Pragmatics of Explanation

November 2, 2016

Let X, Y, Z stand for sets of sets of sentences.

1 The Game

We start with a language, $\mathcal{L}_e$, conceived as a set consisting of an incoherence constant ($\bot$), atomic sentences, and sentences formed with a connective for non-factive, complete, immediate explanation ($\twoheadrightarrow$). We have already defined material ($\mid\!\sim$), modally robust ($\mid\!\sim^{\Uparrow W}$), and sturdy consequence relations ($\mid\!\sim^{\Uparrow}$) over this language. JMDoes this need to be extended to include $\neg$ and $\wedge$? **Let's see how much we can get away with by pushing connectives into the set-theoretic meta-language.**

The fundamental thing that speakers do with the sentences of $\mathcal{L}_e$ is undertake commitments. These commitments come in three flavors: Assertional, Practical, and Erotetic. JMGive a brief rundown of these. Do we need aprokritic? Do we need to expand $\mathcal{L}_e$ to include a ? operator on sets? What about a ! operator for practical commitments? In addition to these types of commitment, there are five key concepts that constitute our pragmatic framework: *game board*, *commitment position*, *entitlement space*, *commitment context* and *context space*.

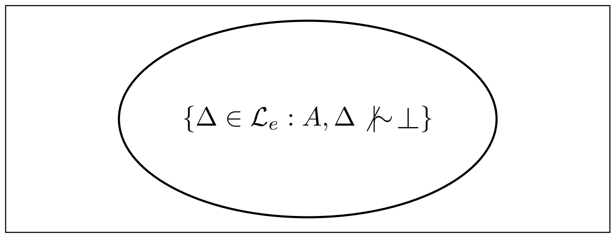
A speaker's total set of commitments at any time is her *commitment position*, or simply, her *position*. The set of all possible positions that any speaker can occupy is the *conversational game board.* We can quite naturally identify the game board with the power set of $\mathcal{L}_e$, i.e. $\mathcal{P}(\mathcal{L}_e)$. Notice that doing so entails that some of the positions that speakers can occupy are incoherent, since $\mathcal{P}(\mathcal{L}_e)$ includes incoherent sets. This is not as undesirable a consequence as may initially appear; speakers do, after all, find themselves having made incompatible claims.[1] Of course, speakers are not *entitled* to occupy such positions. This brings us to our third key concept.

When a speaker asserts a sentence she makes a certain sort of move in the game. If she asserts A, then she undertakes a commitment that, *inter alia*, prohibits her from asserting those sentences that are incompatible with A. In this sense, asserting A has the effect of circumscribing the range of future commitments that a speaker is permitted to undertake—i.e. there are positions that she is no longer permitted to occupy. Only those sets of sentences with which A is compatible are considered 'live options'. (Of course, a speaker may very well retract an assertion and thereby make available those previously impermissible commitments). In this sense, we can think of an assertional commitment to A as carving out a portion of the game board consisting of those positions that are now *accessible* to the speaker. Since it is within this part of the game board that a speaker's *entitled* commitments are to be found, we call it a speaker's *entitlement space*. It is

[1] The inclusion of incoherent sets is just one of the many reasons why we should not identify commitment positions with possible worlds. According to what Lewis calls *linguistic ersatzism* possible worlds identified with maximally consistent sets of sentences. As elements of $\mathcal{P}(\mathcal{L}_e)$, commitment positions are neither necessarily maximal nor necessarily coherent.

important to remember that a speaker's entitlement space not contain only those sets of possible commitments to which she *is* entitled. Rather, this space represents all those sets of commitments to which she *may* be entitled. Since every assertion a speaker makes alters her entitlement space, and since her total set of commitments is her commitment position, we can say that a speaker's commitment position determines her entitlement space.

We can represent the concepts *game board*, *commitment position*, and *entitlement space* graphically in the following manner. In the picture below, the rectangle represents the game board and the oval represents the entitlement space for a speaker whose commitment position consists of a single assertional commitment to A.



The last two concepts in our pragmatic framework are those of *commitment context* and *context space*. The former is simply the set of commitments shared by all conversational participants. The latter is simply the set of positions that all participants in the conversation—all 'players'—take to be accessible. While the commitment context is the intersection of the commitment positions of the participants, the context space is the intersection of their entitlement spaces. Just as entitlement spaces are determined by commitment positions, the context space is determined by commitment context. The graphical representations of commitment context and context space will simply be specified versions of those for commitment position and entitlement space.

2 Queries

While asserting a sentence serves to exclude portions of the game board, asking a question or *querying partitions* the space of possible commitments. A partition of a set Z is a set of non-empty subsets of Z such that the union of those subsets equals Z and no two of these subsets overlap. Here is the formal definition of a partition:

Definition 2.1.
X is partition of Z *iff* $\forall \Delta \in X : \Delta \neq \emptyset$ and $\bigcup_{\Delta \in X} = Z$ and $\forall \Delta \forall \Theta \in X : \Delta \cap \Theta \neq \emptyset \Rightarrow \Delta = \Theta$.

To query is to divide up the game board into mutually exclusive entitlement spaces—i.e. sets of sets of sentences— and to solicit others' help in trying to determine in which of those spaces the speaker's entitlements actually lie. In other words, the goal of a query is to determine where one's entitlements lie, which portion of the game board contains those sentences to which a speaker might be entitled.

To illustrate the effect that queries have on commitment space, we introduce an operator, ?, that takes sets of sentences as arguments. The partition of commitment space induced by the formula $?\{A\}$ is represented in the following picture: (To reduce clutter, we heretofore omit reference to $\mathcal{L}_e$ and $\mathcal{P}(\mathcal{L}_e)$.)

$\{\Delta : A, \Delta \not\mid\!\sim \bot\}$	$\{\Delta : A, \Delta \mid\!\sim \bot\}$

Likewise, the following picture represents the partition of commitment space induced by the question $?\{A, B\}$:

$\{\Delta : A, \Delta \not\mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \not\mid\!\sim \bot\}$	$\{\Delta : A, \Delta \mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \not\mid\!\sim \bot\}$
$\{\Delta : A, \Delta \not\mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \mid\!\sim \bot\}$	$\{\Delta : A, \Delta \mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \mid\!\sim \bot\}$

[JM]Here is the same question asked in a commitment context Γ

$\{\Delta : A, \Delta \not\mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \not\mid\!\sim \bot\}$	$\{\Delta : A, \Delta \mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \not\mid\!\sim \bot\}$
$\{\Delta : A, \Delta \not\mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \mid\!\sim \bot\}$	$\{\Delta : A, \Delta \mid\!\sim \bot\} \bigcap \{\Delta : B, \Delta \mid\!\sim \bot\}$

$\{\Delta : \Gamma, \Delta \not\mid\!\sim \bot\}$

[JM]Here is what a why-question, *Why B?*, i.e. $?\{\Sigma \twoheadrightarrow B, \Theta \twoheadrightarrow B\}$ does to the game board:

$\{\Delta : \Sigma \twoheadrightarrow B, \Delta \not\mid\!\sim \bot\} \bigcap \{\Delta : \Theta \twoheadrightarrow B, \Delta \not\mid\!\sim \bot\}$	$\{\Delta : \Sigma \twoheadrightarrow B, \Delta \mid\!\sim \bot\} \bigcap \{\Delta : \Theta \twoheadrightarrow B, \Delta \not\mid\!\sim \bot\}$
$\{\Delta : \Sigma \twoheadrightarrow B, \Delta \not\mid\!\sim \bot\} \bigcap \{\Delta : \Theta \twoheadrightarrow B, \Delta \mid\!\sim \bot\}$	$\{\Delta : \Sigma \twoheadrightarrow B, \Delta \mid\!\sim \bot\} \bigcap \{\Delta : \Theta \twoheadrightarrow B, \Delta \mid\!\sim \bot\}$

[JM]Can't these sets be reduced to sets of modally robust inferences or even sturdy inferences? Fuck Yeah!!!!

- $\{\Delta : \Sigma \twoheadrightarrow B, \Delta \not\mid\!\sim \bot\} = W$ where $\Sigma \mid\!\sim^{\Uparrow W} B$. All those sets compatible with the assertion of $\Sigma \twoheadrightarrow B$ are just those sets that do not defeat $\Sigma \mid\!\sim B$!!!!
- Likewise: $\{\Delta : \Sigma \twoheadrightarrow B, \Delta \mid\!\sim \bot\} = \overline{W}$ where $\Sigma \mid\!\sim^{\Uparrow W} B$.
- So is this the same as the picture directly above? (note: $\Theta \mid\!\sim^{\Uparrow W'} B$)

$W \cap W'$	$\overline{W} \cap W'$
$W \cap \overline{W'}$	$\overline{W} \cap \overline{W'}$

3 Desiderata for a Pragmatics of Explanation:

- Account for the difference between logically possible answers to a why-question and the contextually possible answers to a why-question.
- Treat the propriety of contextually possible answers as a function of the cognitive and conative states/attitudes (or their deontic scorekeeping analogs) of conversational participants.
- If the alternatives that comprise the semantic content of why-questions are complete explanations, then the pragmatics needs to provide a notion of a *partial answer to a why-Question* as well as the rules that govern which partial answers are the 'right ones' given the context (see next point).
- Define the relationship between complete/partial explanations and complete/partial answers to why-questions.
- Identify the contextual parameters that determine what makes an explanation (i.e.possible [partial] answer to a why-question) the 'best'.
- Make our picture of explanatory practices more descriptively adequate.
- Less urgent:
  - Account for the impermissibility of disjunctive explanations.
  - Account for distinction between A and Gamma??

4 Initial Thoughts:

- HYPOTHESIS: Sturdy inferences ($\Gamma, \Sigma \mathrel{|\!\!\sim^{\Updownarrow}} B$) are made explicit by claims of non-factive, complete, immediate explanation ($\Gamma, \Sigma \twoheadrightarrow B$).
  - *Non-factive:* A sturdy inference entails neither the explanans nor the explanadum.
  - *Complete:* Nothing need be added to Σ in the context of Γ in order to explain B.
  - *Immediate:* It is not the case that Σ explains B in Γ by explaining some C which then explains B.
- The set of alternatives which constitutes or in part constitutes the semantic content of why-questions, e.g. *Why B?* are NOT the premises of sturdy inferences (i.e. Σ), but are the inferences, or the explicit inferential commitments themselves (i.e. $\Gamma, \Sigma \twoheadrightarrow B$) with the same conclusion.

  *** **Are the alternatives (1) sturdy inferences (i.e. $\Gamma, \Sigma \mathrel{|\!\!\sim^{\Updownarrow}} B$; $\Gamma\Theta \mathrel{|\!\!\sim^{\Updownarrow}} B$; etc.) or (2) merely modally robust inferences (i.e. $\Gamma, \Sigma \mathrel{|\!\!\sim^{\Uparrow W}} B$; $\Gamma, \Theta \mathrel{|\!\!\sim^{\Uparrow W'}} B$; etc.)?**
  - ∗ Option (1) would be in keeping with the standard semantics for questions, but (2) would align with our SC2...
  - ∗ Let's go with option (1) and see how far we can run with it.

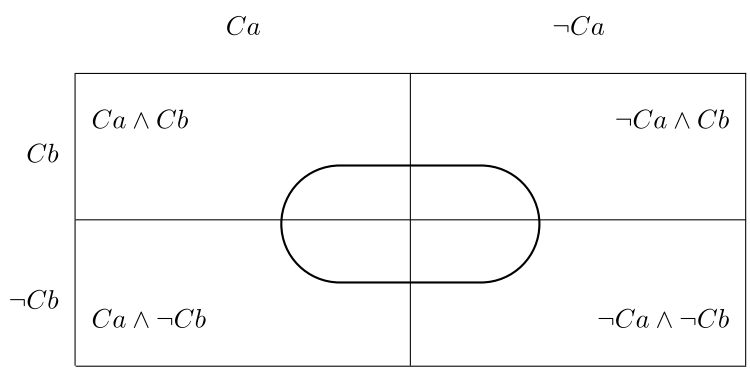
5 Intro to Partition Semantics and Pragmatics of Answers

In their dissertation, Groenendijk and Stokhof, provide a partition semantics for questions and a pragmatics for answers. The basic idea is that the semantic content of questions is a partition on logical space that divides the latter into mutually exclusive, exhaustive possibilities. For instance, the question "Who's in Chicago" ($?xCx$) asked in universe of discourse consisting of only two individuals, *a* and *b*, would divide logical space as follows:

	Ca	$\neg Ca$
Cb	$Ca \wedge Cb$	$\neg Ca \wedge Cb$
$\neg Cb$	$Ca \wedge \neg Cb$	$\neg Ca \wedge \neg Cb$

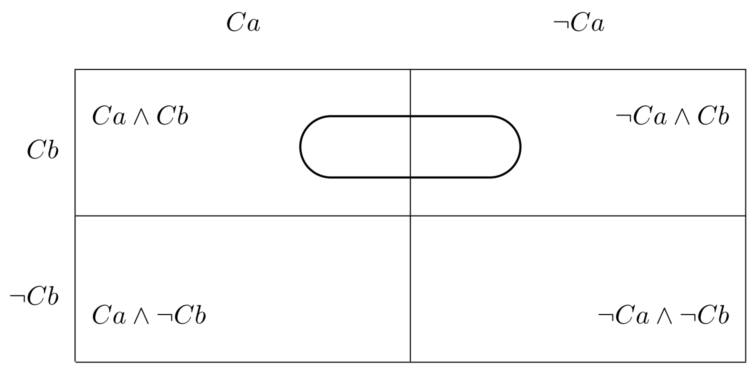
A complete answer to a question is a piece of information that identifies one cell as actual, while a partial answer is any piece of information that permits us to eliminate at least one cell.

G & S's pragmatics aims to represent the role that context plays in circumscribing the set of possible answers. If the context is a set of propositions, then the pragmatically relevant possible answers as those that partition the portion of logical space carved out by the context. Consider the following picture, the same as the one for $?xCx$, but now with an additional oval which represents the current state of information, i.e. the context:



The oval represents the idea that participants assume that actual world lies inside of it, and that all possibilities outside the oval have been dismissed as being non-actual. (Of course, it may be that they have been dismissed mistakenly.) The above picture indicates that, while the semantic question cuts up logical space into four big blocks, it is the division of the oval into four parts that is pragmatically relevant.

Of course, context can also exclude certain logically possible answers, i.e. exclude cells of the partition of logical space. The next picture represents a context that excludes certain alternatives.



In this scenario, only two of the logically possible answers are permissible in the context.

6 Applying Partition Semantics to Why-questions:

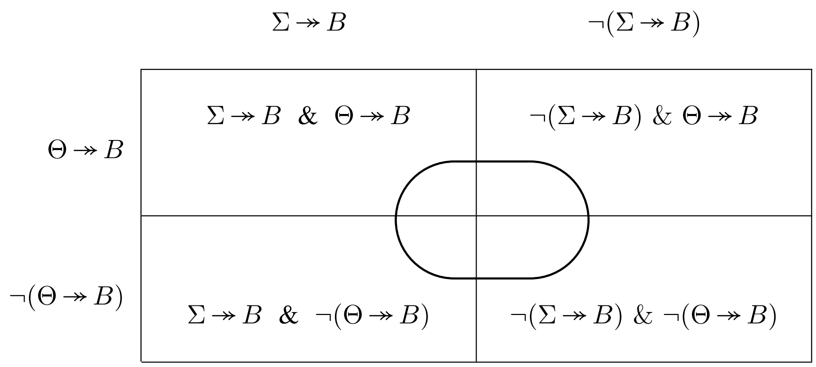
The first step in articulating a partition semantics for why-questions is to determine how why-questions partition logical space. Our guiding insight is that why-questions divide logical space into possible complete explanations. However, while we have been representing complete explanations as sturdy inferences relativized to contexts (i.e. Γ), we should omit these contexts in our formalization of the partition induced by why-questions since the semantics already has a mechanism for representing contexts. Thus, the set of alternative associated with the question *Why B?* is $\{\Sigma \twoheadrightarrow B\ ,\ \Theta \twoheadrightarrow B\}$ rather than $\{\Gamma, \Sigma \twoheadrightarrow B\ ;\ \Gamma, \Theta \twoheadrightarrow B\}$. Following the partition semantics approach, the semantic content of this question is the partition induced by this set, i.e. the set of mutually-exclusive, exhaustive possibilities:

$$\{\Sigma \twoheadrightarrow B \ \&\ \Theta \twoheadrightarrow B,\ \Sigma \twoheadrightarrow B \ \&\ \neg(\Theta \twoheadrightarrow B),\ \neg(\Sigma \twoheadrightarrow B)\ \&\ \Theta \twoheadrightarrow B,\ \neg(\Sigma \twoheadrightarrow B)\ \&\ \neg(\Theta \twoheadrightarrow B)\}$$

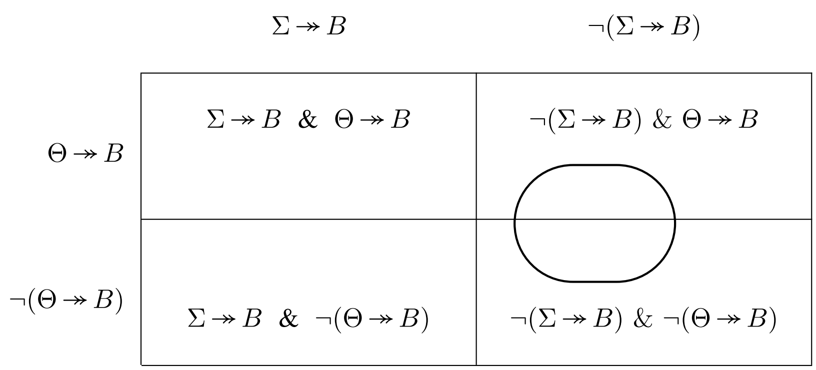
The partition looks like this:

	$\Sigma \twoheadrightarrow B$	$\neg(\Sigma \twoheadrightarrow B)$
$\Theta \twoheadrightarrow B$	$\Sigma \twoheadrightarrow B\ \&\ \Theta \twoheadrightarrow B$	$\neg(\Sigma \twoheadrightarrow B)\ \&\ \Theta \twoheadrightarrow B$
$\neg(\Theta \twoheadrightarrow B)$	$\Sigma \twoheadrightarrow B\ \&\ \neg(\Theta \twoheadrightarrow B)$	$\neg(\Sigma \twoheadrightarrow B)\ \&\ \neg(\Theta \twoheadrightarrow B)$

Now here is the same question, *Why B?* asked in context Γ. Here, the oval represents the set of commitments Γ.



Just as in the case of *Who*-question, why-questions can be asked in contexts in which some logically possible answers are not contextually permissible. In the case of why-questions, this means that certain possible complete explanations are excluded from consideration.



In this situation, the context, Σ is not a permissible answer to the question *Why B?*, and hence is not a competitor for the status of complete explanation of B.

7 Pragmatics of Answers and Explanation

Recall that in partition semantics for questions, a partial answer is any piece of information that permits us to eliminate at least one cell. So, any of the following would be a partial answer to the question "Why B?" asked in Γ: e.g. $\Sigma \twoheadrightarrow B$, $\neg(\Theta \twoheadrightarrow B)$, $\neg(\Sigma \twoheadrightarrow B)$, $\Theta \twoheadrightarrow B$.

But in most conversational contexts, we answer why questions by giving only a partial explanation. In fact, complete explanations seem to be very rarely called for. Given, the way we have defined *partial answer to a why-question*, we can say that **a partial explanation is a part of a partial answer to a why-question.**

For example, to the question "Why B?" a normal response would be "Because A" where $A \in \Sigma$. In a context that includes all the cells of the partition above, this response will conversationally entail the partial answer $\Sigma \twoheadrightarrow B$.

Definition: A partial explanation of B is a part of a partial answer to the question "Why B?"

- A big difference between our pragmatics and that of G&S is that we conceive of context as a set of commitments (and entitlements?) that consists of both the doxastic and the practical variety. (Perhaps also erotetic and apokritic).
- We can successfully do so because we are working on the basis of material inferences and there are certainly practical material inferences.

******Gamma weeds out alternative explanations by restricting the sets of suppositions that may be added to the material inferences. This follows from MR3*****

Quantified Material Consequence (QMC):

$$\Gamma, A \mid\!\sim^{\uparrow W} B \Longleftrightarrow_{df} \begin{cases} 1.\ W \subseteq \mathcal{P}(\mathcal{L}) & \text{and} \\ 2.\ \forall \Delta \in W(\Gamma, A, \Delta \mid\!\sim B) & \end{cases}$$

Modally Robust Consequence (MRC):

$$\Gamma, A \mid\!\sim^{\Uparrow W} B \Longleftrightarrow_{df} \begin{cases} 1.\ \Gamma, A \mid\!\sim^{\uparrow W} B & \text{and} \\ 2.\ \forall W'(\Gamma, A \mid\!\sim^{\uparrow W'} B \Longrightarrow W' \subseteq W) & \text{and} \\ 3.\ \forall \Delta(\Gamma, A, \Delta \mid\!\sim^{\uparrow} \bot \Longrightarrow \Delta \notin W) & \end{cases}$$

Sturdy Consequence (SC): [Sets]

$$\Gamma,\ \Sigma \mid\!\sim^{\twoheaduparrow} B \Longrightarrow \begin{cases} 1.\ \Gamma,\ \Sigma \mid\!\sim^{\Uparrow W} B & \text{where } B \notin \Sigma \text{, and} \\ 2.\ \forall \Theta\,(\Gamma, \Theta \mid\!\sim^{\Uparrow W'} B \Longrightarrow W \not\subset W') & \text{where } B \notin \Theta \end{cases}$$