Embedding Speech Acts: Why, and How

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1. Speech acts: The traditional view and its problems

- Semantics: Reference and Truth Conditions
  built on types **e** for entities, **t** for truth values, **s** for possible worlds / times
- Pragmatics: Speech acts,
  governed by rules how to use linguistic objects in conversation,
  e.g. Stenius (1967): "Produce a sentence in indicative mood only if this sentence is true"
- Consequence: Expressions that denote speech acts (and sentences with indicators of illocutionary force) cannot be embedded – the "Frege point", cf. Geach 1965, Green 2000).

Problem: Semantic operators can have scope over speech acts.

(1) *What's your name again?*
Not: For which name x does it hold: You were called x before, and now you are called x again.
But: Say again what your name is.

(2) *With which document did each guest check in?*
Not: For which document does it hold that every guest checked in with it?
But: For every guest x: With which document did x check in?

(3) *Isn't there a vegetarian restaurant around here?*
Not: Is it the case that there is no vegetarian restaurant around here?
But: Would you not say that there is a vegetarian restaurant around here?

(4) *In case you are hungry, there are biscuits on the kitchen counter.*
Not: In those circumstances in which you are hungry, there are biscuits; otherwise possibly not.
But: For those circumstances in which you are hungry, I tell you that there are biscuits.

(5) a. *He told me quite frankly that the boss is a moron.*
b. *Quite frankly, the boss is a moron.*

Possible reactions:

- Deny that there propositions and speech acts are all that different
  (syntactic view: Performative Hypothesis; Fodor & Katz 1963, Ross 1970, Sadock 1974; semantic view: Lewis 1970).
- Assume that they are different, but accept speech acts as objects of semantics.

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2. A semantic theory of speech acts as actions

2.1 Speech acts as transitions

Szabolcsi (1982), “Model theoretic semantics of performatives”:

- A proposition is true or false at an index, it “leaves the state of affairs in questions untouched”
- Speech acts (at least, performative sentences) “should denote changes in the models”. They specify “how the world would change if the sentence were uttered (under appropriate circumstances).

Hence:

- Speech acts are functions, “transitions from one state of affairs into another”
- Felicity conditions can be stated as presuppositions, i.e. as conditions on the input state.

2.2 Speech acts result in commitments

What is the nature of the change? Cf. discussion of two perspectives in Harnish (2005).

- Intentional perspective (e.g., Bach & Harnish 1982):
  Speech acts express intentions of speakers. E.g. if S asserts φ to A, then S expresses belief in A, and S expresses intention that A should believe φ as well.
- Normative perspective (e.g., Alston 2000):
  With a speech act, a speaker S takes up certain commitments. E.g., if S asserts φ to A, then S is responsible that φ is true – provide evidence for it, face consequences if it turns out false.

I assume the normative perspective. One piece of evidence for it is (6). For the intentional theory, this should be a self-defeating act.

(6) *Whether you believe it or not, I have never seen that guy before*.

A possible problem for the normative view: Moore’s paradox, (7). But this can be explained: If speaker does not believe φ and makes this obvious, then the public commitment for φ is a self-defeating move.

(7) *#It is raining, but I don’t believe that it is raining.*

3. A Model for the Interpretation of Speech Acts

3.1 Ingrediences of the model

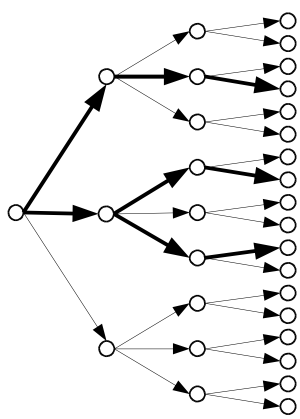
(8) a. Simple types:
  e: entities (objects and events)
  t: truth values (True and False)
  s: indices (world-time-points)
  c: contexts (specifying speaker s_c, addressee a_c, index d_c, etc.

b. Complex types:
  If **σ**, **τ** are types, then **(σ)τ** is a type (functions from **σ**-entities to **τ**-entities);
  if **σ** is a simple type, parentheses will be omitted.

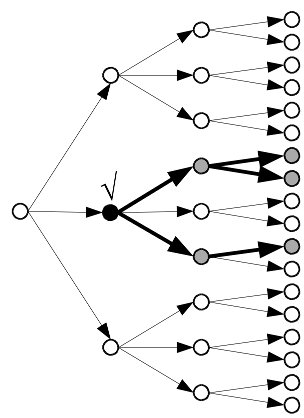
(9) World-time Indices I are ordered by relation ≤, which is transitive, reflexive, left-linear: if $i' \leq i$ and $i'' \leq i$, then either $i' \leq i''$ or $i'' \leq i'$ (branching time model) and discrete, where $i' <_s i$ stands for: i is the immediate successor of i′.

(10) An Index Space is a set of indices I′ such that:
a. For all i, i′, i″: If $i, i'' \in I'$ and $i \leq i' \leq i''$, then $i' \in I'$, i.e. I′ is an interval
b. I′ has a unique smallest element, its root, for which we write $\sqrt{}I'$.
Rooted intervals are of type **st**; as they are important, I write **S** for short.

(11) a. Word-time indices, with three of 18 histories indicated.



b. A rooted interval, or index space, with 6 indices, and root indicated.



3.2 The semantic representation language

Basic meanings of the representation language will be specified in SMALLCAPS. They are interpreted by an interpretation function F. We also have variables, lambda abstraction, Boolean operators, etc.

Interdependence of F and ≤: If $i' <_s i$, then it must hold that for at least one constant α, $F(\alpha)(i') \neq F(\alpha)(i)$. The change from i′ to i must manifest itself in at least one semantic change, otherwise the set of indices I and the relation ≤ would be too fine-grained.

The order ≤ is related to a temporal order, but not identical to it: Whenever i′ is later than i, then $i<i'$.

(12) if F(LATER-THAN)(i)(i′), then $i<i'$.

But this does not necessarily hold vice versa. That is, there might be immediate changes from i to i′ that do not involve any progress of time. Reason:

- The change of obligations in speech acts does not use up time.
- One locutionary act may involve many changes of obligations without any particular temporal order.

The performance of the locutionary act might take time, but we are not concerned with that.

For tense operators we need a way to express precedence that does take up time; we take << for it:

(13) F(LATER-THAN)(i′)(i) iff $i' << i$

3.3 Example for propositional meaning

Meanings are functions from contexts to functions from indices (Kaplanian characters).

Rule of meaning combination:

(14) $[\![\alpha]\!]([\![\beta]\!]) = \lambda c\lambda i[[\![\alpha]\!](c)(i)([\![\beta]\!](c)(i))]$ or $\lambda c\lambda i[[\![\alpha]\!](c)(i)([\![\beta]\!](c))]$, whichever is well-formed.

Example of meaning derivation from a syntactically complex expression:

(15) *I admired Sue.*
$[_{TP}\ I_1\ [_{T'}\ [_{T0}$ PAST-$admire_2\ [_{vP}\ t_1\ [_{v'}\ [_{v0}\ t_2]\ Sue]]]]]$

Undoing syntactic movements for simplicity of exposition, we get:

(16) a. $[\![admire]\!] = \lambda c\lambda i\lambda y\lambda x[\text{ADMIRE}(i)(y)(x)]$, type **cseet**
b. $[\![Sue]\!] = \lambda c\lambda i[\text{SUE}]$, type **cse**
c. $[\![[_{v'}\ admire\ Sue]]\!] = \lambda c\lambda i\lambda x[\text{ADMIRE}(i)(y)(\text{SUE})]$
d. $[\![I]\!] = \lambda c\lambda i[s_c]$
e. $[\![[_{vP}\ I\ admire\ Sue]]\!] = \lambda c\lambda i[\text{ADMIRE}(i)(\text{SUE})(s_c)]$
f. $[\![\text{PAST}]\!] = \lambda c\lambda i'\lambda p\exists i[i << c_t \wedge p(i)]$, type **cs(st)t**
g. $[\![[\text{PAST}\ [\ I\ admire\ Sue]]]\!] = \lambda c\lambda i'\exists i[i << d_c \wedge \text{ADMIRE}(i)(\text{SUE})(s_c)]$, type **cst**

This is a function from contexts c to propositions that yield the truth value True iff there exists an index i before the index of the context d_c for which it holds that the speaker of the context s_c admires Sue.

3.4 Actional meanings: Speech acts as index changers

Example: Assertional commitments.

(17) $\text{ASSERT}(i)(y)(\varphi)(x)$
⇔ at i, the speaker x is liable for the truth of p towards the addressee y.

Notation format for minimal index changes;
F[i] and G[i] are formulas denoting truth values with free index variable i.

(18) $i' \leq i[F[i]]$
$\Leftrightarrow i' <_s i \wedge \neg F[i'] \wedge F[i] \wedge$
for all formulas G such that F and G are logically independent: $G[i'] \leftrightarrow G[i]$

The condition $i' \leq i[F[i]]$ can be rendered as "i follows i′ immediately, and i′ differs from i only insofar as the condition F holds of i′. This expresses a minimal change from i′ to i, consisting in the change of truth value of the condition F[i]. Nothing else happened, i.e. $G[i'] \leftrightarrow G[i]$ for logically independent propositions.

Notice:

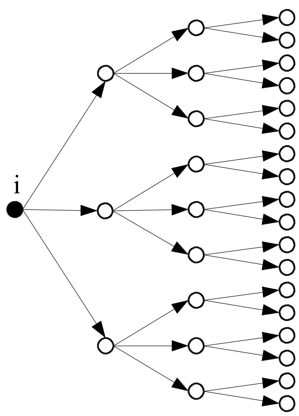
- $i' \leq i[F[i]]$ does not involve any progress of time if not enforced by F.
- (18) presupposes that ¬F[i′], that is, that the commitments expressed by F do not hold already.
  This might be seen to be too strong: One can assert something to which one is committed already.
  Different options here:
  – Repeated assertions lead to stronger commitments.

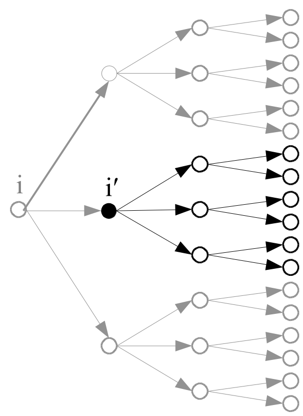
– If F[i′], then i′ is first accommodated to an i″, i″ $<_s$ i′ such that ¬F[i″], and then we proceed with i″ as input index. That is, speaker assumes that the common ground does not contain the expressed commitment yet.

Performing an assertion:

(19) λi′ιi[i′≤i [ASSERT(i)(y)(φ)(x)]], type **css**
Takes an index i′ and changes it to that i that differs from i′ only insofar as at i, the speaker x has assertive commitments with respect to φ towards the addressee y.

(20) Possible courses at an index i: Possible courses after index change has occurred:





3.5 Speech acts as index space changers

For certain speech acts this view is not sufficient – e.g. for denegation (Searle 1969, Hare 1970):

(21) a. *I don't promise to come.* – not a promise that I don't come.
b. *I don't say that he is guilty.* – not an assertion that he is not guilty.

For denegations we require a view of speech acts as functions from index spaces to index spaces.

We define minimal changes for index spaces as follows:

(22) I′ ≤ I [F[√I]]
⇔ I′, I are index spaces, and I = {i″ | i″∈I′ ∧ √I′ ≤ i [F[i]] ∧ i ≤ i″}

That is, I′ is restricted to those indices that follow the minimal change of the root of I′ by F. In (20), this would map the left tree to the highlighted points of the right tree.

Performing an assertion, for index spaces:

(23) λI′ιI[I′≤I[ASSERT[√I](y)(φ)(x)]], type **cSS**
I′ is mapped to that I that differs minimally from I′ insofar as at the root of I, the speaker x has assertive commitments with respect to φ towards the addressee y.

3.6 Performance of speech act: Example

(24) A, to B: *I admired Sue.*
hence: *A told B that he admired Sue.*

Assume: Illocutionary force is expressed by an operator in a syntactic projection ForceP (Rizzi 1997):

(25) $[_{\text{ForceP}}\ I_1\ [_{\text{Force}'}\ [_{\text{Force0}}\ [admire_2\text{-PAST}]_3\text{-ASSERT}]\ [_{\text{TP}}\ t_1\ [t_3\ [_{\text{VP}}\ t_1\ [t_2\ Sue]]]]]]$

Interpretation, with respect to a context c:

(26) $[\![[_{\text{ForceP}}\ \text{ASSERT}\ [_{\text{TP}}\ I\ admired\ Sue]]]\!]$
$= \lambda c[[\![\text{ASSERT}]\!](c)([\![[_{\text{TP}}\ I\ admired\ Sue]]\!](c))$

with $[\![\text{ASSERT}]\!] = \lambda c\lambda p\lambda I'\iota I[I' \leq I\ [\text{ASSERT}(\surd I)(a_c)(\varphi)(s_c)]]$, type **c(st)SS**
$= \lambda c\lambda I'\iota I[I' \leq I\ [\text{ASSERT}(\surd I)(a_c)(\lambda i''\exists i'''[i''' < d_c \wedge \text{ADMIRE}(i''')(\text{SUE})(s_c)])(s_c)]]$, type **cSS**

Given a context of utterance c, this changes an input index space I′ minimally to that index space I that differs from I′ only insofar at I, the speaker s_c is committed to defend the truth of the proposition (that s_c admired Sue) towards the addressee a_c.

3.7 From speech act potentials to commitment changes in conversation

Speech acts of type **cSS** are "speech act potentials" – devices that can be used as a speech act in a particular situation. The application of a speech act potential to a context c is a speech act, resulting in a change of the world. As any change of state, this is an event.

Assume that for contexts c, in addition to an index d_c (the index of utterance), an index space D_c is defined, with $\surd D_c = d_c$. The index space D_c are the acceptable continuations of the commitments of the participants of a conversation.

Application of speech act potential A to a context c (where d_c the index of this context)

(27) $c' + A = c$, where $D_c = A(c')(D_{c'})$

(28) $c' + (26) = c$,
where $D_c = \iota I[D_{c'} \leq I\ [\text{ASSERT}(d_c)(a_c)(\lambda i''\exists i'''[i''' << d_c \wedge \text{ADMIRE}(i''')(\text{SUE})(s_c)])(s_c)]]$, type **S**
(the index space that differs minimally from $D_{c'}$ insofar as s_c has assertive commitments to the addressee a_c, with respect to the proposition that s_c admires Sue at some time prior to d_c)

In the current setup, the same world-time index i can support different contexts, i.e. it may hold that $d_c = d_{c'}$ but $D_c \neq D_{c'}$. This is problematic, as the events leading up the different contexts are different.

4. Explicit performatives

Explicit performatives satisfy two functions: They describe a speech act, and they carry out this speech act. Here we will treat promises, first a descriptive case and then a performative case.

(29) a. *I promised you to come.*
b. *I (hereby) promise you to come.*

The descriptive case

Assume the following contextualized proposition:

(30) $[\![[_{TP}\ I_1\ [_{I'}\ [_{I''}\ [_{I0}\ promise_2\text{-PAST}]\ [_{VP}\ t_1\ [_{V''}\ [_{V'}\ [_{V0}\ t_2]\ you]\ [_{VP}\ to\ come]]]]]]]\!]$

$= \lambda c\lambda i[[\![\text{PAST}]\!](c)(i)([\![[_{VP}\ I\ [promise\ you\ [to\ come]]]]\!](c))$

$= \lambda c\lambda i'''\exists i[i << c_t \wedge \exists i'[i' \leq i\ [\text{PROMISE}(i)(a_c)(\lambda i''[\text{COME}(i'')(s_c)])]]]$, type **cst**.

When applied to a context c this yields a proposition that is true iff there is a past change from i to i′, where i′ differs minimally from i insofar s_c has obligations towards a_c to come. – This can be asserted:

(31) $[\![[_{ForceP}\ \text{ASSERT}\ [_{TP}\ I\ promised\ to\ come]]]\!]$

$= \lambda c\lambda I\iota I'[I \leq I'\ [\text{ASSERT}(I')(a_c)((30)(d_c))(s_c)]]$, type **cSS**

The performative case

There are two options:

- The performative verb *promise* is moved to the head of ForceP, replacing ASSERT
- There is a general ForceP operator PERFORM

Here I pursue the latter option, as there are performative uses that do not have a performative verb:

(32) *The dance floor is hereby opened.*

First, the present tense proposition:

(33) $[\![[_{TP}\ I\ promise\ to\ come]]\!]$

$= \lambda c\lambda i[i{=}d_c \wedge \exists i''[i'' \leq i\ [\text{PROMISE}(i)(a_c)(\lambda i''[\text{COME}(i'')(s_c)])]]]$, type **cst**

This applies to contexts c and delivers a true proposition iff the index of c originated from an index i″ by a minimal change in which s_c took on the obligation to come.

(34) $[\![[_{ForceP}\ \text{PERFORM}\ [_{TP}\ I\ promise\ to\ come]]]\!]$

$= \lambda c\lambda I'\iota I[I' \leq I\ [(33)(d_c)(I)]]$

$= \lambda c\lambda I'\iota I[I' \leq I\ [\surd I'{=}d_c\ \wedge \exists i''[i'' {\leq} i'\ [\text{PROMISE}(i')(a_c)(\lambda i''[\text{COME}(i'')(s_c)])(s_c)]]]]$

$= \lambda c\lambda I'\iota I[I' \leq I\ [\text{PROMISE}(i')(a_c)(\lambda i''[\text{COME}(i'')(s_c)])(s_c)]$, type **cSS**

Applied to a context c′ and an index space $D_{c'}$, following (27), this changes $D_{c'}$ to an index space I that differs minimally insofar as the speaker s_c now has the obligation to come. Notice that for this effect the clause must be in present tense, as this is the only way that the context index c_t is affected.

The role of *hereby* can be seen as relating the change induced by PERFORM and the change induced by the lexical meaning of the verb *promise*.

5. Logical operations over speech acts

5.1 Denegation

We now consider denegation, one of the reasons why we assume index spaces, and not simple indices.

(35) *I don't promise to come.*

Denegation (cf. Searle 1969) can be understood as explicitly refraining from performing a speech act, like an act of promise (cf. Hare 1970). As such, they are not regular speech acts. This is reflected by the fact that we cannot use *hereby,* different from usual explicit performatives.

Denegations can be understood as excluding all promises to come from the possible continuations. We need index spaces to express that. Proposed syntactic analysis, simplified:

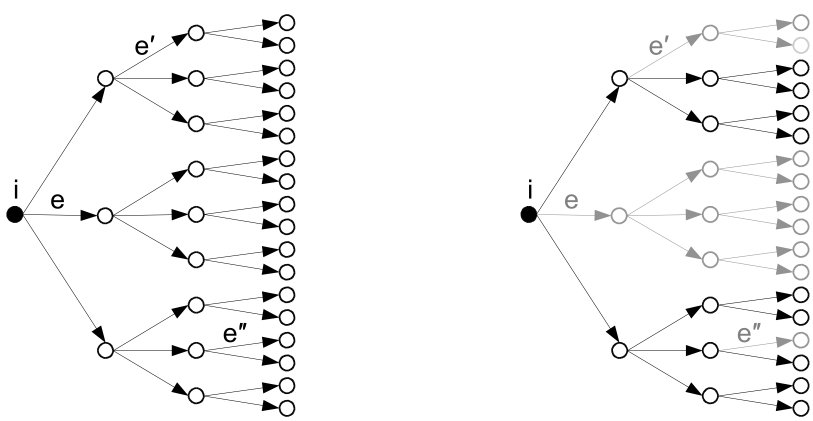
(36) $[_{\text{NegP}}$ *I*$_1$ [*don't* $[_{\text{ForceP}}$ PERFORM $[_{\text{TP}}$ t_1 *promise*-PRES [*to come*]]]]]

Negation removes from the input index I′ those indices that originate from a promise by the speaker to the addressee to come:

(37) $[\![(36)]\!]$
$= \lambda c \lambda I'[I' - \cup\{[\![\text{PERFORM } [_{\text{TP}}\ \textit{I promise to come}]]\!](c)(I'') \mid I'' \text{ an index space, } I'' \subseteq I'\}]$

Cf. diagram (38), where in e, e′ and e″ the speaker promises the addressee to come.

(38) Input option space, with e, e′, e″: promising events. — Output option space after denegation of the promises.



Cf. for such speech acts that have an effect on subsequent indices Cohen & Krifka (2011), on "meta speech acts". Notice that meta speech acts do not change the root of the input index space.

Denegation expressed by *n't*, also used for Boolean negation, due to relation to descriptive use:

(39) *I did not promise to come.*
Assertion of: Within the reference time interval, I did not utter a promise to come.

5.2 Imperatives and Prohibitives

Cf. Barker (2012) for a proposal for imperatives that could be expressed in the current approach.

(40) *Jump!*

This restricts the input index space I to an index space I′ such that all histories that continue √I contain an index at which the addressee jumps.

What about negated imperatives, or prohibitives? Boolean negation cannot be applied to actions, but denegations do the proper job: (41) removes from the input space those transitions at which the addressee jumps, hence excludes the act of jumping.

(41) *Don't jump!* (contrast with: **Not jump!*)

5.3 Questions

Just as propositions have to be distinguished from assertions, the semantic object of a question (following Hamblin 1973, a set of propositions) has to be distinguished from questions as speech acts.

Krifka (to appear) proposes that questions are meta speech acts in which the speaker restricts the possible continuations from the input index space I to those at which the addressee performs certain assertions. Example:

(42) *Who did you meet?*
$[\![[_{\text{ForceP}}\ \textit{who}_1\ [\textit{did}_2\text{-REQU}\ [_{\text{ForceP}}\ t_2\text{-ASSERT}\ [_{\text{CP}}\ t_1\ [\textit{you}\ t_2\ \textit{meet}\ t_1]]]]]]\!]$

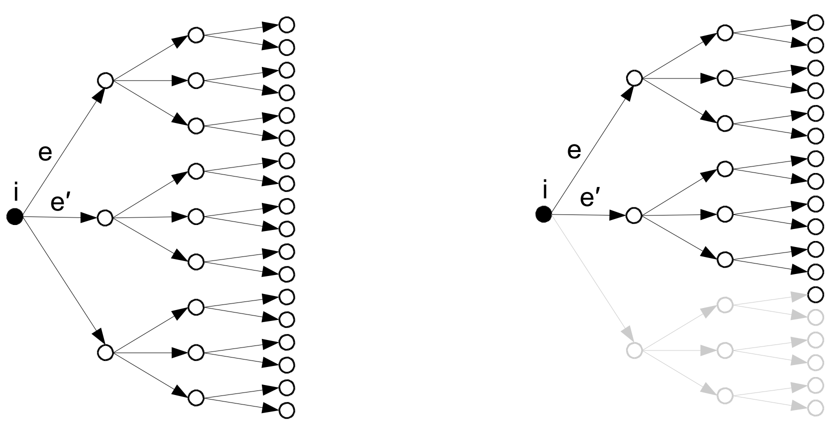
Meaning of sentence radical, e.g. for questions embedded under *know*:

(43) $[\![[_{\text{CP}}\ \textit{who}_1\ [\textit{you (did) meet}\ t_1]]\!]$
$= \lambda c \lambda p \exists x[\text{PERSON}(x) \wedge p = \lambda i[\text{MEET}(i)(x)(a_c)]]$,
e.g. $\lambda c \lambda p[p =$ 'a_c met John' $\vee\ p =$ 'a_c met Bill'$]$

Meaning of question speech act as a request:

(44) $\lambda c \lambda I'\ [\cup\{\iota I[I' \leq I\ [\text{ASSERT}(\surd I)(s_c)(p)(a_c)] \mid (43)(c)(p)\}]$
notice that s_c, a_c have changed their positions.

(45) Assume e: a_c asserts that a_c met John, e′: a_c asserts that a_c met Bill.
Index space after s_c asked the question to a_c:



Addressee can reject the proposed continuations; cf. Krifka (t.a.) for modeling.

A question may be based on just one proposition, e.g. declarative questions (Gunlogson 2002):

(46) *It will rain tomorrow?*

Extra-propositional negation as request for denegation of an assertion, cf. Krifka (t.a.):

(47) *Isn't there a vegetarian restaurant around here?*
[$_{\text{ForceP}}$ *is*$_2$-REQUEST [$_{\text{NegP}}$ *n't* [$_{\text{ForceP}}$ *there*$_1$ ASSERT [$_{\text{TP}}$ t_1 t_2 *a vegetarian restaurant here*]]]]

Speaker wants addressee to denegate the assertion (refuse to assert) the proposition 'There is a vegetarian restaurant here'. Typical reason: Speaker assumes that there is a vegetarian restaurant, but wants to give the addressee the option to exclude this assertion. Similar to tag questions:

(48) *There is a vegetarian restaurant here, isn't it?*

5.4 Conjunction of speech acts

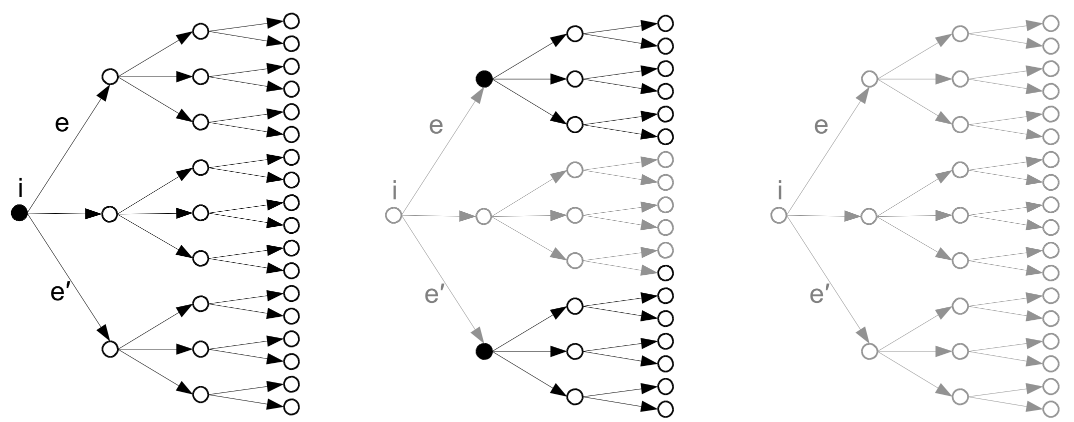
Speech acts can be conjoined, but they generally resist disjunction (cf. Krifka 1999, 2001).

(49) a. *I hereby promise you to sing, and I hereby promise you to dance.*
equivalent to: *I hereby promise you to sing and to dance.*

b. *#I hereby promise you to sing, or I hereby promise you to dance.*

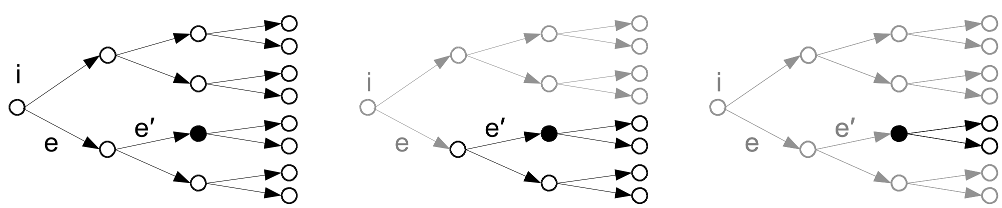
Conjunction and disjunction of index spaces do not give us back index spaces:

(50) Input option space, with e, e′: speech acts | Disjunction of output option spaces, as union | Conjunction of output option spaces, as intersection



In contrast, dynamic conjunction (first one update, then the second) results in index spaces:

(51) Input option spaces, with e, e′: speech acts | Output option space after e | Output option space after e′



Hence, conjunction, but not disjunction can be defined for speech act potentials.

(52) $[A \& A'] = \lambda c \lambda I'[A'(c)(A(c)(I'))]$

Why is this conjunction, i.e. expressed by *and,* the same term used for Boolean conjunction? – Because Boolean conjunction can be used descriptively to report the effect:

(53) *He promised her to sing and promised her to dance.*

5.5 Quantification into speech acts

Speech-act conjunction can be generalized to universal quantification into speech acts, which occurs in cases like the following, under the indicated paraphrase:

(54) *I hereby promise you to do everything you want me to do.*
‘For everything x you want me to do: I hereby promise you to do x.’

This is fine as a generalized conjunction. Quantifiers that not based on conjunction are not acceptable:

(55) ??*I hereby promise you to do most of the things you want me to do.*

Possible, but complicated reading: If want me to do the things in the set X, I choose a set that contains more than half of the elements X′, and then I promise to do everything in X′.

Cf. Krifka (2001) for quantification into questions:

(56) *What did every guest / most guests bring to the party?*
‘For every guest x: What did x bring to the party?’

With *most guests* we only get the propositional interpretation: ‘What y is such that for most guests x it holds that x brought y to the party?’

6. Embedded speech acts

We have seen in the last section that operators like negation, conjunction and universal quantification can be defined for speech acts. This is possible because speech act (potentials) have a semantic type: **css**, or, lifted to index spaces, **cSS**. In this section we will look at cases in which speech acts are embedded by other operators.

6.1 Conditional Speech Acts

Austin (1961), biscuit conditionals:

(57) *If you want biscuits, there are some on the side board.*

Analyses that assume speech acts in the consequent of the conditional e.g. DeRose & Grandy (1999), and Siegel (2006), who assumed a quantification over “potential” speech acts: Conditional speech acts are not restricted to assertions, as the following examples with conditionalized questions, commands and explicit performatives show:

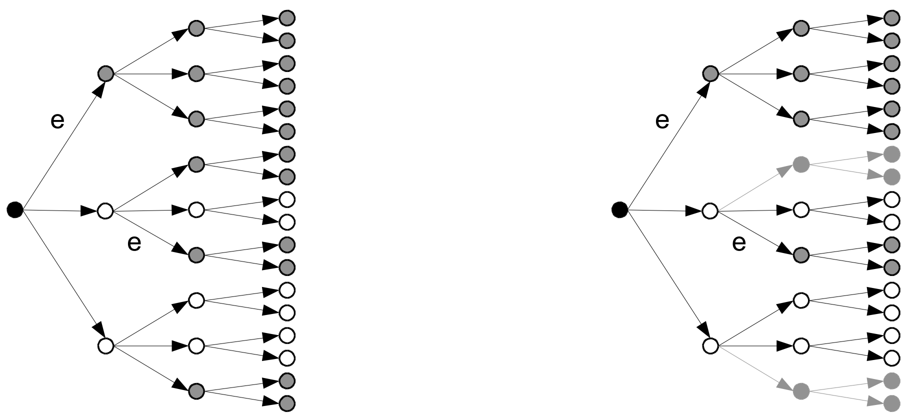
(58) a. *If I want biscuits, where can I find them?*
b. *If she wants biscuits, give her some.*
c. *If you want biscuits, I promise you that there are some on the side board.*

We can implement conditional speech acts following Frank P. Ramsey's insight for "denotational" conditionals, according to which a conditional *if Φ, Ψ* is true with respect to a "stock of knowledge" if and only if, when *Φ* is added to this stock of knowledge, *Ψ* follows.

Speech acts are interpreted not with respect to stocks of knowledge, but with respect to index spaces. Consequently, a conditional speech act *if Φ, A* should change the input space such that for all indices at which the condition *Φ* holds, the speech act *A* is performed. Just as with denegation of speech acts, this will typically not change the root of the input option space, but it will restrain the possible developments of the option space. It is best to make this clear with an illustration:

(59) Input option space;
grey: indices where you are hungry,
e: events of asserting that there are biscuits

Output option space
after conditional assertion
if you are hungry, there are biscuits



Notice: Only those histories survive where in case you are hungry, there is a prior change of commitment by the speaker for the proposition that there are biscuits on the counter (an assertion that is taken as an offer, by principles that allow for the computation of indirect speech acts not considered here.

(60) $[_{\text{ForceP}}\ [_{\text{TP}}\ \mathit{if}\ \Phi]\ [_{\text{ForceP}}\ \text{ASSERT}\ \Psi]]$

(61) $\lambda c \lambda I' \cup \{I \text{ is an index space, } I \subseteq I' \mid [\![\Phi]\!](c)(\surd I)] \rightarrow [\![\text{ASSERT } \Psi]\!](c)(I) = I]\}$

This takes an input space I′ and returns an output space that is the union of all index spaces I that are a part of I′ such that it holds that if the antecedent proposition is satisfied at the root of I, then the effects of asserting the consequent *Ψ* hold already.

(This is reminiscent of treating conditionals in dynamic semantics, in particular Heim 1992).

6.2 Speech-act embedding predicates: Direct speech and embedded root clauses

<u>Direct speech</u>

Direct speech are not always literal quotes:

(62) Mary, to Bill: *Ich hasse John.*
Report: *Mary said to Bill: "I hate John."*

Cf. also liberal use of direct speech in Thukydides, *The Peloponnesian War*: "... so my habit has been to make the speakers say what was in my opinion demanded of them by the various occasions, of course adhering as closely as possible to the general sense of what they really said."

Assume: Direct speech does not (necessarily) copy locutionary acts, but refer to the illocutionary acts.

(63) $[\![[_{\text{ForceP}}\ I_1\ [\ hate_2\text{-ASSERT}\ [_{\text{TP}}\ t_1\ t_2\ John]]]]\!]$
$= \lambda c \lambda I' \lambda I[I' \leq I\ [\text{ASSERT}(a_c)(\lambda i[\text{HATE}(i)(\text{JOHN})(s_c)])(s_c)]$

Assuming two variants of *say*, embedding propositions vs. embedding speech-act potentials:

(64) $\text{SAY}(i)(y)(p)(x) \Leftrightarrow$ at i, x asserts (by saying) the proposition p
(can be expressed with reference to ASSERT)

(65) $\text{SAY}(i)(y)(A)(x) \Leftrightarrow$ at i, x performs the speech act A, where A is an assertion;
reference to a reported context c′ is necessary, where $s_{c'} = x$, $a_{c'} = y$

Embedded root clauses

(66) a. *Mary said she hates John.* b. *Mary said that she hates John.*

(67) a. *Maria sagt, sie hasst John.* b. *Mary sagt dass sie John hasst.*

Embedded root clauses (Hooper & Thompson 1973, etc). are likely candidates for an analysis as speech-act potentials. Cf. also Krifka (1999, 2001), McCloskey (2005) for embedded root questions.

(68) *The baritone was asked what did he think of Mrs. Kearney's conduct*. (J. Joyce, *Dubliners*)

In German, verbs like *sich fragen* 'wonder' allow for root modal particles like *denn*:

(69) a. *John weiß, wen Maria* (**denn*) *getroffen hat.*
John knows who Mary PART has met
b. *John fragt sich, wen Maria* (*denn*) *getroffen hat.*
John wonders who Mary PART has met

(70) $\text{WONDER}(i)(A)(x)$
$\Leftrightarrow \text{ASK}(i)(x)(A)(x)$
⇔ at i, the person x performs the question act A at i with x as addressee.

(71) a. *Aunt Kate wants to know won't you carve the goose as usual.* (Joyce, *Dubliners*)
b. *I was dying to find out was he circumcised.* (Joyce, *Ulysses*)
c. *Find out does he take sugar in his tea.*
d. *Do you think will he be re-elected?*

6.3 Speechact-modifying adverbials

One of the main arguments for the performative analysis were adverbials that appear to attach to the performative prefix, as the following example and its paraphrase suggest (cf. Schreiber 1972, Davison 1973, Sadock 1974 for early literature on the phenomenon, and Mittwoch 1977 for an early critical view).

(72) *Your tie and shirt frankly don't go together.*
‘I tell you frankly [that your tie and shirt don't go together].’

Such adverbs can be used in a descriptive way, as in the following example:

(73) a. *Mary told Bill frankly that his tie and shirt didn't go together.*
b. *Mary frankly told Bill that his tie and shirt didn't go together*.

(73)(a): manner-related, (b) choice-related (cf. McConell-Ginet 1982, Shaer 2003); the choice for Mary to perform the event of telling was frank. The performative use corresponds to (b).

Basic meaning of *frankly* applied to an event e: For the agent of e to perform e is a frank action, e.g. potentially violating social norms.

For the performative use, I assume that changes of indices create events that can be picked up by adverbs like *frankly*.

(74) $[\![[_{\text{ForceP}}\, I\, [_{\text{ForceP}'}\, \textit{frankly}\, [_{\text{ForceP}'}\, \text{ASSERT}\, [_{\text{TP}}\, \Phi]]]]]\!]$
$= \lambda c[[\![\textit{frankly}]\!](c)([\![\text{ASSERT}]\!](c)(\varphi))]$

(75) as $[\![\text{ASSERT}]\!](c)(\varphi) = \lambda c\lambda I'\lambda I[I' \leq I\ [\text{ASSERT}(\surd I)(a_c)(\varphi)]]$) is of type **cSS,**
$[\![\textit{frankly}]\!]$ has to be of type **(cSS)cSS**

(76) $[\![\textit{frankly}]\!](c) = \lambda R\lambda c\lambda I'\iota I\exists e$[e is the event created by the change from I′ to I
$\wedge$ R(c)(I′)(I) $\wedge$ to perform e is frank]

(77) $\lambda c\lambda I'\iota I\exists e$[e is the event created by the change from I′ to I $\wedge$ to perform e is frank
$\wedge\ I' \leq I\ [\text{ASSERT}(\surd I)(a_c)(\varphi)(s_c)]]$

7. Conclusion

Speech acts (illocutionary acts) can be given a semantic interpretation:

- as functions from indices to indices that change the commitments of speakers and addressees
- or as function from index spaces to index spaces that change the commitments of speakers and addressees, representing the possible future commitments – for speech acts like denials.

This allows to capture cases in which semantic operators have scope over speech acts, like

- Denegation: *I don't promise to come.*
- Conjunction: *I promise to come, and I promise to leave early.*
- Quantification: *What did everyone bring to the party?*
- Conditional speech acts: *In case you are hungry, there are cookies on the counter.*
- Speech act reports: *He said he likes beer.*
- Speechact-modifying adverbials: *Frankly, your shirt and tie don't go together.*

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