Negation Marking in Conjuncts
A One-to-many Relation?

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Stuttgart, March 9, 2018

Outline

Introduction

- Standard German (StG) is not a negative concord language, but
- Single negation reading with conjunction of negative noun phrases (CNNP):

(1) Die meisten Berühmtheiten beantworten
[**keine** Briefe und **keine** e-Mails].
'Most celebrities answer no letters and no e-mail messages.'

- We will show:
  - not (always) conjunction of sentences
  - not "negative coercion"
- Combining:
  - Previous analysis of negative concord
  - Analysis of conjoined NPs
- Single-negation reading follows from framework

Overview

Outline

Negation in StG

- StG is not a negative concord language.

(2) **Keine** Berühmtheit hat **keine** Briefe beantwortet.
'No celebrity answered no letters.' (DN)
'No celebrity answered any letters.' (SN)

- Analysis 1: Conjunction of two negative sentence ("bi-propositional")

(3) Die meisten B. beantworten [**keine** Briefe und **keine** e-Mails].
'Most celebrities answer no letters and no e-mail messages.'
Die meisten$_x$ Berümtheiten: x beantworten **keine** Briefe
und x beantworten **keine** e-Mails.

- Analysis 2: *kein* as abstract negation + indefinite

(4) NOT (Die meisten Berühmtheiten beantworten [Briefe und e-Mails]).
'NOT(most celebrities answer [letters and e-mail messages])'

Bi-propositional analysis

(5) Die meisten Berühmtheiten beantworten [**keine** Briefe und **keine** e-Mails].
'Most celebrities answer no letters and no e-mail messages.'

(6) For most celebrities it is the case that they do not answer letters and they do not answer e-mail messages.
Most x(**celebrity**(x) :
$\neg\exists y$(**letter**(y)$\wedge$**answer**(x, y))$\wedge\neg\exists y$(**message**(y)$\wedge$**answer**(x, y))))

Problem for bi-propositional analysis

Reciprocal pronouns or collective predicates require joint analysis of the conjuncts.

(7) Ich habe gestern [**keinen** Hund und **keine** Katze]
I have yesterday no dog and no cat
miteinander streiten hören.
with each other quarrel hear
'Yesterday I heard [no dog and no cat] quarrel with one another.'

Split readings – split analysis?

As for simple negative constituents since Jacobs (1980), n-coordination permits split readings:

(8) Du brauchst **keinen** Anzug zu tragen.
'You don't need wear a suit.' (NOT < NEED < EXIST)

Motivates split analysis (Jacobs, 1980; Penka, 2011):

(9) du NOT [einen Anzug zu tragen brauchst]
you NOT a suit to wear need

Amalgamation requires surface adjacency.

(10) a. dass du jeden Abend keinen Anzug trägst.
b. ≠ dass du NOT [jeden Abend einen Anzug trägst]
that you NOT every evening a suit wear
'that you don't wear a suit every evening'
(EVERY < NOT < EXIST)

Problems for split analysis: Adjacency

But: adjacency of the negative constituent, not of the indefinite.
NPI *jemals* (ever) indicates wide scope of negation.

(11) [Der Besuch **keines** Amerikanischen Präsidenten] hat jemals soviel Begeisterung verursacht wie der von Kennedy.
'The visit of no American president ever caused as much enthusiasm as the one of Kennedy.'

(12) Auf der Party brauchst du [[**keinen** Anzug] und [**keine** Krawatte]] zu tragen.
'At the party, you don't need to wear a suit and you don't need to wear a tie.'

(13) Maria hat sich [[über Geschenke von **keinem** Verwandten] und [über Glückwünsche von **keinem** Freund]] jemals so sehr gefreut wie bei ihrer Hochzeit.
'Maria was never as excited [[about any relative's presents] and [about any friend's wishes]] as on her wedding.'

Problem for split analysis: Disjunction effect

Split analysis predicts that:

(14) [**no** N_1 und **no** N_2] VP
= it is not the case that [an N_1 and an N_2] VP.

True for obligatorily mono-propositional cases:

(15) a. Ich glaube, dass Monika [**keinen** Vortrag und **kein**
I think that Monika no lecture and no
Seminar] (miteinander) vergleichen muss.
seminar with each other compare must

b. Ich glaube nicht, dass Monika einen Vortrag und ein
I think not that Monika a lecture and a
Seminar (miteinander) vergleichen muss.
seminar with each other compare must

'I think that Monika is not obliged to compare any seminar and any course with each other.'

Problem for split analysis: Disjunction effect

(16) [**no** N_1 und **no** N_2] VP
= it is not the case that [an N_1 and an N_2] VP.

Not true for possibly bi-propositional cases:

(17) Ich glaube, dass Monika [**keinen** Vortrag und **kein** Seminar]
I think that Monika no lecture and no seminar
halten muss.
teach must
"neither nor" reading: 'I think Monika is not obliged to teach any of the two: a lecture or a seminar.'

(18) Ich glaube nicht, dass Monika einen Vortrag und ein Seminar
I think not that Monika a lecture and a seminar
halten muss.
teach must
"not both" reading: 'I think that Monika is not obliged to teach both, a lecture and a seminar (but maybe one of them).'

Problem for split analysis: Disjunction effect

CNNP lacks reading predicted by negation over conjunction of indefinites:

(19) Ich glaube, dass Monika [**keinen** Vortrag und **kein** Seminar]
I think that Monika no lecture and no seminar
halten muss.
teach must

a. = Ich glaube, dass M. **keinen** Vortrag halten muss und dass Monika **kein** Seminar halten muss.

b. = Ich glaube nicht, dass M. [einen Vortrag oder ein
I think not that M. a lecture or a
Seminar] halten muss.
course teach must

c. ≠ Ich glaube nicht, dass M. einen Vortrag und ein
I think not that M. a lecture and a
Seminar halten muss
course teach must

Outline

Analysis

- Integrated into a constraint-based underspecified syntax-semantics interface: Lexical Resource Semantics (Richter & Sailer, 2004)
- Negative concord as identical semantic contributions (Richter & Sailer, 2006)
- Analysis of the semantics of conjunction

Lexical Resource Semantics (LRS)

- Linguistic signs contribute constraints on possible readings.
- Underspecification: The constraints usually do not fully determine the intended reading (ambiguity)
- Ordinary semantic representation language + "metavariables" ($\alpha, \beta, \ldots$), ranging over ordinary semantic expressions.
- Contribution constraints: bits of semantic representation required to occur in the overall semantic representation (PARTS-list)
- Scoping constraints: constraints on the logical embedding of operators ($\alpha \lhd \beta$)
- Linking: "Index"/discourse referent of selected elements visible to selector (HPSG: INDEX, here: DR)
- One-to-many: contribution constraints are compatible with contribution by multiple signs and with multiple occurrence in the overall semantic representation.

Negative concord (NC) in LRS

Richter & Sailer (2002, 2004): Negative concord by identical negations.

(20) Nikto ničego ne videl. (Russian)
nobody nothing not saw 'Nobody saw anything.'

(21) Derivation:

word	DR	PARTS	constraints
nikto:	x	$\neg\alpha, \exists x(\alpha')$	$\exists x(\alpha') \lhd \alpha$
ničego:	y	$\neg\beta, \exists y(\beta')$	$\exists y(\beta') \lhd \beta$
ne videl:		$\neg\gamma, \mathbf{saw}(x, y)$	$\mathbf{saw}(x, y) \lhd \gamma$

a. NC-reading: $\neg\exists x(\exists y(\mathbf{saw}(x, y)))$
b. Plugging: $\alpha = \beta = \gamma$; $\alpha' = \exists y(\beta')$; $\beta' = \mathbf{saw}(x, y)$

Cross-linguistic variation

Richter & Sailer (2006):

- Standard French: no additional constraint $\Rightarrow$ ambiguous
- Polish: only one negation within one verbal projection
- StG: negations contributed within one verbal projection are necessarily distinct.

(22) Negation Faithfulness Constraint (NegFaith):
In every headed phrase, whenever one daughter has a constraint $\neg\alpha$ and another daughter has a constraint $\neg\beta$, the overall phrase has a scoping constraint $\alpha \neq \beta$.

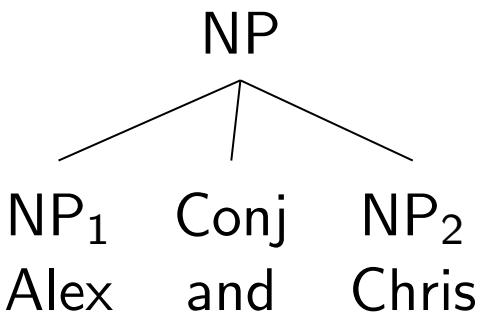
Semantics of conjunction

- Bi-propositional: Conjunction of propositions

  (23) [Every dog and some cats] ran through the yard.
  $\forall x(\mathbf{dog}(x) : \mathbf{run}(x)) \wedge \exists x(\mathbf{cat}(x) : \mathbf{run}(x))$

- Mono-propositional: Creation of a set object out of the conjuncts.

Syntax of conjunction



Conjunction phrase:

conj-ph ⇒

$$\left[\begin{array}{l} \textit{conj-ph} \\ \textsc{dtrs} \left\langle \left[\textsc{syns}\ \boxed{1}\right], \left[\textsc{head}\ \left[\begin{array}{l}\textit{conj}\\ \textsc{c-sel}\ \langle \boxed{1}, \boxed{2}\rangle\end{array}\right]\right], \left[\textsc{syns}\ \boxed{2}\right] \right\rangle \end{array}\right]$$

Lexical entry for bi-propositional conjunction particle

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{conj} \\ \text{C-SEL} & \left\langle \left[\text{DR} \;\; x\right], \left[\text{DR} \;\; x\right] \right\rangle \end{bmatrix} \\ \text{DR} & x \\ \text{PARTS} & \langle (\kappa_1 \wedge \kappa_2) \rangle \end{bmatrix}$$

(24) [Every dog and some cats] ran through the yard.

$\forall x(\mathbf{dog}(x) : \mathbf{run}(x)) \wedge \exists x(\mathbf{cat}(x) : \mathbf{run}(x))$

Semantics of bi-propositional conjunction

(25) a. *every dog*: $\begin{bmatrix} \text{DR} & x \\ \text{PARTS} & \langle \textbf{\textit{dog}}(x), \forall x(\alpha : \alpha') \rangle \end{bmatrix}$ and $\textbf{dog}(x) \lhd \alpha$

b. *some cats*: $\begin{bmatrix} \text{DR} & x \\ \text{PARTS} & \langle \textbf{\textit{cat}}(x), \exists x(\beta : \beta') \rangle \end{bmatrix}$ and $\textbf{cat}(x) \lhd \beta$

c. *ran through the yard*: $[\text{PARTS} \ \langle \textbf{\textit{run}}(x) \rangle]$

(26) [Every dog and some cats] ran through the yard.

$\forall x(\textbf{dog}(x) : \textbf{run}(x)) \wedge \exists x(\textbf{cat}(x) : \textbf{run}(x))$

One-to-many: One verb, its semantics is occurs twice!

Conjunct Confusion Blocking

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{conj} \\ \text{C-SEL} & \left\langle \left[\text{DR} \;\; x\right], \left[\text{DR} \;\; x\right] \right\rangle \end{bmatrix} \\ \text{DR} & x \\ \text{PARTS} & \langle (\kappa_1 \wedge \kappa_2) \rangle \end{bmatrix}$$

(27) [Every big dog and some small cats] ran through the yard.

a. $\forall x((\textbf{dog}(x) \wedge \textbf{big}(x)) : \textbf{run}(x)) \wedge \exists x((\textbf{cat}(x) \wedge \textbf{small}(x)) : \textbf{run}(x))$

b. $\#\ \forall x((\textbf{dog}(x) \wedge \textbf{small}(x)) : \textbf{run}(x)) \wedge \exists x(\textbf{cat}(x) \wedge \textbf{big}(x)) : \textbf{run}(x))$

(28) Conjunct Confusion Blocking (CCB)
If the DR value of a conjunction with EXC $\kappa_1 \wedge \kappa_2$ and its conjuncts is identical, then every element of the first conjunct's PARTS list must be in κ_1 and every element of the second conjunct's PARTS list must be in κ_2.

Semantics of mono-propositional conjunction: Plural

- Sets to model plural
- Plural predication: Distributive or collective interpretation depending on the predicate.

(29) Alex and Chris smiled.
$\exists X((\textbf{alex} \in X \wedge \textbf{chris} \in X) : \textbf{smile}(X))$

(30) Alex and Chris hugged.
$\exists X((\textbf{alex} \in X \wedge \textbf{chris} \in X) : \textbf{hug}(X))$

- Predication also defined for empty set:
$\textbf{smile}(X) \equiv \forall x(x \in X : \textbf{smile}(X))$,
i.e., if X is empty, $\textbf{smile}(X)$ is true.

Mono-propositional conjunction

- New, plural discourse referent for the conjunction
  $\exists X((\kappa_1 \wedge \kappa_2) : \phi)$
- Every quantifier in a separate conjunct
- In each conjunct: scope is membership in the conjunction set
  ("$\ldots x_i \in X$")

(31) Every student and a lecturer smiled.
$\exists X((\forall x_1(\textbf{student}(x_1) : x_1 \in X) \wedge \exists x_2(\textbf{lecturer}(x_2) : x_2 \in X))$
$: \textbf{smile}(X))$

Lexical entry of the conjunction particle

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{conj} \\ \text{C-SEL} & \left\langle \left[\text{DR}\ \ x_1\right], \left[\text{DR}\ \ x_2\right] \right\rangle \end{bmatrix} \\ \text{DR} & X \\ \text{MAIN} & \boxed{\text{K}}\ (\kappa_1 \wedge \kappa_2) \\ \text{EXC} & \exists X(\underline{\alpha} : \underset{\sim}{\beta}) \\ \text{PARTS} & \left\langle \boxed{1}(x_1 \in X), \boxed{2}(x_2 \in X), \boxed{\text{K}}(\kappa_1 \wedge \kappa_2), \exists X(\alpha : \beta) \right\rangle \end{bmatrix}$$

$\boxed{\text{K}} \lhd \alpha$ and $\boxed{1} \lhd \kappa_1$ and $\boxed{2} \lhd \kappa_2$

(32) Every student and a lecturer smiled.

$\exists X((\underline{\forall x_1(\textbf{student}(x_1) : x_1 \in X)} \wedge \underset{\sim}{\exists x_2(\textbf{lecturer}(x_2) : x_2 \in X)})$

$: \textbf{smile}(X))$

Outline

Application to coordination

- Coordination is not a binary, headed structure.
  $\Rightarrow$ NegFaith does not apply.
- Across-the-board scoping:

(33) Semantic ATB-constraint (SemATB):
In each conjunction phrase,
if an element from **one** conjunct-daughter's PARTS list takes scope over the entire conjunction,
then this element must be on **every** conjunct-daughter's PARTS list.

Example: Mono-propositional reading

(34) Alex beantwortet [keine Briefe und keine Mails].
Alex answers no letters and no e-mail messages

keine Briefe: $\underline{\neg\alpha, \boxed{A}\exists x_1(\textbf{letter}(x_1) : \alpha')}$ $\quad \boxed{A} \lhd \alpha$

keine Mails: $\underline{\neg\beta, \boxed{B}\exists x_2(\textbf{message}(x_2) : \beta')}$ $\quad \boxed{B} \lhd \beta$

und: $\boxed{1}(x_1 \in X), \boxed{2}(x_2 \in X), \boxed{K}(\kappa_1 \wedge \kappa_2), \exists X(\boxed{K} : \sigma)$ $\quad \boxed{1} \lhd \kappa_1,\ \boxed{2} \lhd \kappa_2$

Effect of SemATB:

- $\boxed{A}$ must be in κ_1
- $\boxed{B}$ must be in κ_2
- If $\neg\alpha$ takes scope over the entire conjunction, then $\alpha = \beta$.

(35) $\underline{\neg}\exists X((\underline{\exists x_1(\textbf{letter}(x_1) : x_1 \in X)} \wedge \underline{\exists x_2(\textbf{message}(x_2) : x_2 \in X)}$
$: \textbf{answer}(\textbf{alex}, X))$

Split reading

(36) Alex braucht [**keine** Briefe und **keine** Mails] zu beantworten.
Alex needs no letters and no e-mail m. to answer

$$\underset{\sim}{\neg}\textbf{NEED}\Big(\exists X\big((\exists x_1(\textbf{letter}(x_1) : x_1 \in X) \wedge \exists x_2(\textbf{message}(x_2) : x_2 \in X)\big) : \textbf{answer}(\textbf{alex}, X)\Big)\Big)$$

- SemATB allows for negation over the conjunction.
- The NPI (*braucht*) must be in the scope of negation.
- The negation can take scope over the predicate.

Example: Bi-propositional conjunction

(37) [**Kein** Student] und [**kein** Dozent] hat gelacht.
no student and no lecturer has laughed

(38) Fully bi-propositional reading ("disjunction effect"):
$\neg\exists x(\textbf{student}(x) : \textbf{laugh}(x)) \wedge \neg\exists x(\textbf{lecturer}(x) : \textbf{laugh}(x))$
$\equiv \neg\exists x((\textbf{student}(x) \vee \textbf{lecturer}(x)) : \textbf{laugh}(x))$

(39) Readings expected under a split analysis:
$\#\ \underset{\sim}{\neg}(\exists x(\textbf{student}(x) : \textbf{laugh}(x)) \wedge \exists x(\textbf{lecturer}(x) : \textbf{laugh}(x)))$

- Negation is contributed by each conjunct.
- Bi-propositional conjunction, i.e. DR-identity.
- Conjunct Confusion Blocking enforces negation to be conjunct internal.
- Reading (39) ok if negation is not in the conjuncts!

Outline

Summary

- New data on negative conjuncts
- Follows from independent analysis of negation and conjunction.
- SemATB is part of a general ATB principle for coordination.
- SemATB is cross-linguistically more robust than the interpretation strategy of n-constituents in non-coordinated structures.
- CNNP is not equivalent to negation with conjoined indefinites
  $\Rightarrow$ Negation is part of the conjunct's semantic contribution.

One-to-many?

- LRS is inherently one-to-many friendly.
- Bi-propositional CNNP readings are one-to-many: multiple use of the verb's semantics.
- Mono-propositional CNNP readings are one-to-many: multiple contribution of a single negation.
- Even non-NC languages allow for a many-to-one interpretation of negated constituents.
- Variation in other syntactic constructions (Burnett et al., 2015), even within one language.
- Constraining one-to-many:
  - Validity of (Sem)ATB reduces cross-linguistic variation in SN/DN ambiguities.
  - Conjunction Confusion Blocking

Thank you!

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