Recursion in Language and Cognition
University of Massachusetts at Amherst, May 26-28, 2009

Embedding Speech Acts

Manfred Krifka
Institut für deutsche Sprache und Linguistik, Humboldt-Universität zu Berlin
Zentrum für Allgemeine Sprachwissenschaft (ZAS) Berlin
krifka@rz.hu-berlin.de

1. Introduction and background

1.1 Syntactic recursion

(1) Direct: $X \rightarrow ... X ...$
Indirect: $X \rightarrow ... Y_1 ...$, $Y_1 \rightarrow ... Y_2 ...$, ... $Y_n \rightarrow ... X ...$

a. $N \rightarrow AP\ N$ — $[_N [_{AP}$ *small*$]$ $[_N$ *egg*$]]$

b. $S \rightarrow S\ CoP$, $CoP \rightarrow Co\ S$ — $[_S [_S$ *John came*$]$ $[_{CoP} [_{Co}$ *and*$]$ $[_S$ *Mary left*$]]]$

c. $S \rightarrow NP\ VP$, $VP \rightarrow V\ S'$, $S' \rightarrow Comp\ S$ — $[_S$ *John* $[_{VP} [_V$ *knows*$]$ $[_{S'} [_{Comp}$ *that*$]$ $[_S$ *Mary left*$]]]]$

d. $VP \rightarrow VP\ S'$, $S' \rightarrow Sub\ S$ — $[_S [_S$ *John* $[_{VP}$ *came* $[_{S'} [_{Sub}$ *when*$]$ $[$*Mary left* _$]]]]]$

e. $NP \rightarrow Det\ N$, $N \rightarrow N\ S'$, $S' \rightarrow Rel\ S$ — $[_S [_{NP}$ *the* $[$*man* $[_{S'} [_{Rel}$ *who* $[_S$ _ *came*$]]]]$ $[_{VP}$ *left*$]]$

1.2 Semantic recursion

Semantic interpretation relies on a recursively defined type system.

(2) a. Basic semantic types: e entities, t truth values, s indices, c contexts.

b. Complex semantic types: If σ, τ are types, then (σ)τ is the type of functions from σ-entities to τ-entities (parentheses may be dropped if σ is a basic type).

E.g., S and S′: type st (propositions), N: set (properties)

Semantic recursion shows up in identity of argument type and value type:

(3) a. Adjectives (*small*): (set)set

b. Coordinators (*and*): (st)(st)st

c. Propositional attitude verbs (*know*): type (st)(e)st,

d. Adjunct clauses (*when Mary left*): (est)est,
Subordinators (*when*): (st)(est)(e)st

e. Relative clauses (*who _ came*): (est)est,
Complementizer (*who, that*): (st)(set)set, occurs in a derivation that ends in st.

From a semantic (or generally, lexicalist) perspective, (a) – (d) are cases of direct recursion, as they involve functions with argument/value identity. (e) is a case of indirect recursion.

1.3 Are all value types potential argument types? The issue of speech acts

Probably yes when we restrict things to types formed from e, t, s, c.
Unclear if we extend the type system to include speech acts (presumed type: a).
Structural assumptions: Stenius (1967), Searle (1969):

(4) illocutionary operator $\begin{pmatrix}\text{sentence}\\ \text{radical}\end{pmatrix}$: σa / a

John came. ASSERT (COME(JOHN)). : (st)a / a

Who came? INTERROG(λx[COME(x)]) : (est)a / a

Main question of this talk:
Can there be embedded speech acts, i.e. can there be expressions of types like (a)τ?

2. The nature of speech acts: Two contrasting views

- Speech acts are context-dependent propositions, i.e. Kaplanian characters, type cst; they may embed if characters embed (now generally assumed).
- Speech acts are communicative actions, of an irreducible type a; they might embed if actions embed – but what would this mean?

2.1 Speech acts as context-dependent propositions (characters)

Performative hypothesis

Syntactic version: Katz & Postal (1964), Ross (1970):

(5) ASSERT $[_S$ *John came*$]$
$= [_S$ ~~*I*~~ $[_{VP}$ ~~*TELL you*~~ $[_S$ *John came*$]]]]$

Semantic version proposed in Lewis (1970), method of "paraphrased performatives":

(6) a. *John came*. has the same meaning as *I tell you that John came.*
b. *Did John come*? has the same meaning as *I ask you whether John came.*

Problem: The paraphrased performative has its own truth value. Lewis says that the truth value of the main sentence is "eclipsed" by the truth value of the embedded sentence.

For a worked-out semantic version for a wide variety of speech acts: Vanderveken (1990).

Speech acts as characters

If c is a context, S(c), A(c), T(c), W(c) are the speaker, addressee, time, world of c, and T(i), W(i) is the time/world component of index i.
With functions we write arguments of types s, c, e first, for perspicuity.

(7) a. ASSERT *John came.*
λcλi[T(c)=T(i) ∧ TELL(i)(A(c))(S(c))(λi′[T(i′)<T(c) ∧ CAME(i′)(JOHN(i′))])], type cst

b. ASSERT = λqλcλi[T(c) = T(i) ∧ TELL(i)(A(c))(S(c))(q(c))], type (cst)cst

Sentence radicals are characters, like speech acts. The main context c is passed to the context of the sentence radical, allowing for reference to speaker, addressee etc.

Speech acts may embed – e.g., illocutionary operators are of appropriate type: (cst)cst

2.2 Speech acts as communicative actions

Speech acts as communicative moves

Earliest account: Frege (1879, *Begriffsschrift*): Distinction between

- thought ("blosse Vorstellung", propositions), notation: —A,
- and judgement ("Behauptung") of a thought, notation: |—A.
  where |, the "Urtheilsstrich", can be seen as the illocutionary operator for assertion.

Stenius (1967): Mood operators combine with sentence radicals to form speech acts, where speech acts are moves in language games (Wittgenstein 1958, cf. also Searle 1969). For example, assertion is related to the "report game" governed by the rule: "Utter an assertion only if its sentence radical is true."

A worked-out version, with Kaplanian characters as sentence radicals: *John came.*

(8) a. $\lambda c \lambda i[\text{T}(i) < \text{T}(c) \wedge \text{COME}(i)(\text{JOHN})]$: meaning of sentence radical, a character, type cst

b. $\lambda q \lambda c[\text{ASSERT}(c)(q(c))]$ meaning of illocutionary operator, type (cst)ca,
a function from contexts c into functions from characters q into speech acts;
c and q are mapped to a speech act in which S(c) expresses the intention
to communicate to A(c) to enrich the common ground of c such that q(c) is accepted.

c. $\lambda q \lambda c[\text{ASSERT}(c)(\lambda c \lambda i[\text{T}(i) < \text{T}(c) \wedge \text{COME}(i)(\text{JOHN})](c))]$
$= \lambda c[\text{ASSERT}(c)(\lambda i[\text{T}(i) < \text{T}(c) \wedge \text{COME}(i)(\text{JOHN})])]$ **speech act type**, type ca;

d. When applied to a context c_0:
$\text{ASSERT}(c_0)(\lambda i[\text{T}(i) < \text{T}(c_0) \wedge \text{COME}(i)(\text{JOHN})])$, **actual speech act**, type a;
$\text{S}(c_0)$ expresses the intention to communicate to $\text{A}(c_0)$ to enrich the common ground
of c_0 such that $\lambda i[\text{T}(i) < \text{T}(c_0) \wedge \text{COME}(i)(\text{JOHN})]$ is accepted.

Do speech acts embed?

(8.d) is not a formula with a truth value; it is a communicative act. Hence speech acts can be embedded in this view only if acts (or act types) can be embedded.

Stenius, following Wittgenstein: the sentence radical is like a picture. The content of the picture is independent from what it can be used for. Hence speech should not embed..

2.3 Evidence for Speech Acts (vs. characters/propositions):

Speechact-related adverbials, e.g. *frankly*. The specify certain aspects of the speech act itself.

(9) a. *Mary, frankly, doesn't like John.*
Speaker asserts that Mary doesn't like John and indicates that this assertion is frank,
i.e. it might violate rules of politeness.

b. **If Mary, frankly, doesn't like John, then we should not invite her to his party.*

Modal particles (MP) in German.

(10) a. *Hans will Maria {wohl / doch / ja / halt} treffen.*
Speaker asserts that Hans wants to meet Maria, and indicates that the justification
for this assertion is reduced (*wohl*), that the assertion runs against an assumption
of the addressee (*doch*), that it makes salient a fact that should follow from
the common ground (*ja*) or that expresses a fact that is dispreferred (*halt*).

b. **Wenn Hans Maria {wohl / doch / ja / halt} treffen will, dann soll er das tun.*

3. Appositive relative clauses and other parentheticals

3.1 Appositive relative clauses as independent speech acts

Appositive relative clauses constitute separate speech acts, according to our criteria.

(11) a. *Mary, who I frankly don't like very much, will visit me tomorrow.*
b. *Hans, der wohl schon morgen kommen wird, möchte Maria treffen.*
'Hans, who will MP already come tomorrow, wants to meet Maria.'

Analysis as two separate speech acts:

(12) i. ASSERT *Mary will visit me tomorrow*;
ii. ASSERT[FRANK] *I don't like Mary.*
Relation: The content of (ii) elaborates on the content of (i).

The assertion of the appositive relative has less communicative weight, but it is not presupposed. Holler (2005) assumes that it bears the subordinating rhetorical relation of elaboration; other appositives may show other relations, e.g. narration or contrast:

(13) a. *Emma was looking for a phone booth, which she finally found.*
b. *Oskar made an honest attempt, which, however, failed at the end.*

Appositive relative clauses are cases of syntactic embedding that do not correspond to semantic embedding (Syn/Sem-mismatch), except for the rhetorical relation between them (see section 5.5). Notice that they are prosodically separated.

3.2 Other parenthetical expressions

Appositive relative clauses belong to the ill-defined class of parenthetical expressions, many of which can be assumed to form separate speech acts. We will mention three types here.

Independent speech acts (possible rhetorical relations)

(14) a. *Mary – who doesn't remember that bright girl? – will come tomorrow.*
b. *The prophet, blessed be his name, would be proud indeed.*

The embedded speech act refers to the sentence radical of the embedding speech act

(15) a. *Mary – it's no secret anymore – will come tomorrow.*
b. *Mary, as everyone knows, will come tomorrow.*

(16) i. ASSERT [*Mary will come tomorrow*].
ii. ASSERT *It is no secret that* [*Mary will come tomorrow*]
Relation: The sentence radical of (ii) gives a justification for (i),
in particular: If something is no secret, it can be asserted publicly.

The embedded speech act refers to the speech act of the embedding speech act.

Cf. Green (2000), parenthetical attitudinatives.

(17) *Mary, as I frankly admit, doesn't like John.*

(18) i. ASSERT *Mary doesn't like John.*
ii. ASSERT[FRANK] *I admit that Mary doesn't like John.*
Relation: (ii) elaborates on (i); it specifies the type of the assertion.

See treatment of explicit performatives, section 6.1 below.

4. Quotations and partial quotations

4.1 Direct and indirect speech with verba dicendi

(19) a. *Mary told / said to John, "I will come."*
b. *Mary told / said to John that she would come.*

Verba dicendi: Direct speech

Defining properties: All context-dependent expressions (*I, tomorrow,* Future tense) are shifted. Direct speech has properties of root utterances, an independent speech act (e.g., verb fronting in German, speechact-related adverbials like *frankly*, modal particles).

Direct quotes with verba dicendi: Speaker reports an utterance (a speech act) by reproducing this very utterance (speech act) (within certain limits, e.g. prosody, translation).

Example: sentence radical of (19.a); underlined: a speech act type.

(20) $\lambda c \lambda i[T(i)<T(c) \wedge \text{TELL}(i)(J)(M)(\underline{\lambda c'[\text{ASSERT}(c')(\lambda i'[T(c')<T(i') \wedge \text{COME}(i')(S(c'))])]})]$

(21) If α is a verbum dicendi and @ is a speech act type, then $[\![\alpha]\!](i)(y)(x)(@)$ iff
a. @ is a speech act type compatible with the lexical meaning of α,
b. at i, there is a context c′ such $S(c') = x$, $A(c') = y$, $T(c') = T(i)$,
and $@(c')$ occurs in i.

Notice: α is of type ee(ca)st; here a speech act type ca occurs in argument position.

Occurrence of a speech act: As actual speech acts are special kind of event, this notion is similar to occurrence of events. We write:

(22) $\text{OCCUR}(i)(@(c))$ for: The actual speech act @(c) occurs in the world of index i; for this, the context c must occur in the world of index i.

Verba dicendi: Indirect speech

We can trace back cases of indirect speech with verba dicendi to direct speech.

Example: Sentence radical of (19.b), underlined: a proposition.

(23) $\lambda c \lambda i[T(i)<T(c) \wedge \text{TELL}(i)(J)(M)(\underline{\lambda i'[T(i)<T(i') \wedge \text{COME}(i')(M)]})]$

(24) If α is a verbum dicendi and p is a proposition, then $[\![\alpha]\!](i)(y)(x)(p)$ iff there is a speech act type @ and a context c′ such that $[\![\alpha]\!](i)(y)(x)(@)$, and $[\![\alpha]\!](i)(y)(x)(@)$ entails that x wants to add the proposition p to the common ground of c′.

This meaning rule applies to assertive speech acts; different for questions, commands etc.

Notice: Semantically, indirect speech is more complex than direct speech. This may explain why there are languages that appear to lack indirect speech (Kobon: Davies 1981, Matses: Fleck 2003).

4.2 Direct and indirect propositional attitude reports

(25) a. *Mary thought that she will go.*
b. *Mary thought: "I will go."*

(26) a. *Mary wondered whether she would go.*
b. *Mary wondered / asked herself: "Will I go?"*

Attitude reports: Indirect speech

Propositional attitude reports basically express an attitude towards a proposition (or character, to account for de se readings and certain shifted indexicals, e.g. *tomorrow*).

(27) $\lambda c \lambda i[T(i)<T(c) \wedge \text{THINK}(i)(M)(\lambda i'[T(i)<T(i') \wedge \text{GO}(i')(M)])]$

Attitude reports: direct speech

(28) $\lambda c \lambda i[T(i)<T(c) \wedge \text{THINK}(i)(M)(\lambda c'[\text{ASSERT}(c')(\lambda i'[T(c')<T(i') \wedge \text{COME}(i')(S(c'))])])]$

(29) If α is a propositional attitude verb and @ is a speech act type, then $[\![\alpha]\!](i)(x)(@)$ iff there is a proposition p such that $[\![\alpha]\!](i)(x)(p)$, and either (a) or (b):
a. the evidence for this is that x performed the speech act type @ compatible with α.
b. for all i′ with $T(i') = T(i)$ and all (typical) addressees y,
if x wants to inform y at i that $[\![\alpha]\!](i)(x)(p)$, then this can be done with $[\![\alpha]\!](i)(x)(@)$.

This presupposes that propositional attitudes can be expressed linguistically, by speech acts. Not always be plausible, as thought might not be fully dependent on language:

(30) a. *The fox thought that the raven was sitting in the tree.* (o.k. if foxes can think)
b. *The fox thought: "The raven is sitting in the tree."* (only o.k. if foxes can speak).

4.3 Partial quotations

Speech act markers in indirect speech or attitude reports

Elements of direct speech can be introduced into indirect speech ("partial quotation").

(31) a. *Maria meinte dass sie <u>doch</u> gar nicht gehen wolle.*
'Mary said that she MP didn't want to go.'
b. *they have said that they <u>frankly</u> cannot verify the peaceful nature of your program*

Proposed solution: The examples with indirect speech embeddings entail the existence of a speech act; this licenses the citation of expressions that were used in these speech acts.

Similar case of partial quotations:

(32) *Mary said that this "sucker" followed her wherever she went.*

With modal particles and speech-act adverbials, using quotation marks appears infelicitous.. Possible reason: They can be only interpreted with respect to the speech act itself, so quotation marks are unnecessary.

Speech act markers in other clauses

We find evidence for speech acts also in certain other clauses (Coniglio 2009), e.g. in the following purpose clause (where stressed *JA* marks strength of optatives).

(33) *Hans trägt einen Schlips, um <u>JA</u> nicht aufzufallen.*
'Hans wears a tie in order to MP not draw attention to himself.'

The use of the modal particle *JA* is justified if the speech act that expresses the purpose explicitly would contain it. Hans said to himself: *Ich will JA nicht auffallen.* 'I don't want to draw attention to myself, if at all possible'.

5. Combinations of speech acts

5.1 Conjunction

Conjunction of speech acts should be a natural operation. This is not Boolean conjunction (as speech acts are not based on truth values), but rather sum formation ⊕: Speech acts are events, and we can form the sum of events.

To conjoin two speech act types $@_1$, $@_2$ is to form their functional composition:

(34) $@_1 \oplus @_2 = \lambda c[@_2(@_1(c))]$ type of ⊕: (ca)(ca)ca

Notice that speech act conjunction may be sensitive for order:

(35) a. *Will Mary come, and when will she come?*
b. **When will Mary come, and will she come?*

5.2 Disjunction

Disjunction is not a plausible combination of speech acts (just as there is no disjunction operation corresponding to sum formation). Whenever two speech acts appear to be disjoined, it is the sentence radicals that are disjoined:

(36) *Give me the book, or give me the money.*
$\lambda c[\text{IMPER}(c)(\lambda i[\text{GIVE}(i)(\text{B})(s(c))(\text{A}(c))] \vee \lambda i[\text{GIVE}(i)(\text{M})(s(c))(\text{A}(c))])]$
$= \lambda c[\text{IMPER}(c)(\lambda i[\text{GIVE}(i)(\text{B})(s(c))(\text{A}(c)) \vee \text{GIVE}(i)(\text{M})(s(c))(\text{A}(c))])]$

Cf. discussion of disjoined commands in Dummett (1973), Merin (1992).

There is one semi-plausible interpretation of disjunction: A speaker offers a set of speech acts to the addressee, with the understanding that the addressee pick out one of the acts.

5.3 Conditionals

Biscuit conditionals

Speech acts can be conditionalized (relevance or biscuit conditionals; Austin 1961):

(37) *If you want biscuits, there are some on the sideboard.*

Analysis of Siegel (2006) involving existential quantification over potential speech acts.

(38) $\lambda c \lambda i[\forall i' \in R_c(i)[\text{WANT}(i')(\text{B})(\text{A}(c))]) \rightarrow$
$\exists c'[c' \sim c \wedge \text{W}(c') = i' \wedge \text{OCCUR}(i')(\text{ASSERT}(c')(\lambda i''[\text{THERE\_ARE}(i'')(\text{B})]))])]$

This says that at all indices i′ accessible from i, if the addressee of the utterance context c wants biscuits, there is a context c′ that is similar to c (insofar speaker and addressee are the same, and possibly more) whose world is i′ and in which the assertion occurs (by the speaker, to the addressee) that there are biscuits. (This is in itself is an indirect speech act that the addressee is free to take some biscuits).

Negation of speech acts

Negation is a Boolean operation, and so we do not expect that they can be applied to speech acts. However, Searle (1969) points out the difference between

(39) a. *I promise that I don't come.*
b. *I don't promise that I come.*

(b) is a refusal to make a promise. It can be analyzed as involving a conditional speech act with an implicit *if*-part: In case you ask me that I make a promise to come, I will not do so.

(40) $\lambda c \lambda i[\forall i' \in R_c(i)[\text{WANT}(i')(\lambda c'[c \sim c' \wedge \text{PROMISE}(c')(\lambda i''[\text{COME}(i'')(\text{S}(c))])])$
$\rightarrow \neg \exists c'[c' \sim c \wedge \text{W}(c') = i' \wedge \text{OCCUR}(i')(\text{PROMISE}(c')(\lambda i''[\text{COME}(i'')(\text{S}(c))]))]]]$

5.4 Conditional conjunctions and disjunctions involving imperatives

The conjunction case

(41) a. *Insult me and I sue you.*
b. *Stay a bit longer and I'll make you a coffee.*
c. *Go to bed now and you'll be well rested tomorrow.*

These appear to be conjunctions of an imperative followed by a threat, a promise, or another predictive speech act. However, notice that the first component need not be an imperative.

(42) *Be chronically ill and the world is a desperate place.*

Assumptions:

- The first sentence is not an imperative speech act, but an imperative sentence radical, type ecst, where argument e is restricted to the addressee:
$\lambda x \lambda c \lambda i[x = \text{A}(c) \wedge \text{INSULT}(i)(\text{S}(c))(\text{A}(c))]$
Notice that we do not get the same interpretation with modal sentences, otherwise similar to imperatives: *You should insult me again and I sue you.*
- The first conjunction is interpreted as the antecedent of a conditional (cf. Culicover & Jackendoff 1997). The special prosody that makes clear that the first clause is not asserted.

Hence we have an ordinary conditional interpretation, e.g. for (40.a):

(43) *If you insult me again, then I sue you.*

The disjunction case

(44) *Don't insult me or I sue you.*

Meaning: 'If you insult me, then I sue you'. Typically interpreted as imperatives backed up by a threat.

Possible explanation:

- As before, the imperative clause is just a sentence radical, type ecst, with argument e restricted to addressee.
- The form [p ∨ q] is interpreted conditionally: if ¬p then q.

This results in a conditionalized speech act:

(45) $\lambda c \lambda i[\forall i' \in R_c(i)[\text{INSULT}(i')(\text{S}(c))(\text{A}(c))]) \rightarrow$
$\exists c'[c' \sim c \wedge \text{W}(c') = i' \wedge \text{OCCUR}(i')(\text{THREAT}(c')(\lambda i''[\text{SUE}(i'')(\text{A}(c))(\text{S}(c))])]]$

5.5 Other connectives

There are several other connectives between speech acts that express certain rhetorical relations between them. One example: *while*, in its non-temporal use, which expresses a general parallel relation (including contrast).

(46) *While John is a linguist, Mary is a logician.*

To express the impact of such connectives, we would have to design a way to express rhetorical relations between speech acts. Here we assume that they are presupposed.

(47) $[\![\textit{while}]\!](c)(@_1)(@_2) = \lambda c.\text{PARALLEL}(c)(@_1,@_2)\ [@_2(@_1(c))]$

while applies at a context c to two speech act types. It presupposes that at c, these two speech act types make parallel contributions. When applied to a context c that satisfies that presupposition, the resulting value modifies the two speech acts by applying the two speech act types. Note that *while* is restricted to assertions.

6. Explicit performatives and proxy speech acts

6.1 Explicitly performative utterances

Explicit performatives pose the problem that they have the form of assertions, but indicate the speech act expressed by the main verb. We are concerned here only with explicit performatives that result in speech acts other than declarations (like baptizings etc.).

(48) a. *I promise you to come.*
b. *I admit that I was wrong.*
c. *I ask you to sit down.*

Proposal: In (a), the speaker **asserts** that there is a speech act of a **promise** by the speaker to come. As speech acts are events, this means asserting the existence of such an event.

The speech act type of (a) then is as follows:

(49) $\lambda c[\text{ASSERT}(c)(\lambda i \exists c'[c \sim c' \wedge \text{W}(c')=i \wedge \text{OCCUR}(i)(\text{PROMISE}(c')(\lambda i'[\text{T}(c')<\text{T}(i) \wedge \text{COME}(i')(\text{S}(c'))]))])]$

When applied to a context c, the speaker asserts at c the proposition that there is a context c′ (identical as to speaker, addressee, and world to c) such that a speech act of a promise by the speaker to the addressee that the speaker will come occurs.

Notice that the speech act verbs, like *promise*, are not used to describe a speech act – they are dependent on a context, just like illocutionary operators. In their descriptive interpretation, they are dependent on an index:

(50) *I promised you to come.*
$\lambda c[\text{ASSERT}(c)(\lambda i[\text{T}(i)<\text{T}(c) \wedge \text{PROMISE}(i)(\text{A}(c))(\text{S}(c))(\lambda i'[\text{T}(i)<\text{T}(i') \wedge \text{COME}(i')(\text{S}(c))]))]$

Where the performative reading and the descriptive reading relate to each other as follows:

(51) $\text{PROMISE}(i)(y)(x)(p)$ iff $\exists c[\text{W}(c)=i \wedge \text{S}(c)=x \wedge \text{A}(c)=y \wedge \text{HAPPEN}(i)(\text{PROMISE}(c)(p))]$

6.2 Proxy speech acts, or "second-hand perfomatives"

(52) *We should take raingear with us. The weather report says it will be raining.*

The second clause is not an assertion of what the weather report said, but a direct contribution to the issue at hand – like *It will be raining, according to the weather report.* Evidence: Simple present tense, drop of complementizer, main clause order possible in German:

(53) *Der Wetterbericht sagt, es <u>wird</u> regnen / dass es regnen <u>wird</u>.*

Proposal: The speaker performs a speech act for another agent that is not present; this speech act is relevant for the conversational issues at hand. It works the same way as with performative speech acts, except that the subject is not the speaker.

(54) $\lambda c[\text{ASSERT}(c)(\lambda i \exists c'[\text{S}(c') = \text{WEATHER\_REPORT} \wedge \text{W}(c')=i \wedge \text{OCCUR}(i)(\text{ASSERT}(c')(\lambda i'[\text{T}(c')<\text{T}(i') \wedge \text{RAIN}(i')]))])]$

7. Quantification into speech acts

Krifka (2001) argues that the pair-list reading of questions with quantifiers is generated by quantification into question acts.

(55) *What did every guest bring?*
Intended reading: 'For every guest x: What did x bring?'
Intended answers of type: *John brought wine, Mary brought beer, Sue brought Salad.*

Observation: This reading is only available for universal quantifiers.

(56) *What did most guests bring?*
Reading: 'For what y does it hold: For most guests x, x brought y.'
Possible answer: *Most guests brought beer.*

Explanation: Speech acts can be conjoined, but not disjoined (cf. sections 5.1, 5.2) Universal quantifiers are generalized conjunctions, hence universal quantification into speech acts is possible. Non-universal quantifiers, as e.g. *most*, also require disjunction as basic operation, hence they are not suitable for quantification over speech acts.

If A is a set of speech act types, and ⊕A is the conjunction of all elements of A (provided that order of conjunction does not matter), then the speech act type of (55) is as follows:

(57) $\oplus\{\lambda c[\text{QUEST}(c)(\lambda y \lambda i[\text{BRING}(i)(y)(x)]) \mid x \in \text{GUEST}(i)\}$

If there are three guests, Mary, Sue and John, this amounts to the following when we specify one particular order:

(58) $\lambda c[\text{QUEST}(c)(\lambda y \lambda i[\text{BRING}(i)(y)(\text{MARY})] \oplus \lambda c[\text{QUEST}(c)(\lambda y \lambda i[\text{BRING}(i)(y)(\text{SUE})] \oplus \lambda c[\text{QUEST}(c)(\lambda y \lambda i[\text{BRING}(i)(y)(\text{JOHN})]$
$= \lambda c[\text{QUEST}(\text{QUEST}(\text{QUEST}(c)(\lambda y \lambda i[\text{BRING}(i)(y)(\text{MARY})]))(\lambda y \lambda i[\text{BRING}(i)(y)(\text{SUE})]))(\lambda y \lambda i[\text{BRING}(i)(y)(\text{SUE})])]$

This amounts to the speech act that results in first questioning what Mary brought, then questioning what Sue brought, and then questioning what John brought.

Questions are speech acts that expect assertions of a particular type as responses. A pair-list answer satisfies the informational need of such a question. See Krifka (2001) for details.

8. Conclusion

The central issues of this talk:

A. What are speech acts — propositions/characters or actions?

B. Is there evidence that speech acts can be embedded?

C. If yes, how can embedding of speech acts be modeled if speech acts are actions?

As for (A), I assumed that speech acts are actions. I tried to give evidence for (B), and I developed proposals for (C).

As speech acts are phenomena of language use (pragmatics), speech act recursion means, in many cases, that pragmatic phenomena feed back into semantics. This is a common phenomenon that we also see, e.g., with the semantic use of the focus/background distinction and the topic/comment distinction.