Introduction to the Philosophy of Language

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Erich Rast

http://akira.ruc.dk/~erast/

Roskilde University

erast@ruc.dk
Literature

- Karttunen (1974)
- Lewis (1979)
- Gazdar (1979)
- Thomason (1990)
- Gärdenfors (1988)
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A Dialog

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(2) Bob: Yeah.

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In both cases, Alice performs the same speech act. What conditions must be fulfilled in order for this dialog to work?

Alice presupposes that Bob knows that in the given situation there is some coffee she’s referring to. (Presumably, she holds a cup of brown liquid in her hand and refers to the content of the cup.) Alice herself, if she’s not trying to deceive Bob, must believe as well that there's coffee in the cup, and she believes that the coffee is good.
Common Ground

● The dialog depends on a given communicational situation.

● The reference of »the coffee« depends heavily on the context. It could be...
  ‣ ... the coffee in the cup Alice is holding
  ‣ ... the coffee in the fridge
  ‣ ... the coffee in Bob’s backpack
  ‣ ... the coffee at RUC’s philosophy department (although unlikely)

● Alice has to believe that Bob knows that there’s some coffee and that he can identify it in the given situation in order for her speech act to be felicitous.

● Alice has to believe that it’s coffee she’s talking about.

Alice and Bob must share some beliefs about the given situation for the speech act to work out as Alice intends it.

Stalnaker calls such a set of mutual beliefs and background knowledge common ground. It contains the tacit, shared assumptions and the background knowledge of the participants that they don’t question.
Update

The common ground contains everything that both Alice and Bob believe.

(5) Alice: The coffee is good.
(6) Bob: Yeah.
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What happens in the dialog?

- Bob accepts Alice’s utterance. So whatever he believed before, after the utterance he believes that the coffee is good.
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- Bob accepts Alice’s utterance. So whatever he believed before, after the utterance he believes that the coffee is good.
- Condition: Bob is honest when he affirms the utterance by uttering »Yeah«.
- Alice has believed that the coffee is good before she made her utterance, and continues to be believe so afterwards.
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- Condition: Alice is honest, diquotation principle applies.
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What does this mean for the common ground?

- The common ground is updated by the meaning of Alice’s utterance in the given situation.
Informally:

Alice holds a cup.
The cup is filled with coffee.

⇓

Alice holds a cup.
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The coffee is good.

Less informally:

\[ \exists x [ \text{cup}(x) \land \text{hold}(Alice, x) \land \exists y [\text{coffee}(y) \land \text{contains}(x, y)]] \]

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Note: dynamic binding across sentence level!
At Least Two Problems in a Formal Treatment

① In order to deal with successive utterances we need to make our formal apparatus **dynamic**. An utterance might extend the domain (univers of discourse) by introducing new entities. So called **anaphoric expressions** might refer back to previously introduced entities. Likewise, the domain of the common ground might be extended when an utterance is accepted.

② We need a formal notion of **updating the common ground**.

The first problem can be solved by using dynamic logic (DPL), discourse representation theory (DRT), file-change semantics (FCS), or similar formalisms. They allow us to describe **dynamic changes of information states**. The second problem can be solved as well, by explicitly modelling the common ground.

Let's first ignore the first problem for now. How can the CG be implemented?
In the following, ideas of various authors (Stalnaker, Gärdensfors, Lewis) are put together in an eclectic manner. This is experimental and it is unlikely that it reflects any of those authors’ opinions. There are more or less standard ways of doing formal pragmatics in dynamic semantics (DRT, DPL, FCS), but they are a bit too complicated to be explained on just a few slides.
Gärdenfors (1988) extensively discusses a syntactic treatment of belief that is useful for our current purpose. (In the following, I assume first-order modal logic as introduced before.)

**Consistent Set of Formulas**
A set $\Gamma$ of formulas $A_1, \ldots , A_n$ is consistent iff $\not\models (A_1 \land \cdots \land A_n) \rightarrow \bot$.

That means that the conjunction of the formulas is not a contradiction.

**Implicative Closure**
$Cn(\Gamma)$ is the implicative closure of a set $\Gamma$ of formulas iff for all $X \subseteq \Gamma$: for all $A_1, \ldots , A_n \in X$: if $\models (A_1 \land \cdots \land A_n) \rightarrow B$, then $B \in Cn(\Gamma)$.

So all implications of any conjunction of formulas in $\Gamma$ are contained in $Cn(\Gamma)$, which of course includes all formulas in $\Gamma$ as well, since $p \rightarrow p$.
(Note: This is very similar to the deductive closure $\{\phi | \Gamma \vdash \phi\}$ of a set of formulas often found in the literature.)

**Belief Set**
A set $K$ of formulas is a belief set iff it is consistent and $K = Cn(K)$.
Belief Expansion and Formal CG

Belief Expansion

\[ K_A^+ := Cn(K \cup \{A\}) \]

This operation has some nice properties, particularly the one that if \( K \) is a belief set, then \( K_A^+ \) (\( K \) expanded by formula \( A \)) is a belief set as well.

That looks like what is needed. The common ground can be considered a belief set that contains all formulas that are mutually believed by the discourse participants. [Note: What follows is not from Gärdenfors (1988)]

Initial Common Ground

At start of a conversation, the common ground is the belief set \( CG \) containing at least all formulas that are semantic representations of the sentences that the participants silently accept as common knowledge or assumptions of the conversation.

Note that by definition, the common ground also contains all logical consequences of the formulas that are mutually acceptable.
Let us assume that we have a mapping from some English sentences to their semantic representation in first-order modal logic and write $[S] \,(CG)$ for an appropriate ML formula obtained from an English sentence $S$ on basis of some common ground $CG$. To put things simple, let's also assume the simplest version of dynamic semantics, namely that quantifiers have infinite scope—no parantheses are needed, and conjunction is implicit.

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**Update**

$$CG[A] := CG^+_A$$

So update is now only a notational variant of Gärdenvor's belief expansion operating on the common ground.

(7) Start $CG_1 := Cn(\{\exists x \cup x, \, hold(Alice, x), \exists y coffee(y), contain(x, y)\})$

(8) Assertion Alice: The coffee is good.

(9) Analysis $[The \, coffee \, is \, good] \,(CG_1)=good(y)$

(10) Affirmation Bob: Yeah.

(11) Update $CG_2 := CG_1[good(y)]$
(12) \( CG_1 := \)
\[ Cn(\{\exists x \text{ cup}(x), \text{ hold}(Alice, x), \exists y \text{ coffee}(y), \text{ contain}(x, y), \text{ good}(y)\}) \]

(13) Alice: The coffee is good.

(14) Bob: Sure.

If the it’s already in the common ground that the coffee is good, then Alice’s utterance won’t be informative for Bob. He has already believed that the coffee is good.

**Informativity of an Utterance** An utterance of \( S \), where \( [S] (CG) = A \), is informative for a recipient relative to the common ground \( CG \) iff \( A \notin CG \)
Other Dialogs

(15) \( CG_1 := Cn(\exists x \cup(x) \land hold(Alice, x)) \)

(16) Alice: The coffee is good.

(17) Bob: What? What coffee?

(18) Bob: That's not coffee, that's cacao!

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- In the example, it was assumed that a presupposition is in the common ground. This concept was introduced by Stalnaker (1974) and is called pragmatic presupposition.
Pragmatic Presupposition for Simple Assertive Utterances

The utterance of a sentence $S_1$ pragmatically presupposes a sentence $S_2$ relative to a common ground $CG$ iff a successful application of $\llbracket S_1 \rrbracket (CG)$ requires that $\llbracket S_2 \rrbracket (CG) \in CG$. 
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- Recall that there is no 1 to 1 mapping between syntax and semantics, so in real live $\llbracket . \rrbracket (.)$ might better return a set of readings instead of an ‘appropriate’ one.
- But if Bob is completely unable to find a unique meaning, Alice’s speech act has been infelicitous. (Note that the real Bob has a lot of information at hand, e.g. prosody, intonation, world knowledge, etc.)
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- There can be several ways how an agent might retract certain beliefs in order to add a new one that otherwise would contradict existing beliefs.
- There is no general solution to the problem of finding a belief revision function that revises a belief set in the light of some new fact.
Problems

As laid out on a previous slide, pragmatic presuppositions are requirements that need to be in the common ground in order to be able to successfully interpret a given utterance. There are problems with this view:

1. The role of **presupposition triggers** is practically ignored.
2. **Presupposition projection** is not accounted for.
3. **Cancellation** is not accounted for.

In brief, the definition of pragmatic presupposition given so far only works for simple, assertive statements not involving connectives like »and«, »or«, and »if . . . then« or a presupposition-cancelling negation. Recall, in the following sentences the determiner »the« is a trigger for an existence presupposition, but the presuppositions are cancelled.

(20) The king of France is not bald; there is no king of France.
(21) If there is a king of France, then he [≈the king of France] is bald.
(22) There is no king of France or the king of France is bald.
Compositional Projection