Introduction to the Philosophy of Language

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A Dialog

Let's take a look at a conversation between two discourse participants Alice and Bob. (The conversation is a bit short, but nevermind.)

1. Alice: The coffee is good.

Alice's utterance can be taken as a constative speech act—an assertion or better supposition by uttering a sentence in the indicative mode. Bob's reply indicates a kind of agreement, although not a very enthusiastic one. Alice could have expressed her utterance in a different way:

3. Alice: Mmmh, good coffee.

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

1. **Alice:** The coffee is good.
2. **Bob:** Yeah.

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.
- 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 believe so afterwards.
- Condition: Alice is honest, diquotation principle applies.

What does this mean for the common ground?
- The common ground is updated by the meaning of Alice's utterance in the given situation.

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**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?

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**Update**

**Illustration**

Informally:
- Alice holds a cup. The cup is filled with coffee.

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

Less informally:
- Alice: The coffee is good.

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

Note: dynamic binding across sentence level!
Belief Sets

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 $(A_1 \land \cdots \land A_n) \to \bot$.

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

Implicative Closure

$Cn(\Gamma)$ is the implicational closure of a set $\Gamma$ of formulas, iff for all $X \subseteq \Gamma$: for all $A_1, \ldots, A_n \in X$: if $\Gamma \vdash (A_1 \land \cdots \land A_n) \to B$, then $B \in Cn(\Gamma)$.

So all implications of any conjunct of formulas in $\Gamma$ are contained in $Cn(\Gamma)$, which of course includes all formulas in $\Gamma$ as well, since $\Gamma \vdash \Gamma$.

(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 $K_A^+ (K \text{ expanded by formula } A)$ 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.

Update as Belief Set Expansion

Let as 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 parentheses are needed, and conjunction is implicit.

Update

$CG[A] := CG_A^+$

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

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

(8) Assertion Alice: The coffee is good.

(9) Analysis [The coffee is good] $(CG_1) = \text{good}(y)$

(10) Affirmation Bob: Yeah.

(11) Update $CG_2 := CG_1[\text{good}(y)]$

Informativity

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

(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) \( CG_1 := Cn(\exists x \text{ cup}(x) \land \text{ hold}(Alice, x)) \)

(16) Alice: The coffee is good.

(17) Bob: What? What coffee?

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

(19) Bob: Yeah.

- The first case arises when Bob didn’t believe anything about the coffee in the cup (in the given situation). It looks like a classical case of presupposition failure. Alice’s speech act was infelicitous.
- In the second case, Bob has believed that the cup contains cacao. He disagrees with Alice by explicitly protesting against the presupposition, which is called presupposition protest.
- In the third case, Bob might have believed that the cup contains cacao, or he just didn’t waste a thought about the cup. Anyway, he’s silently accepting the presupposition. Lewis (1979) has introduced the term accommodation for this case.
- 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.

Notes on Belief Revision

- When Bob silently accepts a presupposition, he accommodates his background beliefs.
- He ‘adds’ the presupposition to his background beliefs, hence to the common ground.
- However, the presupposition might be incompatible with his previous beliefs. (It might contradict with other beliefs.)
- Then, Bob has to revise his beliefs, before the presupposition can enter the common ground.
- Belief revision is non-monotonic: If a belief is added that contradicts with other beliefs in a belief set, then not all of the old beliefs may be kept.
- 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.

Pragmatic Presupposition for Simple Assertive Utterances

The utterance of a sentence \( S_1 \) pragmatically presupposes a sentence \( S_2 \) relative to a common ground \( CG \) if a successful application of \( [S_1] (CG) \) requires that \( [S_2] (CG) \in CG \).

- Successful application could just mean that \( [S_1] (CG) \) is defined, undefined otherwise. (a partial function)
- I don’t know of anyone using the present approach, so please don’t assume others do it the same way. (I’m just making an example, not presenting a full theory.)
- You could avoid \( [\_] () \) by taking about propositions, but that wouldn’t make things clearer.
- The nature of \( [\_] () \) is of course a big, big problem of linguistic research. The problem lies in the combination of syntax, semantics, and pragmatics.
- Recall that there is no 1 to 1 mapping between syntax and semantics, so in real live \( [\_] () \) 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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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-canceling 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 [is the king of France] is bald.
(22) There is no king of France or the king of France is bald.
Compositional Projection

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Introduction to Formal Pragmatics - p. 17/17