

Ingredients of Embedding

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What I want to do

Understand how CP arguments work at the syntax-semantics interface:

- how they combine as arguments of predicates
- what their semantic type(s) is/are
- how/if they move and the copies they leave
- how their distribution is connected to their interpretation (I think it is)

We have very sophisticated theories about these questions with DPs....

Plan

- **Monday** Shameless Self-Promotion of the program in Moulton (2015): the meaning and distribution of *that*-clauses
- **Tuesday** Non-nouny CPs
 - ▶ Raising/ECM, hyper-raising, and Say-Complementizers, Bangla *bole* (Kidwai 2014, Halpert 2015)
- **Wednesday** Nouny CPs Part 1: Propositional not factive
 - ▶ D+CP constructions (Greek, Farsi, Spanish), Korean and Navajo Nominalized clauses, Dutch preverbal CPs (Barbiers 2009), referential CPs (Haegeman and Ürögdi 2010, Kastner 2015)
- **Thursday** Nouny CPs Part 2: Internally-headed Relatives
- **Friday** Nouny CPs Part 3: Events and Pseudo-Relatives

(Depending on time, one or both of the latter topics may be cut)

A reading list

Go to <http://www.sfu.ca/~kmoulton/> and find link to materials under “Upcoming”. Things are also on the dropbox.

Readings ranked in terms of importance for these lectures:

- ① von Stechow, K. and I. Heim. Intensional Semantics. Chapter 2.
<http://web.mit.edu/fintel/fintel-heim-intensional.pdf>
- ② Moulton, K. 2015. CPs: Copies and Compositionality. *LI* 44:3
- ③ Kidwai (2014), Halpert (2015)
- ④ Kim (2009)
- ⑤ Barbiers (2000)
- ⑥ Roussou (1991)

Predicate Argument Relations

We have sophisticated theories of how DPs combine with predicates.

Syntax

- arguments merge in very specific structural positions for theta-roles
- arguments move/have copies in other position for grammatical function (Case, EPP)

Semantics

- arguments of various semantic types (Lewis 1970, Montague 1973, Partee 1985, Carlson 1977, et. seq.) combine with predicates via type-driven semantic composition (Klein and Sag 1985)
 - ▶ Heim and Kratzer 1998 is a good place to start if you're comfortable already with generative syntax

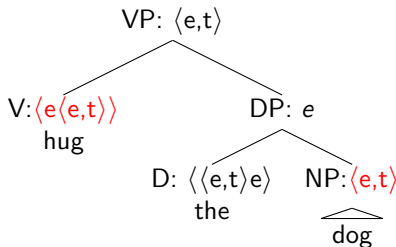
Type-driven composition

e = individual type

t = truth value

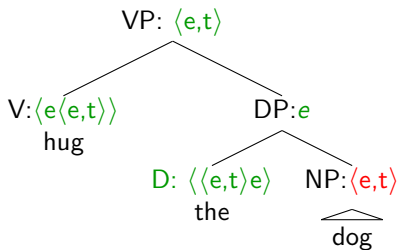
$\langle e, t \rangle$ = predicate/intransitive verb type (a function from individuals to truth values).

Determiners map an NP with predicate meaning ($\langle e, t \rangle$) to type e saturate a predicate:



Type-driven composition

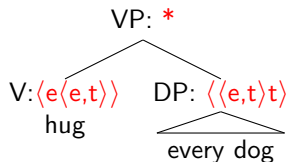
Determiners map an NP with predicate meaning ($\langle e, t \rangle$) to type e saturate a predicate:



I am not saying this is the *only* way arguments saturate: big lit on type e NPs (Cheirchia 1998, Boskovic 2005) and on property type objects (Zimmerman 1992, Chung and Ladusaw 2004, McNally and van Geenhoven 2003).

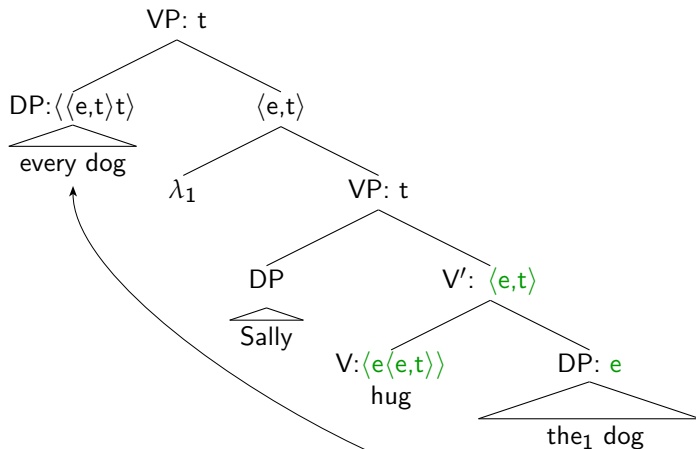
Type-clashes repaired by movement

Movement (Quantifier Raising) along with copies formation can be recruited to resolve type clashes (yes yes, there's other ways, via lifting etc.):



Type-clashes repaired by movement

Traces (copies) can be of a different type than the moved item:



A process of trace conversion converts the lower copy of *every* to *the* (Fox 1999)

So we “know” a lot about how DPs combine with predicates.

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What about CPs?

What about CPs?

A: The Parallelism Hypothesis

C is like D, turning a sentence into an argument (Davidson 1968; Szabolcsi 1987; Abney 1987; Kiparsky 1995; Roberts and Roussou 2003; Manzini and Savoia 2003, 2011).¹

che lavoro 'which job'; *that job*: *che/that* = a D or like a D

(1) Manzini and Savoia 2011

	Determiner	Complementizer
German	dass	dass
Italian	che	che
English	that	that

¹This view is supported by the historical development of Old English 'þæt' from demonstrative to complementizer

What about CPs?

B: The Predicate Hypothesis

C turns a sentence into a predicate (Aboh 2005; Kratzer 2006; Moulton 2009; Arsenijevic 2009; Kayne 2009; Moulton 2015a) in complement *and* relative clause CPs.

The guy/Il ragazzo **that/che** *I saw/ho visto*: *che/that* = always a relativizer

(2) Arsenijevic 2009

	Relativizer	Complementizer
Brabant Dutch	dat	dat
English	that	that
Serbo-Croatian	što	što
French	que	que
Italian	che	che
⋮	⋮	⋮

Classic CP-DP asymmetries

CPs are not nominal or DP-like (Emonds 1972; Stowell 1981; Grimshaw 1982).

- | | | | |
|-----|----|---|---------------------|
| (3) | a. | John is aware of that. | [P DP] |
| | b. | *John is aware of that Fred left. | *[P CP] |
| | | | |
| (4) | a. | This captures the fact that he's appreciated. | DP-only taking verb |
| | b. | *This captures that he's appreciated. | |
| | | | |
| (5) | a. | *John complained that. | CP-only taking verb |
| | b. | John complained that she left. | |

Classic CP-DP asymmetries

In OV languages, we can see how CPs distribute differently from DP:

- (6) a. Hans hat [_{DP} diese Lüge] verbreitet.
Hans has this lie spread.about
'Hans has spread this lie' (German)
- b. *Hans hat [_{CP} dass Joachim Marlene liebt] verbreitet.
Hans has that Joachim Marlene loves spread.about
- c. Hans hat verbreitet [_{CP} dass Joachim Marlene liebt].
'Hans has spread.about that Joachim Marlene loves.'

Classic CP-DP asymmetries

And it's not just a pressure against centre-embedding: Farudi (2007) shows how Farsi allows D+CP (7d) and while just as heavy as bare CPs these can stay *in situ*:

- (7) a. man [_{DP} ketāb-ro] [_{CP} be giti] dād-am
I book-OBJ to Giti gave-1SG
'I gave the book to Giti' (Farsi)
- b. Giti fekr mi-kon-e [_{CP} ke man ketāb-ro dust dār-am]
Giti think DUR-do-3SG that I book-RA friend have-1SG
'Giti thinks that I like the book'
- c. *Giti [_{CP} ke man ketāb-ro dust dār-am] fekr mi-kon-e.
- (8) Giti [**in-o** ke rahmin mi-ā-d emshab] fekr
Giti [this-OBJ that Rahmin DUR-come-3SG tonight] thought
mi-kone-e
DUR-do-3SG
'Giti thinks that Rahmin is coming tonight.' (Farudi 2007)

Well get back to this issue several times today and on Wednesday when we discuss Nouny CPs.

Classic CP-DP asymmetries

CPs can combine with nouns, while DPs need rescuing by Case-assigning *of*.

- (9) a. The destruction *(of) the city. [N *(P) DP]
b. The idea (*of) that Fred would leave. [N CP]

(Stowell 1981 thought that CPs are apposition to nouns. I have an argument against that below.)

Classic CP-DP asymmetries

Traditionally, the difference between CP and DP has been tied to Case: DP argument requires Case, CPs resist it:

(10) The Case Resistance Principle (Stowell 1981)

GB analyses:

- CPs were forced to move out of Case-assigning positions (object, subject, etc.)
- Their traces got Case
- CPs appear extraposed or as satellites if subjects (Koster 1978)

See esp. Safir 1985 and then Bošković 1995.

- HPSG/LFg have distinguished between COMP and OBJ functions (Berman 1996).

Classic CP-DP asymmetries

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Early Anti-symmetry:

- CPs stay low, but other arguments move left (for Case) (Zwart 1993)
- DP fronting accounts: complements base-generated to the right of V, everything else moves left (Zwart 1993)

(12) [DP [_{VP} V t CP]]

German



(13) [V [DP [_{VP} V t CP]]]

English



Classic CP-DP asymmetries

What could the Parallelism Folks say about these differences between DP and CP?

The Parallelism Hypothesis folks could say C is like D not syntactically (hence different distribution of CP and DP) but *is* like D semantically (turns a CP into an argument).

I am going to provide some arguments against even that view.

Another CP-DP asymmetry

The DP-Requirement: Leftward moved FFCs only leave gaps where DPs are otherwise licensed (Williams 1981; Grimshaw 1982; Postal 1986).

- (14) a. Most baseball fans believed/expected that the Giants would win.
b. Most baseball fans believe/expected that/it.
c. That the Giants would win, most baseball fans believed/expected.
- (15) a. Albert boasted/complained that the results were fantastic.
b. *Albert boasted/complained that/it/a belief that the results were fantastic.
c. *That the result were fantastic, Albert boasted/complained.

Another CP-DP asymmetry

- FCC topics/subjects are base-generated satellites related to gap via DP null operator (Koster 1978; Alrenga 2005; Moulton 2013).
- Based on non-subject position of CP subjects

(16)?*Should [that John is rich] make him attractive?

- or moved FCCs part of null DPs (Davies and Dubinsky 2010; Takahashi 2010, Hartman 2013, among many *many* others...)
- these people just dis-agree with the judgments....they say CPs in subject position (as diagnosed by SAI) are fine

(17) Why does [that Fred wants to marry her] so upset Mary's mother, father, brother, sisters, and four grandparents that they haven't ceased to harangue her about it since they discovered the proposal? (Delahunty 1983:382-383)

Another CP-DP asymmetry

Either way....

DP-Requirement corollary: FCCs *alone* cannot move.

(...can someone tell me why? just so I know if I am being clear?...)

Asymmetries *among* CPs

But other types of CPs can move: *so, as* Pro-CPs (Stowell 1987; Postal 1994)

- (18) a. **So** it seems t_{CP} .
b. The results were fantastic, **as** Albert boasted/commented/complained t_{CP} .

Asymmetries *among* CPs

But other types of CPs can move: *so, as* Pro-CPs (Stowell 1987; Postal 1994)

- (18) a. **So** it seems t_{CP} .
b. The results were fantastic, **as** Albert boasted/commented/complained t_{CP} .

As-parentheticals involve movement, as shown by island effects (Postal 1994):

- (19) *The results were fantastic as Albert wondered whether Sally boasted t_{CP}

Asymmetries *among* CPs

We know these are CPs because these verbs don't select DP:

- (20) a. *It seems that.
b. *John complain/boasted/commented that.

Asymmetries *among* CPs

Pro-CPs cannot complement Ns

- (21) a. I believe/claim/am afraid so.
b. my belief/claim/fear that pigs fly
c. *my belief/claim/fear so

Higgins 1972's appendix (list 3, p.242): none take *so*:

- (22) *the/her {admission, announcement, answer, assertion, assumption, claim, comment, complaint, conclusion, expectation, guess, hope, inference, indication, judgment, knowledge, objection, prediction, presumption, pretence, promise, prophecy, proposal, reasoning, report, ruling, sense, speculation, statement, stipulation, supposition, suspicion, teaching, thought, theory threaten, understanding, worry} *so*.

Asymmetries *among* CPs

Clause-taking nouns simply don't take arguments (Stowell 1981; Grimshaw 1990)

- (23)
- a. He claimed that./*his claim of that
 - b. I believe the story./*the belief of the story (Zucchi 1989, 14 (28c))
 - c. *the idea of that
 - d. *the fact of that

Asymmetries *among* CPs

	FCCs	Pro-CPs	DPs/PPs
Move leftward	X	✓	✓
Combine with non-argument taking nouns	✓	X	X

This pattern can't be attributed to Case or category (the usual suspects!)

- Pro-CPs are CPs and don't take Case: *It seems so*/**So seems*

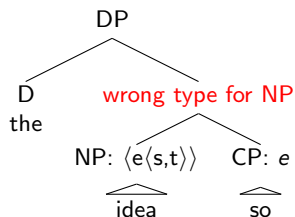
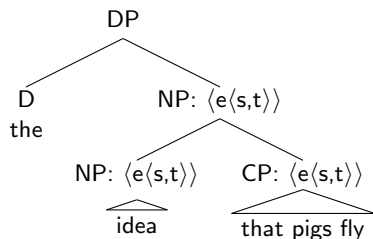
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	FCCs	Pro-CPs	DPs/PPs
Move leftward	X	✓	✓
Combine with non-argument taking nouns	✓	X	X

Preview of the proposal

- FCCs are predicates of things with propositional content type $\langle e\langle s,t \rangle \rangle$
- Pro-CPs (and the relevant DPs) denote individuals with propositional content

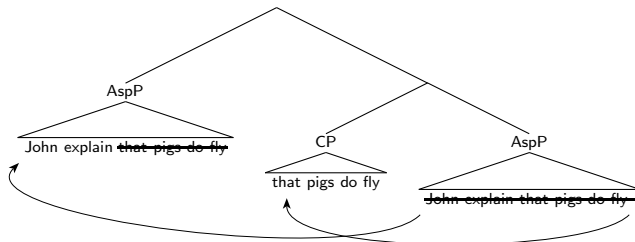
FCCs combine with nouns not as arguments but by predicate modification



Proposal for V+CP

- Since FCCs are predicates of things with propositional content type, $\langle e\langle s,t \rangle \rangle$, they cannot saturate the V
- To saturate **verbs**, FCCs trigger two leftward movements, delivering a remnant movement analysis (Hinterhölzl 1999; Koopman and Szabolcsi 2000)

(24)



Results:

- prevents further movement, predicting no CP movement
- puts FCCs in the right post-verbal position without extraposition
- gets binding, extraction facts right (unlike extraposition)
- makes predictions about which clause are transparent for raising

The semantics: background

A somewhat standard view

Verbs of propositional attitude relate an **attitude holder** to a **proposition**

(25) Sal believes that Sue left.

$\llbracket \text{believe} \rrbracket = \lambda x \lambda p. \text{believe}(x)(p)$

- This is not a meaning....
- And what's a proposition?

What do we want?

What should a semantics for propositional attitude **ascriptions** capture?

- (26)
- a. Max spoke to the president of the university.
 - b. The president of the university is Ulrike Beisiegel.
 - c. Max spoke to Ulrike Beisiegel.
- (27)
- a. Max believes he spoke to the president of the university.
 - b. The president of the university is Ulrike Beisiegel.
 - c. Max believes he spoke to the president of the university.

Substitution of extensional equivalents doesn't necessarily preserve truth.
So a semantics for attitudes must allow how we (the speaker) describe the believed thing to be different “in words” than how that believer would say it.

What do we want?

Necessarily opacity on the embedded event description: epistemically positive

- (28)
- a. Fred was jumping away because he saw a mouse.
 - b. Mary thought that it was Fred dancing.
 - c. #Mary saw that Fred was jumping away from a mouse.

Direct perception: epistemically neutral

- (29)
- a. Fred was jumping away because he saw a mouse.
 - b. Mary thought that it was Fred dancing.
 - c. Mary saw Fred jumping away from a mouse.

Note that indirect perception is factive (presupposes truth of complement) so we don't want to associate opacity with “non-actuality” commitments.

What do we want?

And we obviously want to characterize the subject's beliefs, etc. even if those are false beliefs.

(30) Max believes that pigs fly, which is false/but he's is wrong.

Ingredient #1: possible worlds

- (31) **Possible world:** a complete world history
“...absolutely every way that a world could possibly be is a way that some world is.”
(Lewis 1986, p.2)

There are infinite numbers of worlds, that differ in possibly trivial ways:

- (32) w_0 : the world we live in
 w_1 : just like w_0 except I have 1,140 hairs on my head
 w_2 : just like w_0 except I have 1,141 hairs on my head
:
 w_{346} : just like w_1 except Edgar is president of the university
 w_{347} : just like w_0 except Edgar is president of the university

Ingredient #2: propositions denote sets of possible worlds

A proposition partitions the set of all possible worlds “in half”:

$$(33) \quad \llbracket \text{Edgar is president of the university} \rrbracket = \{w: \text{Edgar is president of the university in } w\}$$

Many worlds are in this set:

$$(34) \quad \begin{aligned} w_{347} &\in \{w: \text{Edgar is president of the university in } w\} \\ w_{346} &\in \{w: \text{Edgar is president of the university in } w\} \end{aligned}$$

Many are not, including w_0 (the world we think we live in)

$$w_0 \notin \{w: \text{Edgar is president of the university in } w\}$$

Ingredient #3: belief states

We can characterize someone's belief (state) as the set of worlds they think they could live in, for all they know

(35) the belief state (BS) of Keir here and now:

$$\text{BS(Keir)(here and now)} = \{ w_0, w_1, w_2, \dots \}$$

But w_{347} or $w_{346} \notin \text{BS(Keir)(here and now)}$

Ingredient #4: belief ascription

$$(36) \quad x \text{ believes } p = \text{BS}(x)(\text{here and now}) \subset p$$

(remember p is a set of worlds)

$$(37) \quad \llbracket \text{Edgar is president of the university} \rrbracket = \{w: \text{Edgar is president of the university in } w\}$$

$$(38) \quad \llbracket \text{Tom believes Edgar is president of the university} \rrbracket = \text{BS}(\text{Tom})(\text{here and now}) \subset \{w: \text{Edgar is president of the university in } w\}$$

Ingredient #5: lambdas

Another way of talking about a sets: functions expressed with lambda expressions

(39) $\llbracket \text{Edgar is president of the university} \rrbracket =$

$\{w: \text{Edgar is president of the university in } w\}$

or:

$\lambda w. \text{Edgar is president of the university in } w$

Final version

Universal quantification:

$$(40) \quad \llbracket \textbf{believe} \rrbracket = \lambda p \lambda x \lambda w. \forall w' (w' \in \text{BS}(x)(w) \rightarrow p(w'))$$

$$(41) \quad \llbracket \textbf{Tom believes Edgar is president of the university} \rrbracket = \lambda w. \forall w' (w' \in \text{BS}(\text{Tom})(w) \rightarrow \text{Edgar is president in } w')$$

The world argument of *believe* is there because we want (41) to be a proposition, too:

(42) No one believes that Tom believes that Edgar is president of the university.

Different attitudes—different worlds

- (43) Max believes/hopes/desires/claims/says that Edgar is president.
- a. *hope* characterizes worlds compatible with what the attitude holder hopes.
 - b. *desire* characterizes worlds compatible with what the attitude holder desires.
 - c. ⋮

Not very illuminating, eh?

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Should the linguist/semanticist (let alone the syntactician) care about different attitudes?

Yes. Fine grained difference in attitudes has both semantic and morpho-syntactic ramifications

What linguistics have always known

Restricting attention to declarative complements, different attitudes trigger/select for:

- different moods in complement
- different complementizers
- different tense/aspect
- extraction behaviour (bridge verbs?)
- embedded root phenomenon (bridge verbs?)

Attitudes have linguistically relevant differences wrt:

- presupposition projective behaviour (Heim 1991)
- entailments/presupposition (factivity, veridicality) (Kiparsky and Kiparsky 1971, et. seq.)

A slightly different packaging of attitude complements

FCCs don't denote propositions

Standard story: CPs denote type $\langle s, t \rangle$, a set of possible worlds

- But some CPs, like FCCs, can be **equated** (Potts 2002) with content nouns like *idea*, *rumour*, *myth*, *story*, *fact*

(44) The idea **is** that Bob is a fraud.

Problem: we don't want to literally equate ideas, myths, stories, etc. with sets of worlds:

- ideas can be funny, rumours mean, myths old, but a set of worlds cannot

FCCs properties of propositional content

Content nouns describe individuals with propositional content, x_c .

$$(45) \llbracket \textbf{idea} \rrbracket = \lambda x_c \lambda w. \text{idea}(x_c)(w)$$

- Such things can be old, mean, and funny.

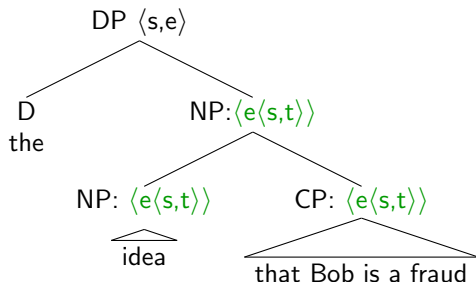
Kratzer (2006): FCCs identify the propositional content of such an individual

$$(46) \llbracket \textbf{that Bob is a fraud} \rrbracket = \lambda x_c \lambda w [\text{CONT}(x_c)(w) = \lambda w'. \text{Bob is a fraud in } w']$$

$$\text{CONT}(x_c)(w) = \{w' : w' \text{ is compatible with the intentional content determined by } x_c \text{ in } w\} \quad (\text{after Kratzer 2013, 195(25)})$$

FCCs properties of propositional content

FCCs combine with content nouns by predicate modification.

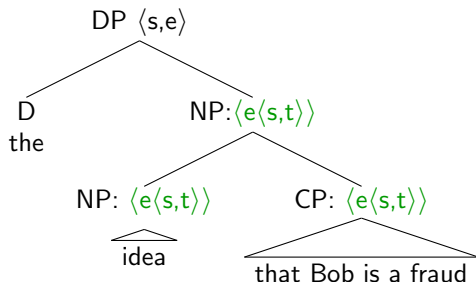


$\iota x_c \lambda w$ [idea(x_c)(w) & [CONT(x_c)(w) = $\lambda w'$. Bob is a fraud in w']]

\leadsto 'the idea **the content of which is** that Bob is a fraud'

FCCs properties of propositional content

FCCs combine with content nouns by predicate modification.



$\iota x_c \lambda w [idea(x_c)(w) \ \& \ [CONT(x_c)(w) = \lambda w'. \text{Bob is a fraud in } w']]$

\leadsto 'the idea **the content of which is** that Bob is a fraud'

It's like a relative clause

FCCs properties of propositional content

CP 'complements' of nouns behave like Modifiers in obviating condition C violations, unlike arguments (Lasnik 1998; Moulton 2013 *contra* Freidin 1986 and Lebeaux 1988):

- (47) a. *Which depiction [of John's₁ face] does he₁ hate most? *argument*
b. Which book [from John's₁ library] did he₁ read? *modifier*
c. Which book [that John₁ hated most] did he₁ read? *modifier*
- (48) a. The fact that [John₁ has been arrested] he₁ generally fails to mention.
b. Whose allegation [that Lee₁ was less than truthful] did he₁ refute vehemently?
(Kuno 2004: 335(72))

Argument against Apposition analysis of N+CP

Stowell 1981 said the CP was in apposition (e.g. *My sister, Alice*). See also Potts 2002.

You can marginally extract from CP complements of N (Ross 1967) (49a), just as with some relative clauses (49b). But you cannot extract from appositives (50).

- (49) a. The money_i which I have {hopes/a feeling} that the company will squander t_i amounts to \$400,000 (Ross 1967:85(4.45a)) N+CP
b. Then you look at what happens in languages that you know and languages_i that you have a friend who knows t_i. (McCawley 1981p.108) RC
- (50) a. The press never liked Katherine Hepburn, [the winner of 4 oscars].
b. *How many Oscars_i did the press never liked Katherine Hepburn, [the winner of t_i].

Some issues to think about

Over-comable problem: You can't stack CP 'complements':

- (51) a. *The claim [that John left] [that he was angry]
b. The claim [that John made —] [that Sally didn't buy —]

(51a) is ruled out because the proposition *that John left* \neq *that he was angry*, which is required by the analysis of FCCs.

This won't work for mathematical statements (the proposition that $2+2=4$ **is** *equal to* the proposition that $1+1=2$)

Some issues to think about

Patrick Elliott (UCL, handout): It can't be the C itself that introduces the CONT function:

(52) John made the claim that Mary left and that Sally is upset.

$\text{cont}(x) = \lambda w'. \text{ Mary left in } w' \ \& \ \text{cont}(x) = \lambda w'. \text{ Sally is upset in } w'$

But this would say the two propositions are equivalent, which isn't not right.

Some issues to think about

Patrick Elliott suggests locating the `CONT` function separately from *that*, so that you can simply conjoin $\langle s, t \rangle$ propositions as usual and then apply `CONT` to that. *That* is vacuous.

Some issues to think about

There is also something to consider about non-Boolean conjunction of propositions.

Relevant here is McCloskey 1991: conjoined sentential subjects CPs can trigger plural agreement if they are somehow *distinct* propositions:

- (53) That the president will be reelected and that he will be impeached are equally likely at this point.
- (54) a. That UNO will be elected and that sanctions will be lifted **is** now likely.
b. ??That UNO will be elected and that sanctions will be lifted **are** now likely

(McCloskey 1991), pp.564–565.

Maybe we want to make a plurality of things with content?

A real outstanding problem

If CPs are predicates of things with content (just like adjectives like *old* or *mean* can be), why can't you say:

- (55) a. #It's mean that Roger slept with Mats.
b. #That Roger slept with Mats is mean.
cf. The rumour that Roger slept with Mats is mean.
- (56) a. #It's old that the earth is flat.
b. #That the earth is flat is old.
cf. The myth that the earth is flat is old/It's old, the myth that the earth is flat.

This is a genuine issue.

Moving on...

What about verbs?

Standard treatment: semantically select for propositions:

$$(57) \llbracket \text{believe} \rrbracket = \lambda p_{\langle s, t \rangle} \lambda y \lambda w [\forall w' \in \text{DOX}(y)(w): p(w') = 1]$$

New treatment:

$$(58) \llbracket \text{believe} \rrbracket = \lambda x_c \lambda y \lambda w [\text{DOX}(y)(w) \subseteq \text{CONT}(x_c)(w)]$$

$$\text{DOX}(y)(w) = \{w': w' \text{ is compatible with what } y \text{ believes in } w\}$$

What about verbs?

Standard treatment: semantically select for propositions:

$$(57) \llbracket \text{believe} \rrbracket = \lambda p_{\langle s, t \rangle} \lambda y \lambda w [\forall w' \in \text{DOX}(y)(w): p(w') = 1]$$

New treatment:

$$(58) \llbracket \text{believe} \rrbracket = \lambda x_c \lambda y \lambda w [\text{DOX}(y)(w) \subseteq \text{CONT}(x_c)(w)]$$

$$\text{DOX}(y)(w) = \{w': w' \text{ is compatible with what } y \text{ believes in } w\}$$

An existence proof: propositional attitude verbs take content DPs

- (59) a. John believed the claim.
b. Sally understood the idea.
c. Bob spoke no lie.

Nominalizations

Object nominalization

- (60) John's great love is physics.
 < John loves physics

Event(uality) nominalization

- (61) John's love of physics is deep. < John loves physics deeply.

Nominalizations

Object nominalization

- (62) John's belief/claim/proposal/... is that PCs suck.
 < John believes/claims/proposes/... that PCs suck

Nominalization

CP complements to nominalizations are likewise not arguments (Stowell 1981; Grimshaw 1990)

(63) The explanation/claim/proof/belief **that pigs fly**.

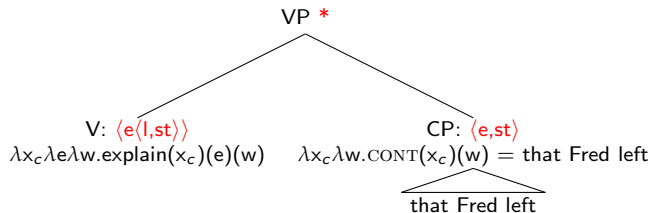
Moulton 2015b: nominalizations of clause-taking verbs have the same type as content nouns.

(64) $\llbracket \text{belief} \rrbracket = \lambda x_c \lambda w. \text{belief}(x_c)(w)$ $\langle e \langle s, t \rangle \rangle$

- clause taking nominalizations are **non-argument structure nominals**
- apparent counterexamples (e.g. Pesetsky and Torrego 2002, Safir 1985) do not hold

What about V+CP?

Event(ualities): type /



- The syntax guides us to a solution...

The syntax: A remnant movement analysis for FCCs

CP extraposition

OV-language: V CP / DP V / *CP V

- (65) a. weil ich dem Hans sagte, [_{CP} dass Uli krank ist].
because I the Hans said that Uli sick is
'because I told Hans that Uli is sick'
b. ??weil ich dem Hans [_{CP} dass Uli krank ist] sagte.
c. weil ich [_{DP} der name] sagte.

...other OV languages: Hindi, Persian, Bangla (for some CPs), Turkish? (for some CPs?)

I know...I know...maybe it's just weight. I don't speak German but here's what I've read:

Middle-field CPs

Webelhuth says that middle field CPs allow only DP type gaps: *freuen mich* selects CPs, not DPs, and the CP cannot occur anywhere pre verbally:

- (66) a. *Ich freue mich das
I am-happy RELF that
'I am happy about that.'
- b. Ich freue mich daß Hans krank ist.
I am-happy RELF that Hans sick is
'I am happy that Hans is sick.'
- c. *[Daß Hank krank ist] freue ich mich.
(Webelhuth:1992: 105(118–120))
- d. *weil ich [daß Hans krank ist] mich nicht freuen kann.
since I that Hans sick is RELF not be-happy can
'I cannot be happy that Hans is sick.'
(Webelhuth:1992: 107(136))

Middle-field CPs

Webelhuth says that middle field CPs allow only DP type gaps: *glauben* can select DPs, so middle field and vorfield CPs are fine.

- (67) a. Ich glaub' das
I believe that
'I believe that.'
- b. [Daß Hank krank ist] Ich glaub'.
- c. ?weil ich [daß Hans krank ist] glauben kann.
since I that Hans sick is believe can
'I can believe hat Hans is sick.'

Middle-field CPs

Recall the DP-Requirement: CPs that move must leave DP gaps (Webelhuth shows this for German CP subjects and topics).

So CPs in the middle-field are either:

- really just DPs (with a silent D?) in which case the facts are expected
- they've moved a little leftward, and like all leftward movement of FCCs, leave a DP trace...
 - ▶ this could be because dislocated CPs must rely on a null operator, which must be a DP....
- When we talk Barbiers (2000) we can return to this

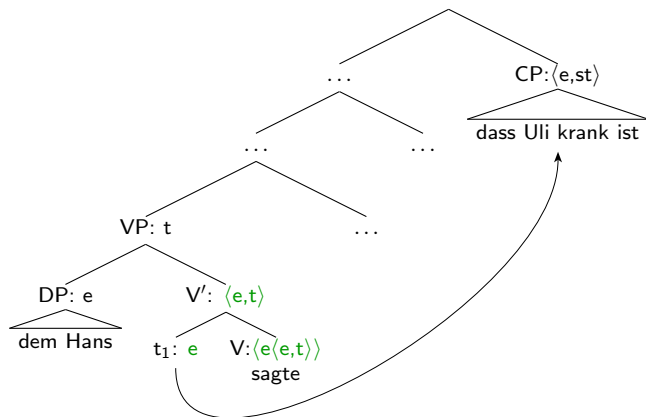
So CPs only exist in the middle field (or fronted) if they're DPs (or have moved and left DP gaps)

And so CPs must **obligatorily appear in the nachfield otherwise**

(well, the following assumes this, so....)

Movement can leave traces of different types

The trace (lower copy) of the extraposed CP *can* saturate the predicate:



But Extraposition is not enough

Extraposed elements should not be transparent for A-bar extraction, but CPs in German are:

- (68) (Ich weiß nicht) wen₁ er gesagt hat [_{CP} dass Claudia t₁ geküßt hat]
I know not whom he said has that Claudia kissed has
'I don't know who he said that Claudia has kissed' (Müller 1998: 145(58a))

But Extraposition is not enough

Extrapolated elements should not be transparent for A-bar extraction, but CPs in German are:

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'I don't know who he said that Claudia has kissed' (Müller 1998: 145(58a))

As we saw, under some circumstances, CPs can appear to the left of the verb, but here they are opaque for extraction (69).

- (69) *(Ich weiß nicht) wen₁ er [_{CP} das Claudia t₁ geküßt hat] gesagt hat.
I know not whom he that Claudia kissed has said has
'I don't know who he said that Claudia has kissed' (Müller 1998: 146(58b))

I think (69) really shows again that CPs in the middle-field are not in-situ complements there, but involve a little movement or are DPs themselves

CP position and interpretation: Barbiers 2000:

Barbiers 2000: Factive verbs let CPs sit pre or postverbally.

- (70) a. Jan zal nooit toegeven [dat ie gelogen heeft]
John will never admit that he lied has
'John will never admit that he has lied.'
- b. Jan zal [dat ie gelogen heeft] nooit toegeven
John will that he lied has never admit
'John will never admit that he has lied.'

Factive

Factive

CP position and interpretation: Barbiers 2000:

- (71) a. Jan zal wel vinden [dat Piet geschikt is]
Jan will certainly find that Piet eligible is
'John will certain find/have the opinion that Piet is eligible' *Proposit.*
- b. *Jan zal [dat Piet geschikt is] wel vinden.
John will that Pete eligible is certainly find

(Note: at least German, Webelhuth 1992 argues that only those CPs that can have DP traces can sit in the middle-field. Does *vinden* take DPs? Like: *Jan zal vinden dat*?

CP position and interpretation: Barbiers 2000:

The interesting cases: verbs that change their flavour of meaning depending on position of CP: Postverbal → propositional or factive; preverbal → factive only.

- (72) a. Jan zal je vertellen [dat ie haar gezien heeft].
John will you tell that he her seen has
(i) 'John will tell you that he has seen her.' (which may or may not be true) *Proposit.*
(ii) 'John has seen her and he will tell you that.' *Factive*
- b. Jan zal [dat ie 'r gezien heeft] niet aanjou vertellen.
John will that he her seen has not to you tell
(i) *'John will not tell you that he has seen her.' (which may or may not be true) *Proposit.*
(ii) 'John has seen her but he will not tell you that.' *Factive*

CP position and interpretation: Barbiers 2000:

It is not clear to me that these are necessarily **factive**: maybe just presupposed content.

- We will talk about this notion later in the week

Whatever the right semantic characterization, Barbiers data show that pre-verbal CPs are 'different'

- It could be that they are just DPs (recall Webelhuth that middle field CPs leave DP traces)
- the D-ness could give rise to presuppositionality /factivity (see Kastner 2015) and our later lectures

Back to nachfield CPs

High base-generation is not an option either: binding into extraposed CPs:

- (73) a. weil der Direktor **jeder Putzfrau**_i persönlich mitteilte [daß
because the director each cleaning-lady personally told that
sie_i entlassen sei]
she fired was
'...because the director told each cleaning lady personally she was
fired.'
- b. *weil der Direktor **ihr**_i persönlich metteilte [daß
because the director her personally told that
die Putzfrau_i entlassen sei]
the cleaning-lady fired was
'...because the director personally told her; the cleaning lady; was fired.'

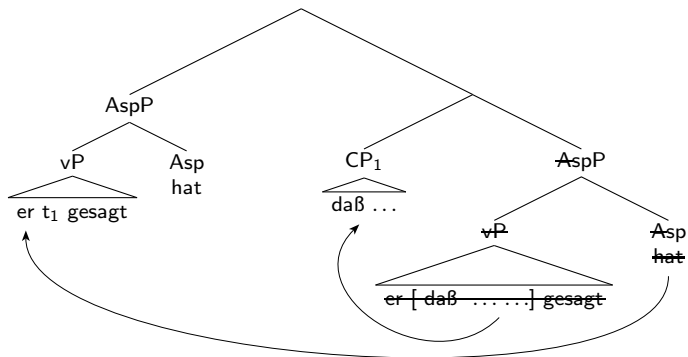
(Note: CP relative clause extraposition can bleed condition C)

Remnant Movement Account

CP 'extraposition' is leftward CP movement and remnant verb phrase (AspP) movement. (Hinterhölzl 1999, Koopman and Szabolcsi 2000, Kayne 2005, den Dikken 1995)

- (74) a. ...weil er gesagt hat [_{CP} dass Claudia Hans geküßt hat].
...because he said has that Claudia Hans kissed has
b. *...weil er gesagt [_{CP} dass Claudia Hans geküßt hat] hat.
...because he said that Claudia Hans kissed has has

(75)



Hinterhölzl 1999

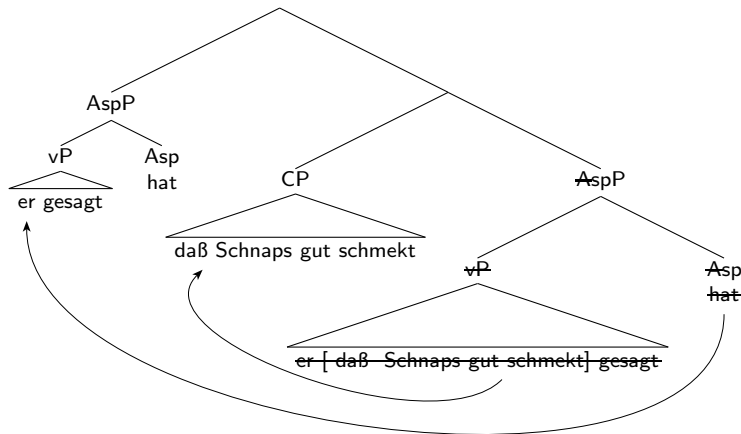
The only way to accommodate the following pattern with CP complements of adjectives in German is leftward movement of the CP out of its selecting phrase, followed by remnant movement of that phrase (see also Koopman and Szabolcsi 2000, p.136–137, for Dutch).

- (76) a. ohne [AP froh] zu sein, dass der Hans nicht kam.
without happy to be that the Hans not came
'without being happy that Hans did not come'
- b. *ohne [froh dass der Hans nicht kam] zu sein.
without happy that the Hans not came to be
(Hinterhölzl 1999: 101(25))
- c. [[AP froh t_{CP}] zu sein [CP dass der Hans nicht kam] [t_{AP}]]

The Neo-Kaynian Hinterholz Analysis of CPs

Er gesagt hat daß Schnaps gut schmeckt

(77)



An argument for remnant movement from English

*P-stranding Effect: no P-stranding from a PP co-argument with FCC (Kuno 1973)

- (78) a. *Who did you say to $_$ [$_{CP}$ that I would buy the guitar]?
b. *Who will Andrew disclose to $_$ [$_{CP}$ that he is married]?

Heavy NP Shift (HNPS) shows *P-stranding Effect (Stowell 1981: 208-211))

- (79) a. *Who did you say to $_$ [$_{DP}$ a few words about his workmanship].
b. *Who will he disclose to $_$ [$_{DP}$ his marriage with Jane]?

CP-**extraposition** from NP: no *P-stranding effect (Drummond 2009):

- (80) a. Who did you give the impression to [$_{CP}$ that you were happy]?
b. Who did you give the book to [$_{CP}$ that Mary wanted]?

An argument for remnant movement from English

- Den Dikken (1995) proposed a remnant analysis of HNPs — so the VP fronting (here AspP) is what HNPS and sentences with CP complements share.
- Conclusion: it's a freezing effect: Movement of AspP prevents P-stranding. (We can talk about why..)
- But it suggests that the derivation for HNPS and CP complements in all cases is the same

So there is evidence even from English that CP position is achieved by Asp fronting.

An argument for remnant movement from English

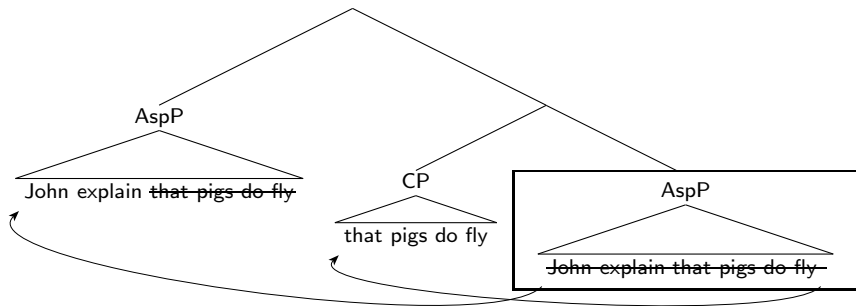
Pseudogapping provides a further argument. HNPS is one of the operations that licenses pseudogapping (81a) (Jayaseelan 1990). CPs can be the remnants in pseudo-gap constructions too ((81b) from Baltin 2003: 225(ft.6)).

- (81) a. Though John wouldn't suppress his anger, he would his fatigue.
b. Though John wouldn't complain that he's angry, he would that he's tired.

Complain doesn't select DPs, so it must be short CP movement that creates the elidable VP constituent deriving pseudogapping.

Remnant Analysis

(82)

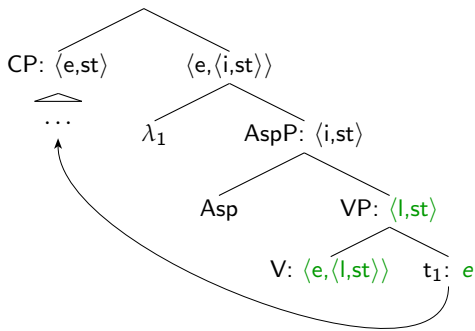


Now I will show that **interpreting this structure resolves the type clash!**

Combining the Syntax and Semantics

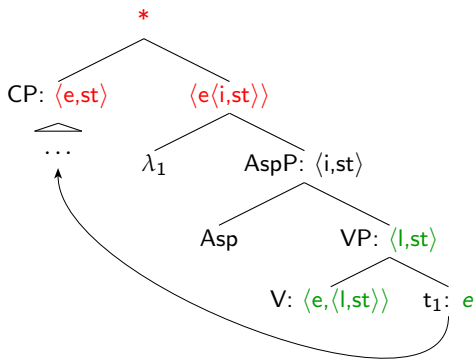
Step 1: CP movement

CP leaves a trace of type e that saturates the verb. (I'll do a copy theory version later.)



Step 1: CP movement

CP leaves a trace of type e that saturates the verb.



Step 2: AspP movement

Aspect is a verbal quantifier

$$(83) \llbracket \mathbf{perfective} \rrbracket = \lambda P_{\langle I, st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \ \& \ \tau(e) \subseteq t]: \langle \langle I, st \rangle, \langle i, st \rangle \rangle$$

$$(84) \llbracket \mathbf{imperfective} \rrbracket = \lambda P_{\langle I, st \rangle} \lambda t \lambda w. \exists e [P(e)(w) \ \& \ \tau(e) \supseteq t]: \langle \langle I, st \rangle, \langle i, st \rangle \rangle$$

- Times: type i , Event(ualities): type I , Worlds: type w

AspP movement leaves event type trace (Hacquard 2006, Kim 2007)

Step 2: AspP movement

AspectP, like *wh*-phrases, pied-pipes complement

- pied-piped constituents are interpreted as though they never moved (Stechow 1996).

(85) Which book about him_i did John_i read which book about him_i.

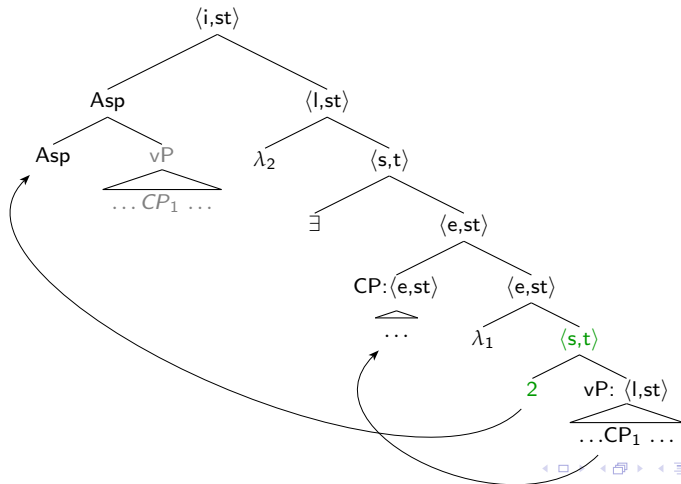
- | | | |
|----|--|----|
| a. | $[_{DP}$ Which book about him _i] should nobody _i read $[_{DP}$ which book] | PF |
| b. | $[_{DP}$ Which] λ_1 should nobody _i read $[_{DP}$ 1 book about him _i] | LF |

(86) a. $[_{AspP}$ Asp VP] ... ~~$[_{AspP}$ Asp VP]~~

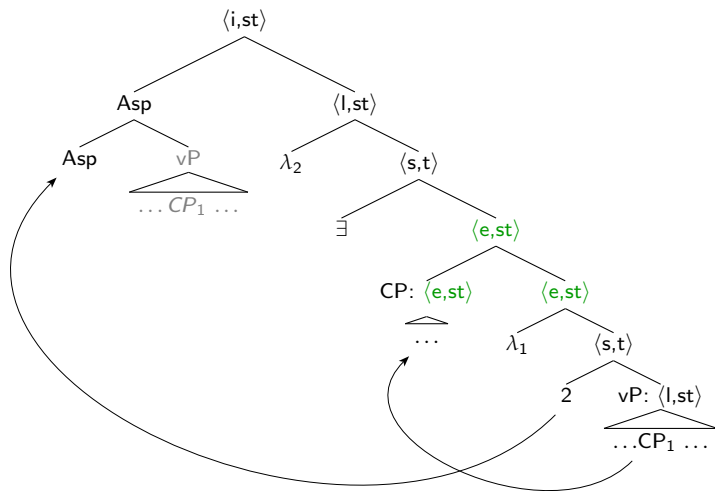
- | | | |
|----|---|----|
| b. | $[_{AspP}$ Asp] λ_{2_i} ... $[_{AspP}$ 2 _i VP] | LF |
|----|---|----|

Step 2: AspP movement

Aspect leaves an event-type trace (*l*) **2** which saturates the event argument of the vP

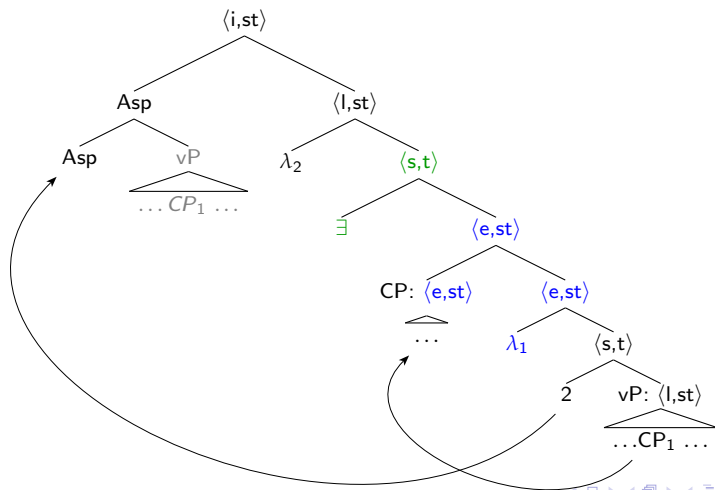


A place for Predicate Modification



Step 3: Close it off!

Close off the content argument via \exists closure (Diesing 1990 et seq)



Original puzzle: FCCs vs. CP-proforms

	FCCs	Pro-CPs
Move leftward	X	✓
Combine with non-argument taking nouns	✓	X

- (87) a. my insistence that John leave.
b. *my insistence so

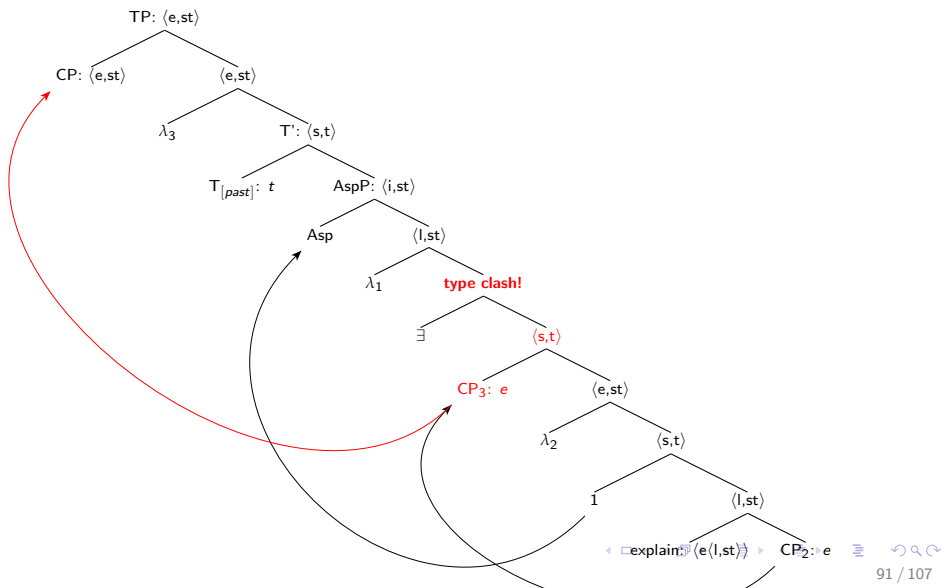
- (88) a. *That John leave I insisted.
b. So you insisted.

Why FCCs don't move further

- FCCs can't move higher than \exists -closure, which is at edge of the verb phrase (Diesing 1992)
- FCCs also require AspP movement, for composition, so they will never move higher than the landing site of AspP

Why FCCs don't move further

FCCs can't move to subject or topic position because intermediate copy creates type clash for \exists



One last derivation to rule out

What about semantically vacuous movement of FCC?

(89) [CP ... \exists [CP _{$\langle e, st \rangle$} ... CP_e]]

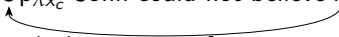
Similar situation for other kinds of 'deficient' arguments like bare nouns:

- (90) a. Ho preso acqua dalla sorgente.
I took water from the spring.
b. *Acqua viene giù dalle colline.
water comes down from the hills.
(Longobardi 1994: 616(14))

- semantically vacuous movement is generally a marked option for arguments

Blocking semantically vacuous movement

Sentential subjects/topic are base-generated with null DP operator (Koster 1978, Berman 1996, Alrenga 2005, Moulton 2013)

- (91) [that Fred left] $Op_{\lambda x_c}$ John could not believe x_c
 $\lambda w \exists x_c [[\text{CONT}(x_c) = \text{Fred left}] \ \& \ \text{John could not believe } x_c \text{ in } w]$.
- 

We can/will? talk more about sentential subjects/topics.

Arguments that they don't move come from anti-reconstruction effects (Moulton 2013).

- Lots of people say sentential subjects (and topics) are D+CP constructions. I hope to get back to that.

Will it 'extrapose' FCCs far enough?

FCCs appear after the whole verbal complex, not just AspP:

- (92) a. ...weil er behaupten muss [_{CP} dass er Hemingway
...because he claim must that he Hemingway
geschlagen hat].
beaten has.
'...because he must claim that he has beaten Hemingway.'
- b. ...weil er *[_{CP}...] behaupten *[_{CP}...] muss.

Will it 'extrapose' FCCs far enough?

The grammar only needs to get CPs to the edge of Aspect phrase, as shown in predicate fronting, which can include FCCs (Büring and Hartmann 1997).

- (93) [sagen dass Schnaps gut schmeckt] muss er nicht.
said that schnapps tastes good must he not.

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Constraints on verb cluster formation force the FCC further to the right
Truckenbrodt 1995; Riemsdijk 1998; Wurmbrand and Bobaljik 2005.

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Truckenbrodt 1995; Riemsdijk 1998; Wurmbrand and Bobaljik 2005.

I must stress that

- PF movement will not alone explain CP distribution.
 - ▶ Otherwise, nothing would explain why the CP doesn't stay to the left of the verb.
- The movement I have argued for **forces** FCCs to sit **within** verbal complex.

Benefits

FCCs are not “in situ saturators”. This explains:

- why FCCs can combine with non-argument taking nouns and nominalizations (unlike Pro-CPs)
- why a remnant syntax is triggered for FCCs
 - ▶ and this explains FCC distribution in Germanic
- why FCCs move no further leftward than AspP (unlike Pro-CPs)
 - ▶ semantically vacuous movement is not allowed for the CP
- why FCCs show reconstruction effects
 - ▶ I give a copy-theory version of all this in the paper, to capture connectivity effects; mostly a trivial exercise...

Trace Converting CPs

Extraposed CPs show connectivity effects (binding and principle C):

- (94) a. I told every woman_i yesterday that she_i would win.
b. *I told her_i yesterday that Mary_i would win.

The standard way to capture such facts is with copies....we don't really have traces anymore.

Trace Conversion/Copies background

When phrases move they can leave elements of a different semantic type. For instance, the quantifier in (95a) can leave a trace that denotes a bound variable. This is handled in the copy theory (95b) by Trace Conversion (Fox 2002).

- (95) a. Every square is not round.
b. $\langle \text{every square} \rangle$ is not $\langle \text{every square} \rangle$ round.

Trace Converting CPs

(96) Trace Conversion (Fox 2002)

- a. Determiner Replacement: $[_{QP} \text{ every square }]_1 \rightsquigarrow [_{QP} \text{ THE square }]_1$
- b. Variable Insertion: $[_{QP} \text{ THE square }]_1 \rightsquigarrow [_{QP} \text{ THE } [\lambda x. x \text{ is a square} \& \lambda y. y=1]]$

(97) a. Every square is not round.

- b. $\langle \text{every square} \rangle$ is not $\langle \text{every square} \rangle$ round. \rightarrow Det. Replacement
- c. $\langle \text{every square}_1 \rangle$ is not $\langle \text{THE square} \rangle$ round. \rightarrow Var. Insertion
- d. $\langle \text{every square}_1 \rangle$ is not $\langle \text{THE } x \text{ s.t. } x \text{ is a square and } x = 1 \rangle$ round.

Trace Converting CPs

Trace Conversion is designed for DPs. But as the pseudo-gapping example in (81) shows, *that*-clauses must be able to move a little and leave CP gaps.

(98) **Category Neutral Trace Conversion (CNTC)** (modelled in part after Sauerland 2004)

- a. Quantifier Removal: $[_{DP} \text{ every square }]_3 \rightsquigarrow [_{DP} \text{ square }]_3$
- b. Index Interpretation: $[_{DP} \text{ square }]_3 \rightsquigarrow [_{DP} 3 : 3 \text{ is a square }]$

(99) $\llbracket [_{DP} 3 : 3 \text{ is a square}] \rrbracket^g = g(3)$ iff $\llbracket \text{square} \rrbracket(g(3)) = 1$; undefined otherwise

Trace Converting CPs

(100) Category Neutral Trace Conversion applied to CPs

- a. Quantifier Removal (N/A)
- b. Index Interpretation: $[\text{that Bob is a fraud}]_3 \rightsquigarrow [3: 3 \text{ is that Bob is a fraud}]$

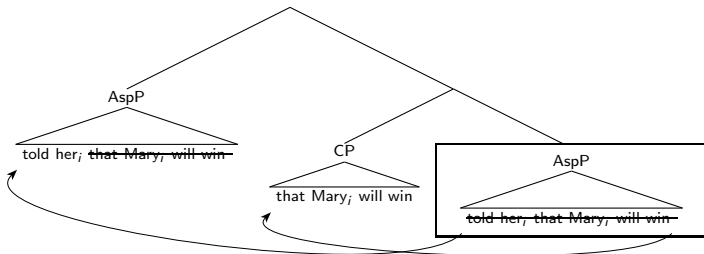
(101) $\llbracket [_{CP} 3: 3 \text{ is that Fred left }] \rrbracket^g = g(3)$ iff $\llbracket \text{that Bob is a fraud} \rrbracket(g(3)) = 1$; otherwise undefined.

$\llbracket \text{that Bob a fraud} \rrbracket(g(3))(w) = 1$ iff $[\text{CONT}(g(3))(w) = \lambda w'. \text{Bob is a fraud in } w']$

Trace Converting CPs

This means that when a CP moves leftward, its lower copy denotes in type e and saturates the verb. Crucially, the content of the CP is also in low copy so that predicts the binding condition C effects

(102)



This account places a lot on the semantic type of FCCs/*that*-clause in particular.

- not anything about CPs (and we've seen this e.g. CP proforms)
- but we should expect other clausal arguments to be of a type that can compose *in situ*

Are there clauses that *do* saturate *in situ*?

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