Reconstructing Coordinations

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The Plan

Some background on coordination

New data: A problem for conjunction reduction

- Unfolding the data, pt.1
- Unfolding the data, pt.2

Towards a derivation: Three candidates

- Flexibility
- Conjunction reduction with more movement
- Conjunction reduction with shifting

Conclusion and outlook

Some background on coordination

What are we talking about when we talk about coordination?

Uniformity in Propositional Logic:

p	q	$p \wedge q$	$p \vee q$
T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	F

Variation in Natural Language:

- [$_{TP}$ Roses are red] **and** [$_{TP}$ violets are blue].
- Spike bit [$_{DP}$ Tom] **and** [$_{DP}$ Jerry].
- Woodstock is [$_{PP}$ behind Snoopy] **or** [$_{PP}$ above him].
- You talk [$_{AP}$ too fast] **or** [$_{AP}$ too slow].

Is the representation of coordination in logic adequate for representing coordination in natural language?

Two families of approaches

Uniformity, like in Propositional Logic:

$[_{XP}$ ...] {and/or}$_{CR}$ $[_{XP}$ ...],

where XP is of type t

Variation, like what we hear (and see):

$[_{XP}$ ...] {and/or}$_{FL}$ $[_{XP}$ ...],

where XP is of a conjoinable type

t is a conjoinable type. If τ is a conjoinable type, then for all types σ, $(\sigma\tau)$ is a conjoinable type.

Two families of approaches

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Variation like what we hear (and see):

$[_{XP}$ ...] {and/or}$_{FL}$ $[_{XP}$ ...],

where XP is of a t-conjoinable type

How to maintain sentential coordination despite the variation? Conjunction reduction

"Variation appears only at the surface form..."

- Spike bit Tom $\{\text{and}/\text{or}_{CR}\}$ Jerry.

"... uniformity holds at the LF"

- [[Spike bit Tom] [$\{\text{and}/\text{or}_{CR}\}$ [~~Spike bit~~ Jerry]]

(see, e.g., Ross, 1967; Schein, 2017; Hirsch, 2017)

Reconstructing conjunction

The following sentence is ambiguous:

(1) Gali and Tali are unlikely to be fired.

Surface scope reading (preferred):

(2) (unlikely (Gali fired)) $\wedge$ (unlikely (Tali fired))

Inverse scope reading[1] (targeted meaning):

(3) (unlikely (Gali is fired $\wedge$ Tali is fired))

**Un-* modifies Adj head (e.g., Collins, 2023); see *prohibit, prevent,* etc.

[1] The conjunction may have to be stressed to obtain the inverse scope reading, i.e., to avoid a homogeneity inference that would collapse the readings (cf., e.g., Szabolcsi & Haddican, 2004).

More than one reading

It holds that the surface scope reading entails the inverse scope reading:

(4) (unlikely (Gali fired)) $\wedge$ (unlikely (Tali fired))
$\Rightarrow$ (unlikely (Gali is fired $\wedge$ Tali is fired))

We can bring out the target meaning with the following continuation (which is infelicitous with the stronger meaning):

(5) Gali and Tali are unlikely to be fired. *Though one of them will be for sure.*

$$[\![(5)]\!] = \begin{cases} 1 & \textit{if } (\text{unlikely}(\text{Gali is fired} \wedge \text{Tali is fired}))\ldots \\ 0 & \textit{if } (\text{unlikely}(\text{Gali fired})) \wedge (\text{unlikely}(\text{Tali fired}))\ldots \end{cases}$$

A mapping problem for (simple) CR

According to (simple) CR, (1)'s LF should be the following:

(6) [[Gali unlikely to be fired] [and$_{CR}$ [Tali unlikely to be fired]]]

Which yields the stronger reading:

(7) (unlikely (Gali fired)) $\wedge$ (unlikely (Tali fired))
$\neq$ (unlikely (Gali is fired $\wedge$ Tali is fired))

A mapping problem for (simple) CR

The targeted meaning can be derived from the following LF:

(8) [unlikely [[Gali fired][and$_{CR}$ [Tali fired]]]]

However, this LF cannot be easily mapped to the observed surface form:

The requisite LF under CR:
[unlikely [[Gali fired][and$_{CR}$ [Tali fired]]]]

The surface form:
Gali and Tali are unlikely to be fired

Where we are

Monotonicity / Coordination	DE predicate	UE predicate
Conjunction	XP **and** XP {unlikely/prohibited...} ...	XP **and** XP {likely/allowed...} ...
Disjunction	XP **or** XP {unlikely/prohibited...} ...	XP **or** XP {likely/allowed...} ...

Availability of coordination reconstruction in raising constructions

Where are we going

Monotonicity / Coordination	DE predicate	UE predicate
Conjunction	XP **and** XP {unlikely/prohibited...} ...	XP **and** XP {likely/allowed...} ...
Disjunction	XP **or** XP {unlikely/prohibited...} ...	XP **or** XP {likely/allowed...} ...

Availability of coordination reconstruction in raising constructions

Warm-up: Free choice readings of disjunction

(9) Gali is allowed to see The Thing or Eraserhead. $\Diamond(p \boxed{\vee} q) \Leftrightarrow (\Diamond p \vee \Diamond q)$

$\Rightarrow$ Gali is allowed to see The Thing $\Diamond p$

$\Rightarrow$ Gali is allowed to see Eraserhead $\Diamond q$

i.e., sentence (9) can convey a conjunctive meaning $(\Diamond p \boxed{\wedge} \Diamond q)$

(see Kamp, 1973, among many others)

Warm-up: Free choice readings of disjunction

How can FC readings be derived?

(10) Gali is allowed to see The Thing or Eraserhead.

a. $\Diamond$ (Gali sees The Thing $\boxed{\vee}$ Gali sees Eraserhead)

$\wr$?

b. $\Diamond$ (Gali sees The Thing) $\boxed{\wedge}$ $\Diamond$ (Gali sees Eraserhead)

There are different approaches to fleshing out $\wr$. On one family of approaches, FC readings are derived by strengthening in grammar:

(11) $\textsc{Str}$ [allowed [... or ...]] $\Rightarrow \Diamond(...) \wedge \Diamond(...)$

(e.g., Fox 2007; see Aloni 2007, Franke 2009, etc., for alternatives)

Warm-up: Free choice readings of disjunction

A surface wide-scope disjunction lacks the FC reading with *allowed*:

(12) Gali is allowed to see The Thing or she is allowed to see Eraserhead.

$\not\Rightarrow \Diamond$ (Gali sees The Thing) $\wedge \Diamond$ (Gali sees Eraserhead)

FC Reading Scope Condition

$\Diamond \gg \vee$ must hold at LF in order to derive the FC reading.

(see, e.g., Zimmermann, 2000; Geurts, 2005, for a different type of examples)

Reconstructing disjunction

The following sentence is ambiguous:

(13) Gali or Tali are allowed to go to the party.

Simple reading (perhaps preferred):

(14) $\Diamond$(Gali goes to the party) $\boxed{\vee}$ $\Diamond$(Tali goes to the party)

Free choice reading (targeted meaning):

(15) $\Diamond$(Gali goes to the party) $\boxed{\wedge}$ $\Diamond$(Tali goes to the party)

More than one reading

It holds that the FC reading entails the simple reading:

(16) $\Diamond$(Gali goes to the party) $\wedge$ $\Diamond$(Tali goes to the party)
$\Rightarrow$ $\Diamond$(Gali goes to the party) $\vee$ $\Diamond$(Tali goes to the party)

We can demonstrate the existence of the stronger target meaning with the following continuation (which would be infelicitous with the weaker meaning):

(17) A: Gali or Tali are allowed to go to the party.
B: *No, you're wrong. Gali isn't allowed to!*

A mapping problem, again

According to (simple) CR, (13)'s LF is the following:

(18) [[Gali allowed to go to the party] [or$_{CR}$ [Tali allowed to go to the party]]]

Which violates the scope condition for FC readings:

$$\diamond \not\gg \vee \text{ (but rather } \vee \gg \diamond)$$

And which accordingly yields only the simple meaning:

(19) $\diamond$(Gali goes to the party) $\vee$ $\diamond$(Tali goes to the party)

A mapping problem, again

To the point, the FC reading can be derived by strengthening the following LF:

(20) [allowed [[Gali goes to the party][or$_{CR}$ [Tali goes to the party]]]]

However, this LF cannot be easily mapped to the surface form:

The requisite LF under CR:
[allowed [[Gali goes to the party][or$_{CR}$ [Tali goes to the party]]]]

The surface form:
Gali or Tali are allowed to go to the party

Intermediate summary: the empirical landscape

Monotonicity / Coordination	DE predicate	UE predicate
Conjunction	XP **and** XP {unlikely/prohibited...} ...	XP **and** XP {likely/allowed...} ...
Disjunction	XP **or** XP {unlikely/prohibited...} ...	XP **or** XP {likely/allowed...} ...

Availability of coordination reconstruction in raising constructions

- Conjunction in subject + *unlikely* (etc) allows for a weak (inverse) reading.

  $\rightsquigarrow$ reconstruction of conjunction below *unlikely* (etc)

- Disjunction in subject + *allowed* (etc) allows for a free choice reading.

  $\rightsquigarrow$ reconstruction of conjunction below *allow* (etc)

- Accounting for this in simple CR runs into a **mapping problem.**

Revisiting the two families of approaches

Uniformity, like in Propositional Logic:

$[_{XP}$ ...$]$ $\{$and/or$\}_{CR}$ $[_{XP}$ ...$]$,

where XP is of type t

Variation, like what we hear (and see):

$[_{XP}$ ...$]$ $\{$and/or$\}_{FL}$ $[_{XP}$ ...$]$,

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What about being Flexible? (Candidate I)

"Variation holds at the LF..."

- Spike bit [Tom $\{\text{and/or}\}_{FL}$ Jerry].

"... meanings of coordinators (etc.) can be shifted."

- Spike bit [[Tom^] $\{\text{and/or}\}_{FL}$ [Jerry^]]

(cf. Partee & Rooth, 1983)

What about being Flexible? (Candidate I)

A straightforward account of our data:

(21) Gali or Tali are allowed to go to the party.

Surface form under Flexibility:

(22) [[[Gali^] or$_{FL}$ [Tali^]]$_1$ [allowed [t_1 go to the party]]]

Reconstruction is available:

(23) [allowed [[[Gali^] or$_{FL}$ [Tali^]] go to the party]]

After reconstruction the scope condition is met and the FC reading is derivable (through strengthening or otherwise, as mentioned above):

(24) [STR [allowed [[[Gali^] or$_{FL}$ [Tali^]] go to the party]]]

$\Rightarrow \Diamond$ (G party) $\wedge \Diamond$ (T party)

An analogous derivation is available for the conjunction + *unlikely* cases:

(25) [unlikely [[[Gali^] and$_{FL}$ [Tali^]] to be fired]] (reconstruction at LF)

$\Rightarrow$ (unlikely (Gali is fired $\wedge$ Tali is fired))

The parse on which the coordination doesn't reconstruct yields the other readings we mentioned.

Problems

Even though flexibility accounts for coordination reconstruction smoothly, it:

- commits us to a substantive hypothesis according to which grammar incorporates mechanisms that can generate a systematic ambiguity,
- faces several independent challenges.

(see, e.g., Schein, 2017; Hirsch, 2017, 2022; Sauerland, 2018)

CR + Sophisticated movement?

Right node raising?

(26) Suggested derivation of apparent subject DP coordination under CR:

a. Tom and Jerry liked milk.

b. LF of (a):
[[Tom [liked milk]][and$_{CR}$ [Jerry [liked milk]]]]

c. RNR to get the surface form in (a):
[[[Tom t_1][and$_{CR}$ [Jerry t_1]]][liked milk]$_1$]

Right node raising on its own? **Not sufficient**

(27) RNR attempt for subject disjunction + *allowed*

a. Gali or Tali are allowed to go to the party.

b. (a)'s LF: ✗
[[G [allowed to go to the party]][or$_{CR}$ [T [allowed to go to the party]]]]
($\not\rightsquigarrow$ FC)

c. RNR to get the surface form in (a): ✓
[[[Gali t_1][or$_{CR}$ [Tali t_1]]][allowed to go to the party]$_1$]

Right node raising + further extraction? **Not adequate**

(28) RNR attempt for subject conjunction + *unlikely*

a. Gali and Tali are unlikely to be fired.

b. (a)'s alternative LF: ✓
[unlikely [[[Gali be fired][and$_{CR}$ [Tali be fired]]]]] ($\rightsquigarrow$ inverse reading)

c. Movement to get the surface form in (a): ✗
[[[Gali t_1][and$_{CR}$ [Tali t_1]]]$_2$[**are** unlikely [t_2 [to be fired]$_1$]]]

(Agreement mismatch, etc.)

Something else is needed ...

Modal movement?

(29) Covert Across-The-Board Movement

a. CR base structure:
[[G [allowed to go to the party]][or$_{CR}$ [T [allowed to go to the party]]]]

b. Covert movement of the modal, CR LF:
[allowed$_3$[[Gali [t_3 go to the party]][or$_{CR}$ [Tali [t_3 go to the party]]]]]

($\rightsquigarrow$ FC, if strengthened)

(cf. Meyer & Sauerland, 2017, for other kinds of examples)

Modal movement? **Not adequate**

Impossible for full coordination examples:

(30) Gali is allowed to go to the party or Tali is allowed to go to the party

$\not\Rightarrow \Diamond$(Gali goes to the party) $\wedge \Diamond$(Tali goes to the party)

Overgeneration:

(31) Gali or Tali have been exactly twice allowed to go to a party.

We admit an undesirable LF:
[allowed [Gali or Tali went exactly twice to a party]]

Something else is needed ...

CR + Covert shifting operations? (Candidate III)

It has been argued that proper names (e.g., *Gali*) have clausal syntax:

(32) Gali $\rightsquigarrow$ [{$\exists$/THE} [λx [x Gali]]]

Applying this to our cases may allow us to stick to CR:

(33) Surface: [STR [$\exists$ [λx [x Gali or$_{CR}$ x Tali]]]$_1$ [allowed [t_1 go to the party]]]

(34) LF: [STR [allowed [[$\exists$ [λx [x Gali or$_{CR}$ x Tali]]] go to the party]]]

(cf. Stowell 1981; Heim & Kratzer 1998; Champollion 2016 on conjunction)

Treating proper names as clausal nominal? **Not enough for two reasons**

- We garner some advantages of flexibility but lose some advantages of CR (e.g., scope restriction with respect to negation).
- A generalization to quantificational DPs is needed (flexibility/shifting):

(35) Most professors or all lecturers are allowed to quit their positions.

$\Rightarrow \Diamond$(most profs quit) $\wedge \Diamond$(all lecturers quit)

No escape from flexibility, type-shifting?

The takeaway:

We have to admit some type-shifting and/or other covert operations into our system (e.g., Lasersohn, 1995; Link, 1983; Winter, 2001; Schmitt, 2013; Champollion, 2016).

What we showed ... and what should we do?

The data:

Monotonicity / Coordination	DE predicates	UE predicates
Conjunction	XP and XP {unlikely/prohibited...} ...	XP and XP {likely/allowed...} ...
Disjunction	XP or XP {unlikely/prohibited...} ...	XP or XP {likely/allowed...} ...

The existence of reading in which $\text{OP}_{\{\text{DE/UE}\}} \gg \{\wedge/\vee\}$.

Consequences for the theory:

- **Flexibility**: A straightforward account with independent issues.
- **CR**: Mapping problem persists ...

to be continued

Selected references i

Aloni, Maria. 2007. Free choice, modals, and imperatives. Natural Language Semantics 15(1). 65–94. doi:10.1007/s11050-007-9010-2.

Champollion, Lucas. 2016. Ten men and women got married today: Noun coordination and the intersective theory of conjunction. Journal of Semantics 33(3). 561–622. doi:10.1093/jos/ffv008.

Collins, Chris. 2023. Negating gradable adjectives. Natural Language Semantics 31(2). 121–137. doi:10.1007/s11050-023-09204-1.

Fox, Danny. 2007. Free choice and the theory of scalar implicatures. In Uli Sauerland & Penka Stateva (eds.), Presupposition and implicature in compositional semantics, 71–120. London: Palgrave Macmillan UK. doi:10.1057/9780230210752_4.

Franke, Michael. 2009. Signal to act: Game theory in pragmatics.: University of Amsterdam dissertation.

Geurts, Bart. 2005. Entertaining alternatives: Disjunctions as modals. Natural Language Semantics 13(4). 383–410. doi:10.1007/s11050-005-2052-4.

Selected references ii

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

Hirsch, Aron. 2017. An inflexible semantics for cross-categorial operators: MIT dissertation.

Hirsch, Aron. 2022. A case for conjunction reduction. Ms.

Kamp, Hans. 1973. Free choice permission. Proceedings of the Aristotelian Society 74. 57–74.

Lasersohn, Peter. 1995. Plurality, conjunction and events. Kluwer Academic Publishers.

Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In Rainer Bäuerle, Christoph Schwarze & Arnim von Stechow (eds.), Meaning, use, and interpretation of language, 302–323. Berlin, Boston: De Gruyter. doi:10.1515/9783110852820.302.

Meyer, Marie-Christine & Uli Sauerland. 2017. Covert Across-The-Board Movement revisited: Free choice and the scope of modals. In Proceedings of nels 47 (vol. 2), .

Selected references iii

Partee, Barbara & Mats Rooth. 1983. Generalized conjunction and type ambiguity. In Rainer Bäuerle, Christoph Schwarze & Arnim von Stechow (eds.), Meaning, use, and interpretation of language, 361–383. Berlin, Boston: De Gruyter. doi:10.1515/9783110852820.361.

Ross, John Robert. 1967. Constraints on variables in syntax: MIT dissertation.

Sauerland, Uli. 2018. The thought uniqueness hypothesis. In Proceedings of salt 28, .

Schein, Barry. 2017. 'And': Conjunction Reduction Redux. The MIT Press. doi:10.7551/mitpress/10488.001.0001.

Schmitt, Viola. 2013. More pluralities: University of Vienna dissertation.

Stowell, Tim. 1981. Origins of phrase structure: MIT dissertation.

Szabolcsi, Anna & Bill Haddican. 2004. Conjunction meets negation: A study in cross-linguistic variation. Journal of Semantics 21(3). 219–249. doi:10.1093/jos/21.3.219.

Winter, Yoad. 2001. Flexibility principles in boolean semantics. MIT press.

Zimmermann, Thomas Ede. 2000. Free choice disjunction and epistemic possibility. Natural Language Semantics 8(4). 255–290. doi:10.1023/A:1011255819284.