbf{soldier}(x), (\textbf{pict}(y) \wedge \textbf{keep}(x, y)) \rangle (\textbf{no-luck}(y, x))$$

Binding to parts of a polyadic quantifier is possible:

(21) Jeder$_i$ hat ein anderes Verständnis von seiner$_i$ Umwelt.
'Everyone has a different understanding of his environment.'

Combinatorics with polyadic quantifiers?

- Moltmann (1995): Polyadic effect through pragmatic inference
- Champollion & Sauerland (2011): Polyadic effect through intermediate accommodation
- de Swart & Sag (2000): Polyadic quantifiers through quantifier amalgamation a the lexical head
- Iordăchioaia (2009): Polyadic quantifiers through underspecified combinatorics

Constraints on polyadic quantifier formation

All determiners that contribute to the polyadic quantifier . . .

- must be in a c-command relation (C-command condition)
- must be within the same V-dependent clause (Clause-boundedness)

Personal choice

- Techniques of underspecified semantics Bos (1996); Copestake et al. (2000); Egg (1998, 2010); Pinkal (1996); ...
- Lexical Resource Semantics (LRS), Richter & Sailer (2004)
- Integrated with a surface-oriented syntax (HPSG, Pollard & Sag (1994))
- Based on a feature logic (Richter, 2004a,b)
- General idea: Words and phrases constrain the semantic representation of their utterance (specifying what must occur in the representation and where)

An apple in every basket is rotten

- *every*: $\langle \ldots, \textbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \ldots \textbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \textbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \ldots, \textbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \ldots \textbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \textbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \dots, \textbf{Every}^i, \dots \rangle \langle \dots, x^i, \dots \rangle \langle \dots, (\dots x \dots)^i, \dots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\dots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \dots \textbf{in}(y, x) \dots)$
- *an*: $\langle \dots, \textbf{Some}^j, \dots \rangle \langle \dots, y^j, \dots \rangle \langle \dots, (\dots y \dots)^j, \dots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \ldots, \textbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \ldots \textbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \textbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \ldots, \mathbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: $\mathbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \mathbf{in}(y, x))$
- *apple*: $\mathbf{apple}(y)$
- *apple PP*: $(\mathbf{apple}(y) \wedge \ldots \mathbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \mathbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: $\mathbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\mathbf{rotten}(y)$
- *NP is rotten*: $\mathbf{rotten}(y)$ is in the scope of the quant that binds y
  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \ldots, \textbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \ldots \textbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \textbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \ldots, \textbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: **basket**(x) must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \textbf{in}(y, x))$
- *apple*: **apple**(y)
- *apple PP*: $(\textbf{apple}(y) \wedge \ldots \textbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \textbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: **apple**(y) is in the restrictor of *an*
- *is rotten*: **rotten**(y)
- *NP is rotten*: **rotten**(y) is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \ldots, \textbf{Every}^i, \ldots \rangle \langle \ldots, x^i, \ldots \rangle \langle \ldots, (\ldots x \ldots)^i, \ldots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\ldots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \ldots \textbf{in}(y, x) \ldots)$
- *an*: $\langle \ldots, \textbf{Some}^j, \ldots \rangle \langle \ldots, y^j, \ldots \rangle \langle \ldots, (\ldots y \ldots)^j, \ldots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten

- *every*: $\langle \dots, \textbf{Every}^i, \dots \rangle \langle \dots, x^i, \dots \rangle \langle \dots, (\dots x \dots)^i, \dots \rangle (\psi)$
- *every basket*: $\textbf{basket}(x)$ must be in the restrictor of *every*
- *in every basket*: $(\dots \wedge \textbf{in}(y, x))$
- *apple*: $\textbf{apple}(y)$
- *apple PP*: $(\textbf{apple}(y) \wedge \dots \textbf{in}(y, x) \dots)$
- *an*: $\langle \dots, \textbf{Some}^j, \dots \rangle \langle \dots, y^j, \dots \rangle \langle \dots, (\dots y \dots)^j, \dots \rangle (\psi)$
- *an apple PP*: $\textbf{apple}(y)$ is in the restrictor of *an*
- *is rotten*: $\textbf{rotten}(y)$
- *NP is rotten*: $\textbf{rotten}(y)$ is in the scope of the quant that binds y

  no other expression occurs in the semantic representation

An apple in every basket is rotten: Readings

Possible readings:

- Non-polyadic: (There is the same rotten apple in every basket.)
  $\mathbf{Some}\,y[\mathbf{apple}(y) \wedge \mathbf{Every}\,x[\mathbf{basket}(x)](\mathbf{in}(y,x))](\mathbf{rotten}(y)))$
  $i = 1$, $j = 1$; non-identical quants
- Non-polyadic: (Every basket contains a rotten apple.)
  $\mathbf{Every}\,y[\mathbf{basket}(y)](\mathbf{Some}\,x[\mathbf{apple}(y) \wedge \mathbf{in}(y,x)](\mathbf{rotten}(y)))$
  $i = 1$, $j = 1$; non-identical quants
- Polyadic:
  $\langle \mathbf{Every}, \mathbf{Some} \rangle \langle x, y \rangle \langle \mathbf{basket}(x), (\mathbf{apple}(y) \wedge \mathbf{in}(y,x)) \rangle (\mathbf{rotten}(y))$
  $i = 1, j = 2$; quantifier unification
- Unavailable polyadic reading:
  $\# \ \langle \mathbf{Some}, \mathbf{Every} \rangle \langle y, x \rangle \langle (\mathbf{apple}(y) \wedge \mathbf{in}(y,x)), \mathbf{basket}(x) \rangle (\mathbf{rotten}(y))$
  $i = 2, j = 1$; quantifier unification
  x is not bound in the first restrictor!

An apple in every basket is rotten: Readings

Possible readings:

- Non-polyadic: (There is the same rotten apple in every basket.)
  $\mathbf{Some}\,y[\mathbf{apple}(y) \wedge \mathbf{Every}\,x[\mathbf{basket}(x)](\mathbf{in}(y,x))](\mathbf{rotten}(y)))$
  $i = 1$, $j = 1$; non-identical quants
- Non-polyadic: (Every basket contains a rotten apple.)
  $\mathbf{Every}\,y[\mathbf{basket}(y)](\mathbf{Some}\,x[\mathbf{apple}(y) \wedge \mathbf{in}(y,x)](\mathbf{rotten}(y)))$
  $i = 1$, $j = 1$; non-identical quants
- Polyadic:
  $\langle \mathbf{Every}, \mathbf{Some} \rangle \langle x, y \rangle \langle \mathbf{basket}(x), (\mathbf{apple}(y) \wedge \mathbf{in}(y,x)) \rangle (\mathbf{rotten}(y))$
  $i = 1, j = 2$; quantifier unification
- Unavailable polyadic reading:
  $\# \ \langle \mathbf{Some}, \mathbf{Every} \rangle \langle y, x \rangle \langle (\mathbf{apple}(y) \wedge \mathbf{in}(y,x)), \mathbf{basket}(x) \rangle (\mathbf{rotten}(y))$
  $i = 2, j = 1$; quantifier unification
  x is not bound in the first restrictor!

An apple in every basket is rotten: Readings

Possible readings:

- Non-polyadic: (There is the same rotten apple in every basket.)
  $\textbf{Some}\, y[\textbf{apple}(y) \wedge \textbf{Every}\, x[\textbf{basket}(x)](\textbf{in}(y,x))](\textbf{rotten}(y)))$
  $i = 1$, $j = 1$; non-identical quants
- Non-polyadic: (Every basket contains a rotten apple.)
  $\textbf{Every}\, y[\textbf{basket}(y)](\textbf{Some}\, x[\textbf{apple}(y) \wedge \textbf{in}(y,x)](\textbf{rotten}(y)))$
  $i = 1$, $j = 1$; non-identical quants
- Polyadic:
  $\langle \textbf{Every}, \textbf{Some} \rangle \langle x, y \rangle \langle \textbf{basket}(x), (\textbf{apple}(y) \wedge \textbf{in}(y,x)) \rangle (\textbf{rotten}(y))$
  $i = 1, j = 2$; quantifier unification
- Unavailable polyadic reading:
  $\# \ \langle \textbf{Some}, \textbf{Every} \rangle \langle y, x \rangle \langle (\textbf{apple}(y) \wedge \textbf{in}(y,x)), \textbf{basket}(x) \rangle (\textbf{rotten}(y))$
  $i = 2, j = 1$; quantifier unification
  x is not bound in the first restrictor!

Constraints on non-polyadic readings

Are the non-polyadic readings desirable? (remark by B. Schwarz)

- if we allow them, we need an additional constraint to ensure inseparability of Det_1 and Det_2, which was one of our core arguments for a polyadic analysis.
- if we do not allow them, we need additional possible interpretations for a polyadic quantifier to allow for $\langle \mathbf{Det}_1, \mathbf{Det}_2 \rangle$ and for a reading where every basket must contain an apple.

Constraints on polyadic readings

- C-command condition: Quantifier unification can only happen if a Det combines with a phrase that contains a quantifier.
- Clause-boundedness: If a CP is a dependent of a verb, then the CP's sem. representation contains all quantifiers that it dominates.

C-command

(22) Scenario: There are some empty cars in the train:

a. Fahrscheinkontrolle ist wichtig, weil [mindestens ein Passagier [in jedem Wagen]] normalerweise schwarz fährt.
'Ticket control is important because usually [at least one passenger [in each car]] has no ticket.'

b. #Fahrscheinkontrolle ist wichtig, weil [in jedem Wagen] normalerweise [mindestens ein Passagier] schwarz fährt.
'…because there usually is at least one passenger with no ticket in each car.'

c. #Fahrscheinkontrolle ist wichtig, weil [mindestens ein Passagier] normalerweise [in jedem Wagen] schwarz fährt.

Preventing telescoping from V-dependent clauses

(23) a. *[That Mary seems to know every boy] surprised someone. (Barker, 2012)
b. *Someone is surprised [that Mary seems to know every boy].
no $\forall > \exists$ reading

- *every boy* contained in a CP that is a dependent of a verb (*surprise*).
- Therefore: neither iterative nor polaydic analysis
- (Already excluded by c-command condition)

(24) *[Die Professorin, [die sagt, dass jeder Student faul ist] hat Vorurteile über ihn].
'The professor that says that every student is lazy has prejudices about him.'

Overview

NPI licensing in complex restrictor

- NPIs licensing of the complex determiner is like that of the highest one in the complex.
- NPIs in restrictor of Det_1 are licensed, if they are licensed in the restrictor of Det_2
- Definite determiner does not license NPIs, but universal does → licensing in IL constellation:

(25) *Auf der Liste wurde [der$_i$ Name] vermerkt,
[der$_i$ <u>je</u> im Zusammenhang mit dem Skandal genannt wurde].
'On this list [the$_i$ name] was noted
[that$_i$ had <u>ever</u> been mentioned in connection with the scandal].'

NPI licensing in complex restrictor

- NPIs licensing of the complex determiner is like that of the highest one in the complex.
- NPIs in restrictor of Det_1 are licensed, if they are licensed in the restrictor of Det_2
- Definite determiner does not license NPIs, but universal does → licensing in IL constellation:

(26) Auf der Liste wurde [der$_i$ Name [jeder Politikerin]] vermerkt,
[der$_i$ je im Zusammenhang mit dem Skandal genannt wurde].
'On this list [the$_i$ name [of every politician]] was noted
[that$_i$ had ever been mentioned in connection with the scandal].'

$$\langle \textbf{Every}, \textbf{The} \rangle \langle x, y \rangle \langle \textbf{politician}(x), (\textbf{name}(y, x) \wedge \ldots \underline{NPI} \ldots)) \rangle (\textbf{is-noted}(y))$$

Barrier for NPI licensing

- An definite DP is not a barrier for NPI licensing, but it may become one when embedding a universal with an inverse linking reading.

(27) Imposing a barrier in Det_2

a. Niemand hat [dem Berater] auch nur irgendetwas erzählt.
'Noone told the advisor anything.'

b. *Niemand hat [dem Berater [jedes Präsidenten]] auch nur irgendetwas erzählt.
'Noone told [the advisor of [every president]] anything.]'

c. Niemand hat [dem Berater [eines Präsidenten]] auch nur irgendetwas erzählt.
'Noone told [the advisor of [a president]] anything.'

NPI licensing in the scope

- Definite NPs do not license NPIs.
- If an NPI licensing quantifiers is embedded, licensing is possible.

(28) a. *[Die Autobiographie] enthält auch nur irgendwelche neuen Informationen.
'The autobiography contains any new information.'

b. [Die wenigsten Autobiographien] enthalten auch nur irgendwelche neuen Informationen.
'Few autobiographies contain any new information.'

c. [Die Autobiographie [der wenigsten Politiker]] enthält auch nur irgendwelche Informationen.
'[The autobiography [of few politicians]] contains any new information.'

NPI licensing: Summary

- NPI licensing confirms the unit-approach to inverse linking constellations.
- Strong influence of Det_2
- Show that restrictor of Det_1 behaves as being in the restrictor of Det_2.
- Champollion & Sauerland (2011): not clear how to handle the NPI data because
  - the two quantifiers are kept separately
  - the relativization of Det_2's restrictor is by a contextually filled variable, not be an addition to semantic representation.

Overview

Conclusion

- C-commanding determiners can behave like a unit.
- Telescoping is real, but so is the clause-boundedness of strong quantifiers
- Existing approaches to inverse linking and telescoping address unit-like behavior at best indirectly.
- Alternative: Polyadic analysis
- Polyadic analysis technically difficult for many approaches to syntax-semantics interface
- One way: Underspecification account

Next steps

- Case-by-case study of individual determiner combinations
- Investigate constraints on telescoping further
- Search for empirical confirmation of c-command condition on quantifier unification.
- Relation to other cases of polyadic quantification?
- ...

References

Barker, Chris. 2012. Quantificational binding does not require c-command. *Linguistic Inquiry* 43(4). 614–633.

Bos, Johan. 1996. Predicate logic unplugged. In Paul Dekker & Martin Stokhof (eds.), *Proceedings of the tenth amsterdam colloquium*, 133–143. ILLC/Department of Philosophy, University of Amsterdam.

Champollion, Lucas & Uli Sauerland. 2011. Move and accommodate: A solution to Haddock's puzzle. In Olivier Bonami & Patricia Cabredo Hofherr (eds.), *Empirical issues in syntax and semantics*, vol. 8, 27–51. Http://www.cssp.cnrs.fr/eiss8/.

Copestake, Ann, Dan Flickinger, Ivan Sag & Carl Pollard. 2000. Minimal recursion semantics. an introduction. Manuscript, Stanford University.

Egg, Markus. 1998. *Wh*-questions in Underspecified Minimal Recursion Semantics. *Journal of Semantics* 15. 37–82.

Egg, Markus. 2010. Semantic underspecification. *Language and Linguistics Compass* 4(3). 166–181.

Heim, Irene & Angelika Kratzer. 1998. *Semantics in generative grammar*. Blackwell.

Iordăchioaia, Gianina. 2009. *Negative concord with negative quantifiers. a polyadic quantifier approach to Romanian negative concord*: Universität Tübingen dissertation.

Keenan, Edward L. & Jonathan Stavi. 1986. A semantic characterization of natural language determiners. *Linguistics and Philosophy* 9(3). 253–326.

Keenan, Edward L. & Dag Westerståhl. 1997. Generalized quantifiers in linguistics and logic. In J. van Benthem & A. ter Meulen (eds.), *Handbook of logic and language*, 837–993. Amsterdam: Elsevier.

Konietzko, Andreas, Janina Radó & Wolfgang Sternefeld. t.a. Telescoping in relative clauses. experimental evidence. In Manfred Krifka, Rainer Ludwig & Mathias Schenner (eds.), *Reconstruction effects in relative clauses*, Berlin: Akademie Verlag.

Larson, Richard K. 1985. Quantifying into NP. Manuscript. Downloadable from semlab5.sbs.sunysb.edu/∼rlarson/qnp.pdf.

Moltmann, Fredericke. 1995. Exception sentences and polyadic quantification. *Linguistics and Philosophy* 18. 223–280.

Pinkal, Manfred. 1996. Radical underspecification. In Paul Dekker & Martin Stokhof (eds.), *Proceedings of the tenth amsterdam colloquium*, 587 – 606. ILLC/Department of Philosophy, University of Amsterdam.

Pollard, Carl & Ivan A. Sag. 1994. *Head-driven phrase structure grammar*. Chicago and London: University of Chicago Press.

Richter, Frank. 2004a. Foundations of lexical resource semantics. Habilitation thesis, University of Tübingen.

Richter, Frank. 2004b. *A mathematical formalism for linguistic theories with an application in head-driven phrase structure grammar*: Universität Tübingen Phil. dissertation (2000). `www.sfs.uni-tuebingen.de/hpsg/archive/bibliography/`

papers/richter_dissertation.ps.
W210.ub.uni-tuebingen.de/dbt/volltexte/2004/1203/.

Richter, Frank & Manfred Sailer. 2004. Basic concepts of lexical resource semantics. In Arne Beckmann & Norbert Preining (eds.), *Esslli 2003 – course material i*, vol. 5 Collegium Logicum, 87–143. Vienna: Kurt Gödel Society Wien.

Rodman, Robert. 1976. Scope phenomena, "movement transformations", and relative clauses. In Barbara Partee (ed.), *Montague grammar*, 165–176. Academic Press.

Safir, Ken. 1999. Vehicle change and reconstruction in $\bar{\text{A}}$-chains. *Linguistic Inquiry* 30(4). 587–620.

Sternefeld, Wolfgang. t.a. Telescoping by delayed binding. In Manfred Krifka, Rainer Ludwig & Mathias Schenner (eds.), *Reconstruction effects in relative clauses*, Berlin: Akademie Verlag.

de Swart, Henriëtte & Ivan A. Sag. 2000. Negation and negative concord in romance. Utrecht University and Stanford University.

Woisetschlaeger, Erich. 1983. On the question of definiteness in "an old man's book". *Linguistic Inquiry* 14. 137–154.

Zucchi, Alessandro. 1995. The ingredients of definiteness and the definiteness effect. *Natural Language Semantics* 3. 33–78.