

Correctible inquiry

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Levels of dynamism

Frege claimed that it was folly to ask for the meaning of a word in isolation, instead intoning that it is the thought as a whole that is the proper unit of semantic investigation. The dynamic turn in semantics pointed to linguistic phenomena such as anaphora as evidence that neither can single sentences be fully understood in isolation, thus turning the gaze of semantic theorizing away from individual thoughts and toward the broader linguistic context in which their specific instantiations appear.

The many varieties of dynamic semantic accounts share in common a model of discourses (be they conversations or texts) in which there is exists a theoretical platform upon which the information of the discourse is built in a stepwise manner, each subsequent contribution to the discourse adding another level or wiping away previous construction. This platform goes variously by names such as *discourse representation*, *conversational scoreboard*, *common ground*, and *information state*. The materials of which discourses are built include *possible worlds*, *situations*, *events*, *discourse referents*, and ordered or unordered sets thereof.

These semantic theories are dynamic in that they describe how new contributions to a discourse *respond to* and *modify* what has preceded, and discourse is very much dynamic in this sense. But by and large, they fail to capture another way in discourse is dynamic. Contributions to discourse also *anticipate* what is to follow in the discussion, and this feature of how discourses proceed ought to be brought under the umbrella of semantic theory.

Collaboration and discourse pairs

Discourse is an essentially collaborative process. At a superficial level, successful discourse requires that the participants accurately understand each others' contributions. This requires constant feedback, step retracing, and repair to keep everyone on the same page. But the importance of collaboration goes deeper than

this. Herb Clark and his contributors (@clark1992) have documented a variety of discourse maneuvers in which an individual other than the interlocutor who initiates the contribution provides essential input into its completion. This has led Clark to suggest that discourse contributions involve two distinct phases: the *initiation* and the *completion*. Crucially, in general, responsibility for the two phases of contribution is distributed among the conversational participants.

Clark is primarily concerned with the phonological and syntactic representation of discourse contributions, and with how the collaborative process determines the reference of elements of the contribution. But the same insights extend to the level of semantico-pragmatic representation as well.

A principle way in which the collaborative nature of discourse is realized is in the way that assertions update the discourse context. Following Robert Stalnaker (CITE: STALNAKER-ASSERTION), I understand the principle effect of assertion to be the elimination of uncertainty, which is modeled as the elimination of previously open possibilities from the context set. But Stalnaker also recognizes that there are two stages to the impact of an assertion. The first is an automatic update that takes place implicitly. It involves incorporating information into the common ground that includes things such as the fact that the speaker is speaking, a record of the salient objects that have been introduced to the context, and perhaps other forms of not-at-issue content of the utterance. The second stage of assertion involves the restriction of the context set to incorporate the at-issue content of the utterance. But this second stage does not take place automatically. Instead, the speaker's fellow interlocutors are given the power to either accept or reject this proposal before the context set is updated. (It may be that the proposal is entered into the conversational record in some form for the purpose of anaphoric reference later on.) Thus, it is fitting to think of assertion as involving two distinct phases: an initiation, which involves the proposal of the asserted content by the speaker, and a completion, which involves either the acceptance or rejection of the asserted content by the hearer.

Another way in which the semantic level of discourse representation is collaborative involves questions and answers. Questions can of course be accepted or rejected, but they also *call for* a particular form of response. That is, questions present an *issue*, which carries with it certain *felicity conditions* that acceptable responses must meet, and the question cannot be considered closed until a response meeting those conditions is proffered. We thus have what we can call a *discourse pair*: an initiation, which is the issue proposed in the question, and a completion, which is the answer. The initiation phase presumes the possibility of a completion, and the completion depends upon the issue proposed. And, crucially, the responsibility for the elements of the pair is distributed among the conversational participants. (Interestingly, this means that discourse initiations need not be immediately followed by their completions. A question may not be (fully) resolved until after a number of clarificatory amendments or sub-questions are introduced and resolved.)

Discourse pairs thus exhibit a recognizable pattern. A contribution is an initiation

if it presumes, or *anticipates* a completion, which is accomplished by means of exerting felicity conditions on adequate responses. A contribution is a completion if its content depends on, or *responds to* an initiation from prior discourse.

I think that the deeply collaborative nature of discourse suggests another shift in semantic attention, expanding on the idea of discourse dynamics, and treating discourse pairs as the primary units of semantic evaluation. The novelty to this proposed shift is that semantic evaluation must trespass not only the boundaries between sentences but also the borders of turns taken in the conversational exchange.

Posits and corrections

The protagonist of the discussion to follow is what I've taken to calling a *posit*. Posits are speculative informational profferments. In conversational exchange, an individual contributes a posit when he puts forward for discussion information for which he does not possess conclusive evidence.

Because they propose to add information to the common ground, posits are similar to assertions. But posits, as I understand them, are not subject to the same standards to which appropriate assertion is held.

In fact, posits can really only be understood in combination with their natural discourse pair complement, the *correction*. Since they form a discourse pair, posits anticipate corrections, and a correction is constrained to respond appropriately to a posit.

The plan for the project

The goal of this project is to motivate inclusion of posits within a model of the structure of inquiry. The motivation has 5 parts:

1. A development of a deeply collaborative model of discourse dynamics and an appeal for the inclusion of posits within this model via analogy to widely accepted elements of inquiry.
2. A historical and conceptual motivation for the notion of speculation and correction in inquiry.
3. A development of a formal model of posits and corrections within the update semantics tradition.
4. An application of the new proposal to an extant problem in discourse dynamics.
5. An application of the proposal to provide a novel understanding of a current debate in the philosophy of language.

Collaborative discourse dynamics and types of contribution

Discourse between individuals who share a language can take a wide variety of forms, but academic study has been primarily concerned with the subclass of discourses that fall under the heading of cooperative communicative exchanges of information. These discourses involve two or more individuals engaged in a project of achieving a mutual goal (generally, increased mutual knowledge), using each other's stock of information to increase their own. In this form, discourse implements a jointly undertaken *inquiry*. An inquiry is, in the words of Robert Stalnaker, "the enterprise of forming, testing, and revising beliefs" [-@stalnak1987 p. ix].

While moves in an inquiry (discourse contributions) can be as varied as the language allows, there is a small set of contribution types derivable from the goals of inquiry:

An individual can submit (propose) information to be taken on as mutually accepted. We call this contribution an *assertion*.

The end point of an inquiry depends in part on its starting point, which is the *issue* that is to be resolved by the process of inquiry. An individual can submit a new issue to the inquiry to be taken on as providing a new goal for the inquiry. We call this contribution a *question*.

Discourse is a joint endeavor, and each of these contribution types is associated with an appropriate response from the contributor's interlocutors. A contribution and its response constitute a *discourse pair*. For assertions, the appropriate response is either acceptance or denial of the proposed addition to the common ground. Call this a proposal/acceptance pair. For questions, acceptance and denial are also important, which indicates that the question provides a genuine addition to the common ground. But the question is distinct from an assertion in that it calls out for an answer, and the form of the question constrains the set of appropriate answers. Call this a question/answer pair.

Sometimes added to this list of contribution types is the *command*, which proposes a non-linguistic demand upon a participant in the inquiry. The appropriate response to such a contribution is to make the world such that the demand is met (or to reject the demand itself).

Perhaps unsurprisingly, these contribution types each have an associated linguistic mood. Inquiry is a structured process, in which it is important not only what information is available but also how it is to be put to use in reaching the goal. As an implementation of inquiry, linguistic discourse has conventional means of representing how the information is being put to use by a contribution. But the scope of contribution types is not limited by the set of conventional moods. What is important is that there is a recognizably unique way in which information is put to use to further the goals of the inquiry.

One motivation for introducing a novel contribution type is by classifying certain linguistic particles as carriers of that type. For instance, a natural model of the

semantic value of epistemic modals [@veltman1996, @fintel2010] is that they provide a test of the common ground. If the test is passed the entire common ground passes through unaltered; if the test is failed, the common ground collapses and a repair is required. But if this was all epistemic modals did, their ubiquity in discourse would be mysterious, as their function is reduced to trivial operations on the common ground. One way of explaining the utility of epistemic modals in discourse is in terms of their unique contribution type. This project has been undertaken within the inquisitive semantics tradition, by accounting for the contribution of epistemic modals as a way of highlighting particular possible worlds within an information state [@groenendijk2014].¹ *Attention shifting*, then, is a novel contribution type because it makes use of information in a unique way. And it, too, is associated with an appropriate response. The appropriate response to such a contribution is to direct ones further contributions to this highlighted piece of the total common ground.²

These examples do not provide an exhaustive list of distinct contribution types, nor do I suggest that I can provide identity conditions specific to types of contribution. But these examples to share certain things in common, and their common traits can provide us with criteria for recognizing novel contribution types.

First, each of these types anticipates an appropriate response, and places constraints on the form of the response. Second, each type outlined above operates on information in a different way. The currency of inquiry is information, and its value is tied to the ways in which information can be put to use to advance the inquiry toward its goal. And last, each of the types above is carried by a conventionalized linguistic tool. If a contribution belongs to a specific type, language will have found a way to implement that type.

Criteria for genuine contribution types:

1. A genuine contribution type has a natural discourse pair complement.
2. A genuine contribution type implements a unique operation on information.
3. A genuine contribution type is realized by a conventionalized linguistic tool.

I think that posits constitute a genuine contribution type distinct from the others listed. Posits are similar to assertions in that they seems to provide a proposal of added information, and they are similar to questions in that they seems to present an issue for discussion. They are also similar to suppositions in that they

¹This is, of course, not the only possible explanation of the unique value of epistemic modals. One could attempt to provide epistemic modals with a more nuanced semantic content, or couch their apparent additional contribution in terms of general pragmatic principles.

²Additional contribution types may include *suppositions*, which are carried by the antecedents of conditionals.

seems to be less than fully committal on the part of the speaker.³ But posits are distinct from each of these, and call for a unique treatment. That they earn such status is what I hope to show throughout the course of this project.

Speculation and correction in inquiry: historical perspectives

William James and the will to believe

William James famously drew a distinction between two independent and sometimes conflicting goals for those engaged in the pursuit of knowledge. The first is to acquire true beliefs. The second is to avoid believing falsehoods. One could meet the goal of believing truths simply by believing everything, but doing so sacrifices entirely achieving the second goal. And one could meet the goal of avoiding falsehoods by believing nothing at all, thereby forfeiting the virtue of believing truths. As James saw it, a strategy of inquiry that floats between these extremes is the path we ought to search for.

James admits that the second goal, that of avoiding false belief, seems to carry more sway, especially in the realm of scientific inquiry. Belief is conceptually tied to action, and while acting on false belief is fraught with peril, withholding belief and failing to act due more rarely leads to trouble. But sometimes non-action is itself action, and peril can find those who remain in one place as well as those who run into its path. James' project was to characterize the situations in which inquiry optimization favors the goal of truth acquisition, even at the potential expense of error avoidance. His proposal, famously, was that for situations in which one's belief choice is *live*, *forced*, and *momentous*, the will to believe outstrips the fear of being wrong. Unfortunately, this category leaves out most quotidian inquiries; perhaps some people ponder the existence of God on a daily basis, but most of us are happy just to complete our grocery shopping all in one trip.

Even James, the arch supporter of faith-based belief, has restricted his speculative endeavors too far. Inquiry need not be momentous or forced for a jump to a conclusion to be fruitful. James' model makes inquiry an optimization task between taking on too many falsehoods and leaving out too many truths. And it is a task that is undertaken by fallible individuals in real time. Such agents have limited access to information and limited resources to dedicate to the process of inquiry [Bratman1988]. Frequently, action is required when certainty cannot be obtained. And on many quotidian decision points, the risk of being incorrect

³Assertion is generally associated with a commitment that it generates for the speaker. This commitment involves some evidential relation between the asserter and the information conveyed, though it is controversial just what relation it is. But whatever the relation amounts to, it seems clear that we sometimes offer contributions to discourse that go beyond the evidence we have available. And we do this not just as a means of flouting the rules of discourse, but frequently in order to respect the project of the communicative exchange.

is fairly low. It is *because* not every inquiry is momentous that striving for truth (and risking falsehood) is sometimes to be preferred.

A preference for belief in the face of uncertainty is further supported by the fact that inquiries are packaged with corrective feedback mechanisms. An important such mechanism is the build and test update procedure that inquiry exhibits. Inquiries are cumulatively built in a step by step process. One contributor to the inquiry adds a proposal to the mutual inquiry workspace at which point it can be played around with by all members of the inquiry before being ultimately accepted or rejected.

These corrective mechanisms are an important reason that efficiency often demands that we make speculative additions to the common ground as opposed to waiting until we can obtain certainty that the addition is true (or otherwise appropriate). But the success of this procedure depends highly on a shared understanding of each party's role in the inquiry. An individual can only feel comfortable in proposing a speculative addition to the common ground if they believe that their collaborators will correct their contribution to the best of their ability. And this requires interlocutors to be more than passive recipients of information. They must use openings in the conversation to voice disapproval or uncertainty in addition to registering understanding and acceptance of what has been presented.

Disagreement is the tool by which interlocutors can check each other's flights of fancy. And, I maintain, it is a tool we both know how to wield, and are prepared to let others wield against us. The primary role of joint inquiry is to expedite what would be an extremely tedious task if attempted alone. Even alone, the task can be sped up via judicious application of speculative intellectual leaps, though the risk involved cannot be wholly eliminated. The collaborative facet of joint inquiry provides extra motivation for assuming the risk – the cooperative interlocutor, to the extent she is able, will pull you back from the ledge by voicing her disagreement.

David Lewis [-@Lewis1975b] spoke of language as a convention of truth and trust in a community. His idea was that our shared language is supported by a tacit agreement to speak truthfully, and to trust that others will do so as well. While the Jamesian model accepts the importance of speaking truthfully, it maintains that the convention may sometimes call for speaking rather than remaining silent even when truth cannot be guaranteed. The importance of trust remains paramount, but it is not just the hearers' trust in the speaker to utter truly. It is also the speaker's trust in his hearers to correct him when he doesn't.

J. S. Mill

John Stuart Mill's [-@mill1859] defense of liberty similarly centrally relies on the corrective value of dispute. Even in the face of certainty regarding the answer

to certain questions, dispute plays an important role. To be always ready to dispute opponents' claims keeps one's defense of their own claims fresh.

In successful inquiry, it is not enough that the participants in the inquiry come to accept truths about the world. The process of inquiry, when faithfully undertaken serves to provide its participants with justification for coming to accept the outputs of the inquiry. Having gone through the inquiry is also necessary for the right to believe its outputs.

But this makes one's right to believe dependent upon the interlocutors with whom one interacts. Not only are asserters expected to be able to provide reasons for the propositions they propose, hearers are expected to challenge assertions when their content contradicts either their own expectations, or the shared conversational record.

These commitments of cooperative exchange are realized in certain discourse mechanisms. The hearer has certain tools at her disposal for challenging assertion. Primary among these is flat out denial, but often it is not maximally cooperative to flatly deny an assertion for this response has the effect of derailing the progress of the inquiry, and it is too sweeping in its effect. Utterances involve a great number of parts, any of which may be subject to criticism, but criticizing one part may leave others unscathed. Thus, hearers also have means for correcting utterances without issues a blanket denial.

C. S. Peirce

For C. S. Peirce, scientific inquiry involved 3 distinct components, each of which provides a distinctive justification for the outputs of the process, and each of which is subject to a distinctive form of evaluation. An initial application of the abductive phase generates a set of hypotheses which serve as potential answers to the posed scientific issue. This phase is the least regulated of the components of scientific inquiry. Peirce maintained that there are rules governing proper application of creative abduction, but many philosophers of science have maintained that analysis of this process is limited to the psychology of scientists. A deductive phase generates necessary consequences of the hypotheses generated in the first phase. The rules of deductive logic govern the outputs of this phase. In inductive phase then steps in to test the hypotheses by comparing their deductive commitments to the outputs of empirical testing. And finally, a phase of selective abduction uses the results of the inductive phase to select the best hypothesis for whatever purposes such a selection is needed: further testing, belief updating, or being proclaimed as scientific fact.

If Peirce's suggestion that these components represent general processes of human reasoning, then we would suspect that inquiry generally manifests the same set of steps. As an inquiry in its own right, discourse, too, should exhibit each of these components.

Incorporating posits and corrections within update semantics

In this section, I will outline the basic idea behind update semantics and indicate how posits can be incorporated within this basic structure.

The discourse contribution of contrastive topic

Focus is a linguistic tool whose use serves primarily to *package* information as opposed to providing its own contribution. It distinguishes the elements of the sentence in which it occurs that are new to the discussion from those that have already been introduced, thus showing to the other participants in the discourse how the contribution is intended to fit in with what has preceded. In this sense, focus has a distinctly *backward looking* function. It depends on, and responds to, previous moves in the conversation. So it makes sense that the most common analyses of focus interpretation assign it a *presuppositional* semantic function. Focus adds a *fellicity condition* to the overall import of a sentence; the sentence is interpretable in situ only if material matching the focus semantic value of the sentence can be found in the previously constructed conversation.

The star bit of data that is marshalled in support of this proposal is that of question/answer congruence. Compare the responses to the following question:

- (1) Who ate the last cookie?
- [Caitlin]f ate the last cookie.
 - Caitlin ate the last [cookie]f

While response B is a perfectly natural answer, the placement of focus in C makes it stand out as unacceptable. According to a popular analysis of questions, due to Hamblin, the semantic value of a question is the set of propositions that count as answers to it. So, a (suitably contextually constrained) semantic value for question A might be:

- (2) { *Albert ate the last cookie, Betsy ate the last cookie, Caitlin ate the last cookie, ...* }

And, the proposed analysis of focus renders the following focus semantic values for the given responses:

- (3) { *Albert ate the last cookie, Betsy ate the last cookie, Caitlin ate the last cookie, ...* }
- (4) { *Caitlin ate the last apple, Caitlin ate the last beet, Caitlin ate the last cookie, ...* }

The alternative set generated by the focus in B is the same as the semantic value for question A, and that generated by the focus in C is not. Add in the proposed felicity condition, and you have a great explanation of question/answer congruence.

Analyzing focus interpretation in terms of a pragmatic rule connecting focus semantic values to semantic antecedents in prior discourse is incredibly fruitful. But now consider the following example:

- (5)
- What did people bring to the picnic?
 - The [children]_{cf} brought [unbridled enthusiasm]_f.

This response involves two focused elements. For both elements, it is easy enough to generate the requisite alternative sets, and alternative set generated for the second focused element (marked with a subscripted *f*), is perfectly congruent with the preceding question. But a difficulty arises when we attempt to apply the felicity condition to the element labeled with *cf* (for *contrastive focus*). Its alternative set is distinctly not congruent with the preceding question, so we would expect the entire utterance to be marked as infelicitous.

The problem of contrastive focus

But now consider the following discourse:

- (6)
- Bears are dangerous.
 - [Grizzly]_{cf} bears are dangerous.

The response in the example above exhibits what is often called contrastive focus. While there are some differences in the intonational patterns between the focus mentioned earlier and contrastive focus (cf. Gundel), there is reason to think that much the same mechanism is at work in the interpretational effects of both. But this example poses a challenge for the proposed analysis of focus interpretation. There is no trouble generating an alternative set for the focused element. The issue is that there is no explicit antecedent for the generated set.

Daniel Buring has supplied us with a technique to locate the requisite antecedent. Building on the notion of the question under discussion developed by Cragie Roberts, Buring posits the existence of a discourse tree, which provides structure for the inquiry being undertaken. Each question governing the inquiry is a node in the tree and is associated with an array of subquestions, complete answers to which constitute partial answers to the parent question. The idea is that the subquestions provide a *plan of inquiry* for addressing the parent question. The objective of the inquiry is to answer the top-most question in the tree. The plan for doing so is to answer each of the subquestions in turn.

But how should we apply this proposal to the current case, where contrastive focus is present without any explicit question? We can, of course, appeal again to the ever present implicit question under discussion. All discourses, it would be maintained, whether questions have been explicitly introduced or not, are governed by a plan of inquiry, which is structured by questions, implicit if need be. Then, the explanation of the contrastive topic in (6) would be that the original assertion offers an answer to a parent question, and the correction that follows rejects this answer, replacing it with an answer to a subquestion.

This proposal certainly fits with the structure of the question under discussion representation of the conversational scoreboard. But we may be left a little unsatisfied with the details. First, it seems to be straining the notion of presupposition pretty heavily. Not only is there no direct representation to stand as antecedent to the generated focus semantic value, [AS WAS POINTED OUT EARLIER] contrastive topic is quite resilient to infelicity. Many different potential elements could have been felicitously focused, and it's hard to see how the conversational scoreboard could have all of these options ready to hand. The common response to this sort of worry is to appeal to accommodation. If the scoreboard does not contain the d-tree needed to provide the antecedent for the contrastive focus, then straightaway it comes about. This reliance on accommodation is not without its own set of issues, predominantly stemming from the unconstrained character of accommodation as a theoretical posit.

But what I take to be the central issue with this sort of approach to the problem of contrastive topic in corrections is a conceptual one having to do with the role of corrections in discourse evolution. The question under discussion model of contrastive topic makes the discourse contribution of contrastive topic entirely backward looking. Whatever role the focus plays is just a matter of checking prior discourse for an antecedent to the focus generated alternative set.

Disagreement and the relativism v. contextualism debate

Disagreement has been a bit of a star figure in recent debates in the philosophy of language. Primarily, it has been used as a tool for assessing the adequacy of different proposals for the semantic contribution of certain expressions. Genuine disagreements, as opposed to spurious or merely apparent ones, intuitively require in the linguistic context or the minds of the disputants, the presence of some kind of content toward which the participants have incompatible commitments.

The contestants in battle disagreement are *absolutism*, *contextualism*, and *relativism*, and the standard scorecard has absolutism and relativism coming out on top in virtue of their ability to secure the requisite constant content across uses of the expression. Contextualism, it is charged, assigns contents to the utterances and thoughts of different individuals that have them incurring different, compatible commitments as a result of their utterances or thoughts.

Whatever stance we take on the outcome of this debate, disagreement does

seem to be a valuable tool to have in the linguist's toolkit. Language users have intuitions about the compatibility of sentences used in discourse, and linguistic theories ought to respect those intuitions. But simply marking the presence of incompatible contents in a discourse is a relatively peripheral role for disagreement to play in linguistic theorizing. As they stand, the semantic theories considered above give no insight into disputative discourse itself; they merely accord to a greater or lesser extent with one interesting consequence of such discourse.

The previous discussion has shown that, in at least one way, disagreement plays a significant role in the very structure of communicative exchange; namely, in the posit/correction discourse pair. If the model provided is sound, it provides us with a different avenue for exploring the importance of disagreement as linguistic data. And, I believe, following the data where it leads provides us with a new motivation for incorporating relativism in semantic theory.

References