



The Semantic Types of Clausal Complements

Tra semantica e sintassi: Il ruolo della linguistica storica

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Introduction



- ◆ Topic:
 - Clausal Complements
 - Some ideas on the distribution and meaning
 - What can “formal” semantics contribute?
- ◆ Subtopics:
 - What is clausal complementation, and why should historical linguistics care?
 - Formal Semantics
 - Propositional attitudes: *Mary believes that John is asleep.*
 - Factivity: *Mary believes / knows that John is asleep*
 - Meaning composition – factive determiners
 - De re / de se: *John thinks he has a strange voice*
 - Propositions and Events: *Mary saw John leave.*
 - Embedded illocutionary acts: *Mary thinks John is asleep*
 - Embedded questions
- ◆ Two recent typological treatments, to be mentioned:
 - Schmidtke-Bode, Karsten. 2014. Complement clauses and complementation systems: A cross-linguistic study of grammatical organization. Doct. diss. Friedrich-Schiller-Universität Jena.
 - Schmidtke-Bode, Karsten & Holger Diessel. 2017. Cross-linguistic patterns in the form, function and position of (object) complement clauses. *Linguistics*

WHAT IS CLAUSAL COMPLEMENTATION



- ◆ A clausal constituent occurs in the argument position of a predicate
- ◆ A special case of subordination:
 - clausal argument is subcategorized by embedding predicate
 - distinct from adverbial clauses as modifiers of verbal predicates
 - distinct from relative clauses as modifiers of nominals
 - distinct from free relatives, absolute constructions
- ◆ Relevant issues in clausal complementation:
 - Range of different clausal forms (root clauses, complementizer clauses, questions, imperatives?, participial and infinitive clauses, nominalizations)
 - Range of different embedding predicates (verbal, adjectival, nominal)
 - Which predicates and embedded clauses can be combined?
 - Construction of meaning of predicate + clausal complement (compositional, structural)
- ◆ Semantically equivalent embeddings of non-clauses
 - pronominals / *can't believe it/that*
 - concealed questions: *He knows the time;*
 - reponse particles: *Creo que sí.*

And why should Historical Linguists care?



- ◆ Clausal complementation is an important phenomenon of language, one of the central / universal? properties of the human language faculty (recursion: Clause within Clause)
- ◆ Evidence for subtle changes over time
 - hypotaxis / parataxis
 - changes in form and function of embedded clauses, e.g. development and attrition of complementizers
 - changes in possible embedding predicates, e.g. manner of speaking: *Sie schluchzte, dass sie mich jetzt schon vermisste.*
- ◆ Evidence of ancient languages important:
 - Unique features and combinations, cf. Cristofaro 2008 on Classical Greek
 - Corpus evidence is often reasonably sufficient

FORMAL SEMANTICS

- ◆ Goal: Develop models that capture aspects of linguistic meaning
- ◆ Why?
 - Derive predictions, check evidence, revise models, repeat ...
 - Increase intended coverage of models (e.g. texts, communication)
- ◆ Things to be considered:
 - Precision of models: Be certain what the model actually predicts.
 - Relation between meanings, e.g. inferences, incompatibilities
 - Different status of meaning parts, e.g. presuppositions, implicatures, connotations, and the mechanisms how they are derived
 - Compositionality, meaning of complex expressions must be derivable from the parts
 - Syntax/Prosody / Semantics relation, as a guide to how meanings are composed
 - Language acquisition and processing data (behavioral, neuroscience) should make sense in terms of semantic models
 - Language change data should make sense in these models as well cf. work of Regine Eckardt (e., 2006)

Formal Semantics: Basic ideas

- ◆ History of ideas:
 - Gottlob Frege
 - Rudolf Carnap, Richard Montague, David Lewis, Max Cresswell
 - Barbara Partee, Gennaro Chierchia, Hans Kamp, Irene Heim, ...
- ◆ The very basic model
 - We have a set of entities (“universe”) $A = \{a_1, a_2, \dots\}$
 - Names identify certain entities, e.g. $\llbracket John \rrbracket = a_1$, $\llbracket Mary \rrbracket = a_2$
 - Predicates identify certain sets of entities by mapping them to truth value 1,
 - $\llbracket asleep \rrbracket = [a_1 \rightarrow 0, a_2 \rightarrow 1, a_3 \rightarrow 0, \dots]$, abbr. $\lambda x[x \text{ is asleep}]$
 - Transitive relations map entities to predicate meanings
 - $\llbracket love \rrbracket = [a_1 \rightarrow [a_1 \rightarrow 1, a_2 \rightarrow 0, a_3 \rightarrow 1, \dots],$
 $a_2 \rightarrow [a_1 \rightarrow 0, a_2 \rightarrow 1, a_3 \rightarrow 0, \dots],$
 $\dots]$, abbr. $\lambda y \lambda x [x \text{ loves } y]$
- Predication consists in applying predicates / relations to names, resulting in truth values,
 - $\llbracket \llbracket Mary \text{ is asleep} \rrbracket \rrbracket = \llbracket asleep \rrbracket(\llbracket Mary \rrbracket) = [a_1 \rightarrow 0, a_1 \rightarrow 1, a_2 \rightarrow 0, \dots](a_2) = 1$
 - $\llbracket \llbracket Mary \text{ loves John} \rrbracket \rrbracket = \llbracket love \rrbracket(\llbracket John \rrbracket)(\llbracket Mary \rrbracket) = \llbracket know \rrbracket(a_1)(a_2) = 0$

Formal Semantics: Propositions

- ◆ In the very basic model, all true sentences mean the same (1) – and all false sentences too (0)
- ◆ Considering different state-of-affairs – possible worlds
 - Set of possible worlds W
 - Meanings as mapping from possible worlds:
 - $\llbracket John \rrbracket = [w_1 \rightarrow a_1, w_2 \rightarrow a_1, w_3 \rightarrow a_1, \dots]$ abbr. $\lambda w[\text{John in } w]$
 - $\llbracket asleep \rrbracket = [w_1 \rightarrow [a_1 \rightarrow 0, a_2 \rightarrow 1, a_3 \rightarrow 0, \dots], w_2 \rightarrow [a_1 \rightarrow 1, a_2 \rightarrow 1, a_3 \rightarrow 0, \dots], \dots]$ abbr. $\lambda w \lambda x [x \text{ is red in } w]$
 - $\llbracket [John \text{ is asleep}] \rrbracket = \lambda w [\llbracket asleep \rrbracket(w)(\llbracket John \rrbracket(w))]$ abbr. $\lambda w [\text{John in } w \text{ is asleep in } w]$
 $= [w_1 \rightarrow 0, w_2 \rightarrow 1, \dots]$
 - When applied to a particular possible world: truth value
 - $\llbracket [John \text{ sleeps}] \rrbracket(w_1) = 0$
- ◆ The meaning of a sentence – a “proposition”
 - Tells us the truth conditions: in which worlds is the sentence true or false?
 - Often identified with the set of possible worlds at which the sentence is true
 - Ultimately not sufficient: All tautologies and contradictions have the same meaning, to be neglected here.

PROPOSITIONAL ATTITUDES

- ◆ Dual role of propositions:
 - Meaning of declarative sentences:
 - $\llbracket [John \text{ is asleep}] \rrbracket = [w_1 \rightarrow 0, w_2 \rightarrow 1, w_3 \rightarrow 0, \dots]$
 - Object of propositional attitude verbs:
 - *Mary believes [that John is asleep]*
- ◆ Modeling of propositional attitude verbs:
 - Relation between entity (believer) and proposition:
 - $\llbracket [Mary \text{ believes } [that \text{ John is asleep}]] \rrbracket$:
 $\llbracket believe \rrbracket(w)(\llbracket John \text{ is asleep} \rrbracket)(\llbracket Mary \rrbracket) = 1$
 $= \llbracket believe \rrbracket(w)([w_1 \rightarrow 0, w_2 \rightarrow 1, w_3 \rightarrow 0, \dots])(a_2) = 1$
 iff in w , a_2 considers the proposition $[w_1 \rightarrow 0, w_2 \rightarrow 1, w_3 \rightarrow 0, \dots]$ to be true
 - Hintikka 1962:
 - Belief als modal notion (quantification over possible worlds):
 - In all worlds w' that are compatible with the beliefs of a in w , the proposition p is true, i.e. $p(w') = 1$
 - $\lambda w \forall w' [w' \in \text{Bel}(a_2, w) \rightarrow p(w') = 1]$
 - $\lambda w \forall w' [w' \in \text{Bel}(a_2, w) \rightarrow [w_1 \rightarrow 0, w_2 \rightarrow 1, w_3 \rightarrow 0, \dots](w') = 1]$

FACTIVITY



- ◆ Knowledge:
 - Knowledge as factive belief (Kiparsky & Kiparsky 1970)
 - *Mary knows that John is asleep* ⇔ *Mary believes that John is asleep and Mary is, in fact, asleep*
 - Additional meaning component as a presupposition:
 - *Mary doesn't know that John is asleep* ⇒ *Mary is, in fact, asleep*
 - Other cases of presupposition, e.g. additive particles:
 - *John, too, is asleep.* presupposes: Someone else is asleep.

Presuppositions and Common Grounds



- ◆ A presupposition is a proposition that is treated as known to be true to the interlocutors by the speaker (Stalnaker, Beaver)
- ◆ Common Ground (CG)
 - A CG is a set of propositions c that interlocutors consider shared information
 - Claim of c : for all $p \in c$, $p(\text{real world}) = 1$
 - The point of conversation is to add information to the the common ground:
 - $c + \text{John is asleep.} = c \cup \{\lambda w[\text{John is asleep in } w]\}$
 - Meanings as Context Change Potentials, functions from input CGs to output CGs (dynamic semantics; Stalnaker, Heim)
 - $[[\text{John is asleep}]] = \lambda c[c \cup \{\lambda w[\text{John is asleep in } w]\}]$
- ◆ Presuppositions and common grounds
 - Presupposed information is already present in input CG:
 - $[[\text{John, too, is asleep}]] =$
 $\lambda c: \lambda w \exists x \neq \text{John}[x \text{ is asleep in } w] \in c \cup \{\lambda w[\text{John is asleep in } w]\}]$
 - If this presupposition is not satisfied in the input CG: protest, or accommodation
 - Presupposed information is projected (cf. Karttunen, Heim, Beaver)
 - $[[\text{It is not the case that John, too, is asleep}]]$
 $\lambda c: \lambda w \exists x \neq \text{John}[x \text{ is asleep in } w] \in c \cup \{\lambda w \neg [\text{John is asleep in } w]\}]$

The presupposition of factive predicates

- ◆ Applied to propositional attitudes:
 - Believe:
 - $\llbracket \text{Mary believes that John is asleep} \rrbracket$
 $= \lambda c [c \cup \lambda w \forall w' [w' \in \text{Bel}(w, \text{Mary}) \rightarrow \lambda w' [\text{John is asleep in } w](w') = 1]]$
 - Knowledge:
 - $\llbracket \text{Mary knows that John is asleep} \rrbracket$
 $= \lambda c: \lambda w [\text{John is asleep in } w] \in c$
 $[c \cup \lambda w \forall w' [w' \in \text{Bel}(w, \text{Mary}) \rightarrow \lambda w' [\text{John is asleep in } w](w') = 1]]$
- Other factive propositional attitudes, e.g. regrets referring to preferences
 $\llbracket \text{Mary regrets that John is asleep} \rrbracket$
 $= \lambda c: \lambda w [\text{John is asleep in } w] \in c$
 $[c \cup \lambda w \forall w' [w' \in \text{Prefer}(w, \text{Mary}) \rightarrow \lambda w' [\text{John is asleep in } w](w') = 0]]$

MEANING COMPOSITION

- ◆ How are these meanings composed?
- ◆ What we have found:
 - *believe* expresses that the subject referent has a propositional attitude towards the proposition of the complement clause
 - *know* expresses the same propositional attitude to the proposition, but presupposes that the proposition is true.
- ◆ Question: Where does the additional presupposition come from?
 - First possibility: From the meaning of the embedding predicate, as this is the only place of difference
 - $\llbracket \text{believe} \rrbracket = \lambda c \lambda p \lambda x [c \cup \{\lambda w [w' \in \text{Bel}(w, x) \rightarrow p(w') = 1]\}]$
 - $\llbracket \text{know} \rrbracket = \lambda c \lambda p \lambda x: p \in c [c \cup \lambda w [w' \in \text{Bel}(w, x) \rightarrow p(w') = 1]]$
 - Second possibility: From the meaning of the embedded proposition, if there is a difference
 - $\llbracket \text{that } [\text{John is asleep}] \rrbracket = \lambda c \lambda w [c \cup \{\lambda w' [\text{John is asleep in } w']\}]$
 - $\llbracket \text{that}_{\text{fact}} [\text{John is asleep}] \rrbracket = \lambda c \lambda w: \lambda w' [\text{John is asleep in } w] \in c$
 $[c \cup \{\lambda w' [\text{John is asleep in } w']\}]$

Factive determiners

- ◆ Factive determiners, cf. Kastner 2015
 - Example Daakie (Port Vato, Austronesian; Vanuatu), Krifka 2016
 - Lis-ing mwi kibebe [ke Enet mo koliet]]
 - L. 3SG.RE know COMP.RE E. 3SG.RE sing
 - ‘Lising knows that Enet sings.’
 - Lis-ing mwe deme [ka Enet bo koliet]]
 - L. 3SG.RE think COMP.IR E. 3SG.IR sing
 - ‘Lising thinks that Enet sings’
 - Lis-ing mwe notselaane [ka Enet to koliet]]
 - L. 3SG.RE mistakenly.belief COMP.IR Enet 3SG.DIST sings
 - ‘Lising held the wrong belief that Enet would sing’

Factive determiners: Classical Greek

- ◆ Determiners *hóti* (factive) vs. *hōs* (non-factive), cf. Cristofaro 2008
 - Factive determiner *hóti* with indicative clause

(14) *oulē isasin hóti Hippías mèn [...] êrche*
 NEG know:3PL that Hippias PTCL be.first.AOR.IND.3PL
 ‘They don’t know that it was Hippias that was supreme’ (Thucydides, 1.90.2)
 - Non-factive determiner *hōs* with indicative clause

(17) *oi mèn Lakedaímōnioi légonusi hōs [...] ho krētēr*
 the PTCL Lacedaemonians say:3PL that the bowl
egnéto katà tèn Samiēn [...] autoi dé
~~PAST-3SG.AOR.IND.3SG~~ ~~the Samos~~ ~~PTCL~~
 ‘the Lacedaemonians say that the bowl arrived in Samos’
- ◆ Two ways in which a proposition p can be part of a CG
 - p is present in CG and assumed to be true, e.g. *know*, *regret*
 - p is present as a topic in the CG: response-stance, e.g. *deny*, *consider*

How meanings compose



- ◆ In a language with distinct complementizers, what ensures that, e.g. *know* selects for *that*_{factive} clauses, *believe* selects for *that*_{nonfactive} clauses
 - Cristorforo 2008 argues for a constructional meaning, the complex meaning can be assigned only to the whole package
 - Such non-compositional assumptions are possible (cf. idioms), but dispreferred, to be entertained only if compositional analysis is impossible
 - Reason: We see syntactic structure as an instruction for semantic composition, assumption that syntactic parts contribute to meaning in a constant way
- ◆ Compositional derivation:
 - Assume that *know* presupposes truth of complement:
 - $\llbracket \textit{believe} \rrbracket = \lambda c \lambda p \lambda x [c \cup \{\lambda w [\forall w' \in \text{Bel}(w, x) \rightarrow p(w') = 1\}]]$
 - $\llbracket \textit{know} \rrbracket = \lambda c \lambda p \lambda x : p \in c [c \cup \lambda w [\forall w' \in \text{Bel}(w, x) \rightarrow p(w') = 1]]$
 - Assume that *that*_{fact} presupposes truth of clause:
 - $\llbracket \textit{that}_{\text{fact}} \rrbracket = \lambda c \lambda p [p]$
 - Well-known pragmatic principle “maximize presupposition” (Heim 1987), cf. choice of definite article over indefinite article if uniqueness presupp. satisfied
 - Hence: if $p \in c$, choose *know* and a *that*_{factive} clause due to maximize presupposition.

CONTENT INDIVIDUALS



- ◆ A new approach: Kratzer 2006, Keir Moulton 2011, Patrick Elliott 2016
- ◆ Propositional attitude predicates can subcategorize for individuals
 - Example
 - *Mary believes the story / rumor (that John is a thief)*
 - Explanation: *story*, *rumor* etc. apply to entities that have propositional content (like container nouns like *bottle* that apply to things that have content, e.g. milk)
 - Kratzer assumes that *believe* applies to such proposition containers in general
 - *Mary believes the story* : Mary believes the propositional content of the story
 - ◆ Generalization to other cases
 - Embedding by *that*-clauses
 - *Mary believes that John is a thief.*
Mary holds the belief that John is a thief.
 - analyzed as: Mary holds belief x , the content of x is specified by *that*-clause
 - specifically: the content of x is compatible with the information of the *that*-clause
 - $\forall w [\forall w' \in \text{Dox}(w)(x) \rightarrow \text{John is a thief in } w']$
 - Notice: modal quantification now resides in the complementizer.
- ◆ Unifies verbal and nominal uses (*believes that...*, *the belief that...*)
- ◆ Treats complementizers as related to relativizers – relevant for lg. history

- ◆ What is it?
 - Two readings of *John thinks that he has a nice voice*.
 - De re: John listens to a voice recording, not knowing that this is his own voice, he thinks that the person speaking on the recording has a strange voice, e.g. John said: "His voice is strange."
 - De se: John considers his voice to be strange, e.g. John said: "My voice is strange."
- ◆ How is it expressed?
 - Logophoric pronouns for de se readings, cf. Pearsons 2015, Ewe
 - *John bòu be yè / e nyi hovi*
J. thinks COMP LOG / 3SG COP stupid
'John thinks that he is stupid'
 - Infinitive constructions with PRO subject
 - *John glaubt, PRO eine seltsame Stimme zu haben.* – only de se
 - *John glaubt, dass er eine seltsame Stimme hat.* – de se, de re, other person
- ◆ How can it be modeled?

Representation of de se

- ◆ Enrichment of clausal representation by perspective center z
 - Centered proposition, with logophoric anapher referring to perspective center z , world + sign: "you are here!" (Lewis 1979, Chierchia 1990, Pearson 2015)
 - $[[\text{he}_{\text{log}} \text{ has a strange voice}]] = \lambda z \lambda w [z \text{ has a strange voice in } w]$
- ◆ Propositional attitude predicates take perspectivized propositions:
 - Subject self-ascribes the property
 - Formal implementation:
 - Quantification over pairs of entities and worlds,
 $\langle y, w' \rangle \in \text{Bel}(w)(\text{John})$ iff John considers w' true in w and John self-identifies with y
 - $[[\text{John thinks } [\text{he}_{\text{log}} \text{ has a strange voice}]]]$
 $= \lambda w' \langle y, w' \rangle [\langle y, w' \rangle \in \text{Bel}(w)(\text{John}) \rightarrow \lambda z \lambda w [z \text{ has a nice voice in } w](y)(w')]]]$
- ◆ Non-logophoric interpretation
 - Regular anaphoric pronoun: free variable (to keep things simple)
 - Interpretation as proposition:
 $[[\text{he}_x \text{ has a strange voice}]] = \lambda w [x \text{ has a strange voice}]$, x bound by *John*
 - Alternatively, a centered proposition:
 $[[\text{John}_x \text{ thinks } [\text{he}_{\text{log}} \text{ has a strange voice}]]]$
 $= \lambda w' \langle y, w' \rangle [\langle y, w' \rangle \in \text{Bel}(w)(\text{John}) \rightarrow \lambda z \lambda w [z \text{ has a nice voice in } w](y)(w')]]]$

De se and PRO constructions

- ◆ De se interpretation and the syntax/semantics relation
 - With infinitival constructions, a de se reading is enforced (not always with de se pronouns, cf. Pearsons 2015)
 - Can be explained if infinitival constructions are analyzed as predicates:
 - $[[\textit{have a strange voice}]] = \lambda w \lambda x [x \text{ has a strange voice in } w]$, subject fills x position
 - $[[\textit{to}]] = \lambda R \lambda x \lambda w [R(w)(x)]$
 - $[[\textit{to have a strange voice}]] = \lambda x \lambda w [x \text{ has a strange voice in } w]$, no regular x position
 - Use of such meanings
 - Fill object position of e.g. *claim*: *John claims to have a strange voice*: self ascription
 - Also in commands: *Mary ordered John to get her a beer*: ascription of action to John
 - Or generics: *To have a strange voice is bothersome*.
- ◆ Cf. Classical Greek, Cristofaro 2008:
 - (5) *oîmai gar me parà sou pollês*
 believe:1SG in.fact 1SG.ACC from you:GEN abundant:GEN
kaí kalês sophias plerôthêsthai
 and good:GEN knowledge:GEN fill:PASS:FUT.INF
 ‘I believe I will be filled with excellent wisdom drawn in abundance out of you’ (Plato, Symposium, 175e)

PROPOSITIONS AND EVENTS

- ◆ Embedded propositions vs. events
 - Propositions:
 - *Mary saw that John left / was leaving.*
 - *Maria sah, dass Johann abgereist war / am Abreisen war.*
 - Events:
 - *Mary saw John leaving.*
 - *Maria sah Johann abreisen.*
 - *Maria sah, wie Johann abreiste.*
- ◆ Events in grammar
 - Davidson 1967, ... Maienborn 2011
 - Representation of event sentences by event entities
 - $[[\textit{John leave}]] = \lambda w \lambda e [leave(w)(e) \wedge AG(w)(e)=John]$
 - $[[\textit{John left}]] = \lambda w \exists e [past(e, w) \wedge leave(w)(e) \wedge AG(w)(e)=John]$
- ◆ Embeddings:
 - Event readings: visual contact with event that falls under event predicate
 - $\lambda w \exists e [see(w)(e)(Mary) \wedge e[leave(w)(e) \wedge AG(w)(e)=John](e)]$
 - Proposition readings: “inner” visual contact with proposition, realize as true due, often due to visual evidence
 - $\lambda w [see(w)(\lambda w \exists e [leave(w)(e) \wedge AG(w)(e)=John])]$

Event embeddings: Meaning composition

- ◆ Event embeddings:
 - Gerundive or nominal expressions – reduced clausal forms
 - notional subject of embedded clause in the accusative –
- ◆ Similar in Classical Greek (Cristofaro 2008): participial clauses
 - (13) (a) *kaí ē gunḗ eporai min*
and the woman saw:3SG 3SG.ACC
exiōnta
go.out:PRES.PTCPPL-ACC.M.SG
'And the woman saw him go out' (Herodotus, 1.10.6)
- ◆ Cristofaro argues for a **constructional meaning**:
 - perception verb + proposition: “realize” reading
 - perception verb + participle clause: “perception” reading
- ◆ However, this can be treated by polysemy of embedding predicate
 - seeing an entity, e.g. *John saw Mary*: visual contact with entity
 - seeing an event, e.g. *John saw Mary leave*: visual contact with event
 - seeing a proposition, e.g. *John saw that Mary left*: visual evidence for truth of proposition
- ◆ An interesting case: manner interrogatives
 - insight in manner often requires direct experiential contact, but not necessarily so:
 - *Die Polizei sah, wie die Einbrecher sich Zugang zu der Bank verschaffen*.

EMBEDDED ILLOCUTIONARY ACTS

- ◆ Embedded root clauses (Hopper & Thompson 1973, Heycock 2006)
 - Lack of complementizer:
 - *Mary thinks / said John has left*.
 - V2 in German, Scandinavian languages
 - *Maria glaubt / sagt, Johann ist abgereist*.
 - Restricted to non-factive predicates
 - **Mary knows / regrets John has left*.
 - Cannot be in the scope of negation
 - *Mary didn't say / doesn't think that John has left*.
 - **Mary didn't say / doesn't think John has left*.
- ◆ Sketch of explanation (Krifka 2014)
 - Lack of complements, V2:
 - Embedded clause is not a proposition, but an illocutionary act
 - The embedded root clause is the main point of the utterance
 - Embedding clause gives evidential motivation, similar to *according*-phrases:
 - *According to Mary, John has left*.

Embedded illocutionary acts: modeling

- ◆ What is an illocutionary act, e.g. assertion?
 - Distinction proposition / assertion (Frege 1879, 1918; Peirce 1905),
 - φ : proposition, thought, bearer of truth values
 - $\vdash\varphi$: claim that φ is true, a personal judgement, social commitment
 - With a speech act, speaker undergoes a social commitment,
 - S_1 : *John is a thief*
- S_1 is now committed to the truth of the proposition: $S_1 \vdash \lambda w [J$ is a thief in $w]$
- ◆ Modeling this as an act
 - Undergoing a commitment changes the world: new obligations, cf. Szabolcsi 1982, Krifka 2014
 - Changes the Common Ground by adding a proposition / commitment
- ◆ Commitment changes and Common Grounds
 - Assertion indicates two changes:
 - $c + S_1$: *John is a thief.* = $c \cup \{\lambda w [J$ is a thief in $w]\}$
 $\cup \{S_1 \vdash \lambda w [J$ is a thief in $w]\}$
 - Purpose of commitment: to convey a proposition φ , backed up by $S_1 \vdash \varphi$,
 - In Krifka 2015: φ is triggered as conventional implicature of $S_1 \vdash \varphi$

Adjusting commitments

- ◆ The level of commitment of assertion can be mitigated or enhanced, while still trying to achieve adding a proposition to the CG (Wolf 2015)
- ◆ Adjusting level of commitment
 - Invocation of authority:
 - *By God, John is a thief.*
 - Explicit performatives:
 - *I swear, John is a thief.*
 - Commitment-level particles: German *beileibe*, Kiezdeutsch *ischnwör*
- ◆ Adjusting the proposition speaker is committed to
 - Epistemic weakening by particles
 - *Perhaps John is a thief.*
 - *Johann ist wohl ein Dieb.*
 - Epistemic weakening by propositional attitudes:
 - *I believe John is a thief.*
 - Evidential weakening
 - *Mary claims John is a thief.*
 - *Laut Maria ist Johann ein Dieb.*

Modeling embedded root



- $\llbracket_{\text{ForGP}} \vdash \llbracket_{\text{CGP}} \text{Maria denkt} \llbracket_{\text{CGP}} \text{Johann ist ein Dieb} \rrbracket \rrbracket \rrbracket$
= $\lambda c[\lambda c \cup \{\lambda w[\lambda J \text{ ist ein Dieb in } w]\} \cup \{\lambda w[\llbracket M \text{ denkt in } w: \lambda w[\lambda J \text{ ist ein Dieb in } w]\} \cup \{\lambda S_1 \vdash \{\lambda w[\llbracket M \text{ denkt in } w: \lambda w[\lambda J \text{ ist ein Dieb in } w]\} \rrbracket \rrbracket \rrbracket$
- ◆ In contrast, embedded non-root
 - Complement clause
 - $\llbracket_{\text{CP}} \text{dass Johann ein Dieb ist} \rrbracket \rrbracket = \lambda w[\lambda J \text{ ist ein Dieb in } w]$
 - Embedding, CGP
 - $\llbracket_{\text{CGP}} \text{Maria denkt} \llbracket_{\text{CP}} \text{dass Johann ein Dieb ist} \rrbracket \rrbracket \rrbracket$
= $\lambda c[\lambda c \cup \{\lambda w[\llbracket M \text{ denkt in } w: \lambda w[\lambda J \text{ ist ein Dieb in } w]\} \rrbracket \rrbracket$
 - Illocutionary force
 - $\llbracket_{\text{ForGP}} \vdash \llbracket_{\text{CGP}} \text{Maria denkt} \llbracket_{\text{CP}} \text{dass Johann ein Dieb ist} \rrbracket \rrbracket \rrbracket$
= $\lambda c[\lambda c \cup \{\lambda w[\llbracket M \text{ denkt in } w: \lambda w[\lambda J \text{ ist ein Dieb in } w]\} \rrbracket \rrbracket$
 $\cup \{\lambda S_1 \vdash \{\lambda w[\llbracket M \text{ denkt in } w: \lambda w[\lambda J \text{ ist ein Dieb in } w]\} \rrbracket \rrbracket \rrbracket$
- ◆ Prediction:
 - In *Maria denkt, Johann ist ein Dieb*, the proposition ‘J is a thief’ more salient
 - Difference in anaphoric potential:
 - S_1 : *Maria denkt, dass Johann ein Dieb ist.* – S_2 : *Das stimmt.* (pref: Mary thinks so.)
 - S_1 : *Maria denkt, Johann ist ein Dieb.* – S_2 : *Das stimmt.* (pref: J is a thief.)

EMBEDDED QUESTIONS



- ◆ Question embedding (cf. Groenendijk & Stokhof 1984):
 - By predicates that also embed declaratives:
 - *Mary knows who is the thief.*
 - *Mary knows whether / if John is the thief.*
 - By predicates that do not embed declaratives:
 - *Mary wonders / asked who is the thief.*
 - *Mary wonders / asked whether / if John is the thief.*
- ◆ Question embedding under *know* etc.:
 - Question denotes a set of propositions Q
 - e.g. $\llbracket \text{who is the thief} \rrbracket = \text{‘J is the thief’, ‘Bill is the thief’, ...’}$
 - Embedding expresses quantification over true answers:
 - $\forall p[p \in Q \wedge p \text{ is true} \rightarrow M \text{ knows that } p]$
 - Explains why not with factive predicates, as they already presuppose truth
 - **Mary regrets who came / whether John came.*
- ◆ Question embedding under *wonder* etc.:
 - Not reducible to quantification over all true answers
 - Evidence of illocutionary level, e.g. discourse particles *denn*
 - *Maria fragt sich, wer denn gekommen ist.*

Concealed questions



- ◆ Embedding of nominals that are interpreted as questions:
 - Example:
 - *John knows the time.*
 - *John knows what the time is.*
- ◆ Explanation (Heim 1979):
 - The nominals in concealed questions are functional:
 - $[[time]] = \lambda t \lambda w [t \text{ is the time of } s \text{ w}]$, s: situation
 - This is similar to a question meaning
 - $[[who \text{ left}]] = \lambda x \lambda w [person(x) \wedge x \text{ left in } w]$
 - This explains why they embed under *know*.

Conclusion



- ◆ We have worked through a number of topics relating to clausal subordination
 - What is clausal complementation, and why should historical linguistics care?
 - Formal Semantics
 - Propositional attitudes: *Mary believes that John is asleep.*
 - Factivity: *Mary believes / knows that John is asleep*
 - Meaning composition – factive determiners
 - De re / de se: *John thinks he has a strange voice*
 - Propositions and Events: *Mary saw John leave.*
 - Embedded illocutionary acts: *Mary thinks John is asleep*
 - Embedded questions
- ◆ Formal semantics has developed reasonably rich and predictive models to describe the meanings of the embedded objects and the embedding predicates
- ◆ It is fruitful to use them in empirical research in typological and historical linguistics.

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