

Dynamic Pragmatics, or Why We Shouldn't Be Afraid of Embedded Implicatures*

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Abstract This paper examines a particular case of embedded pragmatic effect, here dubbed *local pragmatic enrichment*. I argue that local enrichment is fairly easily accommodated within semantic theories which take content to be structured. Two standard approaches to dynamic semantics, DRT and Heimian CCS, are discussed as candidates. Focusing on cases of local enrichment of disjuncts in clausal disjunctions, I point out that in these cases, local enrichment is driven by *global* felicity requirements, demonstrating that the local/global distinction is not a simple dichotomy.

Keywords: Embedded implicature, pragmatic intrusion, dynamic semantics

1 Introduction

In the last decade or so, there has been a great deal of interest in the mainstream semantics/pragmatics community on the topic of embedded scalar implicature. By “embedded scalar implicature,” we mean scalar effects which contribute content that falls under the scope of a proposition-embedding semantic operator such as a disjunction, conditional, or propositional attitude predicate. This interest in embedded effects was sparked by Gennaro Chierchia’s now well-known paper on the topic (Chierchia 2004), and an alternate proposal due to Fox 2007. These papers have given rise to a lively debate on the issue, with the participants mostly falling into one of two camps: those that argue that there indeed are embedded scalar effects and attribute them to a syntactic/semantic mechanism which is part of compositional

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semantics; and those who offer pragmatic accounts of the relevant effects in terms of standard Gricean pragmatics. What the two camps have in common is the shared assumption that if there are indeed embedded scalar effects, they cannot be accounted for in Gricean terms, for Gricean pragmatics can offer no account of such effects.

While this recent debate has focused on scalar effects, the broader pragmatics literature has been dealing with a wide range of apparent embedded pragmatic effects for decades.¹ Indeed, embedded implicature is raised as a problem for Gricean theory by Cohen 1971, in what is, to my knowledge, the first published critique of Grice's theory of implicature. In this broader pragmatics literature, a range of responses is offered to the problem, almost all adopting a more radical approach to the semantics/pragmatics interface than is advocated in the more recent and narrower discussion of embedded scalar effects alluded to above. But both literatures are in agreement that standard Gricean theory cannot provide an account of embedded pragmatic effects.

My goal in the current paper is threefold. First, I would like to expand the debate taking place in the current semantics/pragmatics literature beyond the scalar cases, by discussing a set of embedded pragmatic effects of a very different nature. Second, I will make a plausibility argument for the idea that embedded clauses *are* accessible as input to Gricean pragmatic reasoning and for modification by such pragmatic reasoning; that is, I will challenge the claim that there is no Gricean account for embedded pragmatic effects. Finally, I will argue that this idea is entirely compatible with the general approach to the construction of meaning advocated within commonly accepted versions of dynamic semantics.

2 The problem of embedded pragmatic effects

Before turning to the promised plausibility argument, it will be just as well to briefly review some cases of embedded pragmatic effects, and to remind ourselves why they are a problem for the conservative Gricean. Let's get warmed up by looking at some familiar examples involving scalars. Consider first example (1) below, originally due to Sauerland 2004:

- (1) Kai ate the broccoli or he ate some of the peas.

We observe that this is most naturally interpreted as “Kai ate the broccoli or he ate **some but not all** of the peas.” Here, we see the typical scalar interpretation induced by *some* having an effect that is local to the non-matrix clause in which *some* occurs. In other words, in interpreting the sentence, the scalar effect induced by *some*

1. For an excellent survey of this literature, see Recanati 2003.

apparently results in an enrichment of the second disjunct, not in an enrichment of the “global” content of the disjunction.²

The point is even clearer where the scalar effect occurs in the antecedent of a conditional. Consider:

- (2) If I give an extension to some of my students, the others will be upset.

Here, the state of affairs being presented in the antecedent is clearly one in which the speaker gives an extension to **some but not all** of her students; if she gave the extension to all her students, there would be no “others” to be upset. So again, the scalar enrichment has its effect locally, within the antecedent of the conditional.³

Examples (3) and (4) illustrate the same point with a different scalar item, *warm*.

- (3) A: Should I bring a sweater?
B: You don’t need to. Either it’ll be warm outside, or we’ll sit inside.
(4) If it’s a warm evening, it’ll be nice to sit outside.

Let’s now turn from these relatively familiar examples to the type of example I will focus on here, involving what I will call *local enrichment*. My favorite example of local enrichment is this one (slightly modified), due to Wilson & Sperber 1993.

- (5) [I’m not going to the party. It won’t turn out well for me.]
Either I’ll get drunk and no-one will talk to me, or no-one will talk to me and I’ll get drunk.

In this example, the conjoined clauses within each disjunct are understood to stand in a consequence relation, so that the disjunction as a whole is interpreted as: “Either I’ll (first) get drunk and (then) as a consequence no-one will talk to me, or (first) no-one will talk to me and (then) as a consequence I’ll get drunk.” As Wilson and Sperber note, it’s really essential in this case to assign an enriched interpretation to the disjuncts themselves, as otherwise the two disjuncts would have identical contents, which would render utterance of the disjunction as a whole redundant, therefore infelicitous. However, it’s also worth noting that parallelism between the

2. Sauerland in fact argues that the relevant implication *is* a global one and hence that (1) does not involve any local scalar effects. Geurts 2010 agrees with Sauerland on this point. In Simons 2010, I give a somewhat more complicated case of a disjunction involving a scalar term which I argue is not amenable to the global-implicature solution these authors propose.

3. There is some debate as to whether scalar effects can be triggered in the antecedent of a conditional, or whether apparent such effects must be explained in other terms. See Simons 2010, Geurts 2010 for discussion, and Howe 2010 for some empirical evidence.

disjuncts is not at all essential for the local enrichment to take place, as shown by this variant on the original example:

- (6) Either I'll get drunk and no-one will talk to me, or I'll get stuck with some thundering bore.

The examples that I will focus on here involve a different kind of local enrichment. Consider first this one:

- (7) A: How will you get to Boston?
B: Either I'll rent a car or I'll fly.

B's reply here is completely unremarkable. But notice that the natural way to understand the first disjunct is as "I'll rent a car **and drive the car that I rent to Boston.**" That is, the first disjunct is enriched.⁴ This enrichment must be disjunct-internal, for certainly utterance of the disjunction does not commit the speaker to the claim that she will drive any car to Boston. Rather, the possibility characterized by the first disjunct is one involving both renting a car and driving it to Boston.

It's also worth noting that an utterance of the clause *I'll rent a car* does not always induce the interpretation "I'll rent a car and drive it." Suppose, for example, that Harry is Margaret's administrative assistant. Margaret, who is in Providence, gets a phone call telling her that she is urgently needed at the office in Boston. Harry, always efficient, says immediately: *I'll rent a car*. Margaret will presumably understand him to mean simply that he will carry out the rental, so that she can use the car to get to Boston. Or suppose that Harry and Margaret need a shiny new car for a photo shoot, and are wondering how to arrange it. In this context, Harry's utterance of *I'll rent a car* will not mean "I'll rent a car and drive it" (anywhere, let alone to Boston).

We can easily generate the same effects in the antecedent of a conditional. Suppose that in the context of a discussion among several people about getting to a conference in Boston, one person says to another:

- (8) If Bill rents a car, he could give you a ride there.

The conditional as a whole makes sense only if the antecedent is interpreted as "Bill rents a car and drives it to Boston/the conference."

Here is our second example.

4. As noted by a member of the audience at SALT, the second disjunct is also arguably enriched, as we understand it as meaning "I'll fly in an airplane."

- (9) [Context: It's Barb's birthday, and she is planning to spend it with her friend Henry.]
A: So what does Henry have planned for tonight?
B: Oh, I'm not sure. Either he'll cook dinner or we'll go out and eat. Then we'll probably go to a movie.

Again, the first disjunct gets an enriched interpretation, conveying "he'll cook dinner for both of us and we'll eat it together," and not merely that Henry will cook dinner for some unspecified beneficiary.

We can easily construct a parallel conditional example. Suppose Barb and Henry are planning their evening together. Barb tells Henry:

- (10) If you cook dinner, I'll bring dessert.

Should she later show up at his house, cheesecake in hand, to discover him wiping his mouth and patting his belly after enjoying his excellent home cooked dinner, she will consider that he did not hold up his end of the agreement. In other words, it is clear in the context that the antecedent expresses not merely that Henry cooks dinner, but that he cooks it and invites Barb to share it.

2.1. Why embedded pragmatic effects are a problem for the conservative Gricean

Embedded pragmatic effects raise two somewhat independent problems for the conservative Gricean. I'll begin by separating them, but then suggest that there is a way to unify the two problems as an issue of *accessibility* of subordinate content.

The first problem, I call *the Calculation Problem*, and it is basically this: on conservative Gricean theory, the contents of embedded clauses are not allowed as input to Gricean reasoning. I borrow from Recanati 2003, citing Anscombe and Ducrot 1983, a very straightforward explanation of why this is so:

- (i) Conversational implicatures are pragmatic consequences of an act of saying something.
- (ii) An act of saying something can be performed only by means of a complete utterance, not by means of an unasserted clause such as a disjunct or the antecedent of a conditional.
- (iii) So, the content of an embedded clause cannot itself be the input to the calculation of a Gricean implicature.

Consider, for example, the conservative Gricean view on example (7)B above. The propositions expressed by the disjuncts are not asserted; in particular, the speaker has not *said* e.g. that she will rent a car. As (on the conservative view) a Gricean calculation must begin from an observation about what the speaker *said* (in Grice's

sense), no implicature based on what is expressed in an individual disjunct can be calculated.

As an aside, let us note here that this Gricean worry reveals an important assumption that I think is almost universally made, namely, that if there *are* embedded pragmatic effects, these effects must be the result of reasoning based (solely?) on the contents of embedded clauses. This assumption ignores the possibility that global reasoning could produce embedded effects. As we'll see in what follows, this is a possibility we should allow for.

Let us turn now to the second theoretical problem raised by embedded implicature. This is really a problem for standard compositional semantics and for the conservative theory of the semantics/pragmatics interface generally. The problem is that compositional semantics is typically construed as a closed system, which doesn't (seem to) provide a mechanism for the intrusion of language-external considerations in the calculation of sentence content.⁵

As noted above, these two problems have a common feature – both are problems about the *accessibility* of embedded content. On standard views, embedded content is not supposed to be accessible either as input to pragmatic inference, or as a target for modification by such inference. In the next section, we'll address this issue directly.

3 Rethinking Accessibility

I find that the standard view just articulated doesn't seem very plausible when I consider my own ability, as a speaker/hearer, to identify and reason about the sub-parts of utterances. For example, it seems to me that when I hear an utterance of a disjunctive sentence, I am quite aware that *this* string of words constitutes one disjunct and *that* string of words constitutes another. I recognize that each disjunct has its own role within the utterance, roughly, the role of presenting some state of affairs as a possible alternative, so that, upon hearing an utterance like (7)B, I can say to myself “Hmm, I'm surprised she's thinking of flying.”

Similarly, when I hear an utterance of a conditional, I know which part is the antecedent and which is the consequent, and I recognize roughly what the different contributions of each part are. And upon hearing a sentence like *John believes that Obama will be re-elected*, I can tell that the string *Obama will be re-elected* is the part of the sentence that presents the content of John's belief. So intuition suggests that the contents of embedded clauses *are* accessible to interpreters independently, to some degree, of the contents of the sentence as a whole.

5. Chierchia's (2004) paper addresses exactly this issue.

Introspection is all very well, but of course we would hope for something a little more concrete to support the view. There is indeed some empirical support for the idea that interpreters can respond to the contents of subordinate clauses independently of the content of the sentence as a whole. First, consider the following discourse:

- (11) [A and B discussing the prospects of a couple they both know.]
A: Either they're gonna get divorced or they're gonna have another baby.
B: You're wrong, they're either gonna get divorced or they're gonna kill each other.

This is an example of what Grice (1981: 64) calls *substitutive disagreement*. The idea is that speaker B is not exactly denying what speaker A said, but rather disagreeing with the inclusion of a particular disjunct. Perhaps more to the point, speaker B might have responded with any of the utterances below:

- (12) ... No, they're never going to have another baby.
(13) ... Yes, they really might just wind up getting divorced.
(14) ... You really think they might have another baby?

With these responses, B agrees or disagrees with the inclusion of a particular disjunct, or questions the content of a particular disjunct, rather than responding to the content of the disjunction as a whole. In order to do this, the speaker must be able to reason about (the content of) each individual disjunct.⁶

Similar observations can be made about possible responses to conditionals. Consider:

- (15) A: If Jane comes later, we can fill her in.
B: She won't be coming.

B's utterance is a response to the possibility raised by the (utterance of) the antecedent, rather than being a response to the conditional as a whole.⁷

6. Note that this can also be done with non-clausal disjuncts, as in Grice's original example:

(14) A: Either Wilson or Heath will be the next Prime minister.
B: I disagree, it will be either Wilson or Thorpe.

7. One might say that (the utterance of) the conditional as a whole gives rise to the implication that the speaker believes it is possible that Jane will come, and that B is responding to this globally generated implication. But practically speaking, all it takes to generate the implication is the recognition that this clause has been uttered as the antecedent of *some* conditional; the discourse would be completely plausible if B interrupted A mid-sentence. Our *theory* of the implication might involve reference to

I've also demonstrated elsewhere (Simons 2007) that clauses under embedding verbs can be the target of pragmatic reasoning, and sometimes constitute the main point content of the utterance. As a small illustration, consider any of the sentences in (16) uttered in response to the question in (15). The utterances in (17) or (18) would be natural in response to any of these; and these responses require the recognition that the content of the subordinate clause is being offered as a possibly true answer to the question.

- (15) Where did Jane go last week?
- (16) a. Henry believes she spent the week with Frances.
 b. Henry thinks she spent the week with Frances.
 c. Henry said she spent the week with Frances.
 d. Henry hinted she spent the week with Frances.
- (17) But she can't have, I had lunch with Frances on Wednesday.
- (18) Why would she want to spend the week with Frances?

All these examples indicate that speakers can respond to, argue about, and question the content of embedded clauses independently of the overall (asserted) content of the sentence in which they occur.⁸ So, why not reason about these contents (in a generally Gricean manner) or modify contents to serve pragmatic ends?

3.1 Independent contributions of subordinate clauses: the dynamic perspective

So far, I've described some intuitions and provided some discourse-related evidence suggesting that interpreters can reason about what is conveyed by subordinate clauses uttered as part of a complex sentence. I would now like to suggest that this idea is entirely compatible with some standard dynamic approaches to semantics.

It is a cornerstone of dynamic semantics that each clause in a complex sentence makes its own independent contribution to the update of a context. Just to bring this point home, let's look at some CCPs that have been proposed in the literature, for disjunction, for conditionals, and for *believe*.

(19) CCPs for disjunction

the conditional as a whole; but in *practice*, the implication is recognized as soon as the antecedent is produced.

8. Ginzburg & Cooper 2004 argue that the phenomenon of Clarification Ellipsis (CE), illustrated in (i) similarly requires a theory which allows for sub-utterance accessibility, to allow that "any semantically meaningful sub-utterance can be clarified using CE" (306).

(i) A: Did Bo finagle a raise? B: Bo?

1. $c+[A \text{ or } B] = [c+A] \cup [c+B]$ (Simons 1998)
2. $c+[A \text{ or } B] = [c+A] \cup [c+\neg A]+B$ (“translation” of Roberts 1989, Kamp and Reyle 1993)
3. $c+[A \text{ or } B] = c + \neg[\neg A \ \& \ \neg B]$
 $= c - (c-(c+A) + c-(c+B))$ (Beaver 2001 and elsewhere)

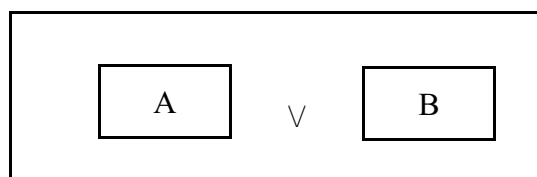
(20) CCP for (material) conditional
 $c+[If A \text{ then } B] = c - ((c + A) - (c+A+B))$ (Heim 1983)

(21) CCP for *believe*
 $c + \alpha \text{ believes } \varphi = \{w \in c: \text{Dox}_\alpha(w) + \varphi = \text{Dox}_\alpha(w)\}$ (Heim 1992)

The three proposals for a dynamic treatment of disjunction shown in (19) are of course all different, but all have this in common: at some point in the calculation of the context update for an *or* sentence, each disjunct plays an independent role. That is, there is a step in the update procedure which involves updating a (sub)-context just with the content of one disjunct. Similarly for the CCP in (20): in calculating the overall context update induced by the conditional (under the material conditional analysis), the antecedent and the consequent each play an independent role. And as shown by the CCP in (21), calculating an update for a sentence with an attitude verb involves a step in which the content of the subordinate clause plays an independent role.

This independence of subordinate clauses is even clearer in DRT, where interpretation is carried out via the construction of a DRS. Typically, subordinate clauses trigger the construction of a subordinate DRS. (22) illustrates one proposal for a DRS for a disjunctive sentence *A or B* (Kamp & Reyle 1993, Simons 1998).

(22)



Once we adopt a theory in which an interpreter is assumed to construct a model as in (22), it seems straightforward to assume that the interpreter can engage in pragmatic reasoning about the contents of sub-parts of the structure. In fact, the idea that pragmatic principles apply in the process of DRS construction goes back to van der Sandt 1992, who proposes that sub-DRS’s are subject to two particular constraints: the requirement to be non-redundant (i.e. not entailed by the superordinate structure) and the requirement to be consistent (i.e. the negation of the sub-DRS must not be entailed by the superordinate structure). Beaver & Zeevat 2004

observe that these principles can be seen as a way of partially cashing out Grice's maxim "Be Brief." This analysis suggests that sometimes the best way to satisfy a global constraint is by satisfying a constraint locally. This will turn out to be an important idea in the analysis of our target examples.

3.2 Back to the compositionality problem

We noted earlier that allowing for local pragmatic effects seems problematic from the perspective of standard views on the semantics/pragmatics interface. But in response to this worry, let's note that dynamic semantic systems *standardly* allow for rampant non-compositionality via the mechanism of local accommodation. Let's illustrate this with a familiar example. Consider example (23):

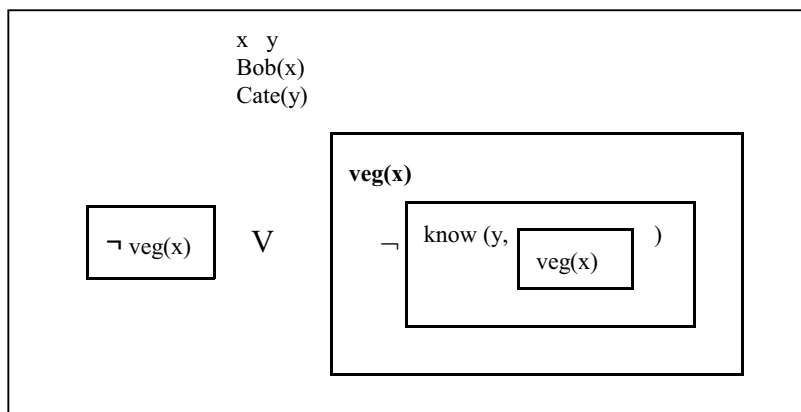
(23) Either Bob isn't a vegetarian, or Cate doesn't know that he is.

In a Heim-style framework, this case would typically be treated as follows: We assume that *know* requires the content of its complement to be entailed by the local context. However, the content of the first disjunct is incompatible with the content of the complement of *know*, so the global context must not entail this content, nor can it be accommodated globally. Hence, update proceeds as follows:

(24) $c+[A \text{ or } B] = (c+A) \cup (c+[\text{Bob is a vegetarian}] + B)$

While we usually talk about this in terms of adding the presupposition to the local context before updating with B, one could just as well characterize it as involving enrichment of the content of the second disjunct, an enrichment required in order to render the disjunct felicitous in its context. That local accommodation corresponds to local enrichment is more obvious when we consider the DRT treatment, illustrated in (25). In this DRS, the material in bold, **veg(x)** is the accommodated content.

(25)



Local accommodation is possible in both DRT and in Heimian Context Change Semantics because both theories allow for the manipulation of the contexts of subordinate clauses. So these seem like just the theories we need in order to develop a general theory of embedded pragmatic effects.

To summarize so far, let's compare the position I am advocating with the standard Gricean view of communication. Cast in contemporary terms, the standard view is this: when a speaker makes an assertion, she intends to bring about some update to the conversational context. The conventional content of her utterance is a guide to, but not fully determinative of, the update she intends to bring about. Interpreters reason on the basis of general principles as to what that intended update is.

The dynamic pragmatic view that I propose is a modest extension of these ideas. On this view, we observe that the production of a complex sentence made up of subordinate clauses constitutes an instruction to carry out a structured update to the conversational context (or DRS), made up of several sub-updates. However, the conventional content of a subordinate clause is only a guide to the sub-update intended by the speaker. Interpreters reason on the basis of general principles as to what the intended sub-update is.

The open question now is what sort of general reasoning might lead to a pragmatic modification of a sub-update. In the next section, I take as a case study the instances of local enrichment of disjuncts introduced in section 2, and offer an account of these enrichments, assuming a dynamic semantic framework.

4 Local Enrichment from a Dynamic Perspective

First, a reminder of the two central examples, repeated from above:

- (26) A: How will you get to Boston?
B: Either I'll rent a car or I'll fly.
 >> *Either I'll rent a car and drive that car to Boston or I'll fly.*
- (27) [Context: It's Barb's birthday, and she is planning to spend it with her friend Henry]
A: So what does Henry have planned for tonight?
B: Oh, I'm not sure. Either he'll cook dinner or we'll go out and eat.
 >> *Either he'll cook dinner for both of us and we will eat it together or we'll go out and eat.*

Of course, the enriched interpretations observed for the disjuncts could just as well occur with utterances of the same clauses unembedded, as in (28)-(29).

- (28) Abe: How will you get to Boston?
 Bob: I'll rent a car.
- (29) [Ann to Barb, both knowing that Barb plans to spend the evening with her friend Henry.]
 A: What does Henry have planned for tonight?
 B: He's going to cook dinner, then we'll go to a movie.

So as a first step in accounting for the disjunct-internal enrichment, we should try to provide an account for enrichment in the unembedded case.

What I am calling local enrichment is licensed in neo-Gricean frameworks by Horn's (1984) R-Principle, or by the very similar I-Principle proposed by Atlas & Levinson 1981 and reiterated by Levinson 2000.

- (30) R-principle: Say no more than you must (given Q)
 I-principle: Say as little as necessary, that is, produce the minimal linguistic information sufficient to achieve your communicational ends (bearing Q in mind) (Levinson 2000)

These speaker-oriented principles license a particular sort of inference on the part of the interpreter, inferences which enrich or expand on what the speaker has actually expressed with the linguistic form used.

Now let's consider how we might explain the actual enrichments observed in our two cases, beginning with example (28). First, Abe will assume that whatever Bob says in response to his question is intended as an answer to the question, by basic considerations of Relevance. Abe will further recognize that renting a car is not, in and of itself, a way to get to Boston (or anywhere else). So, taking only literal meaning into account, Bob has responded to Abe's question by describing an action which *isn't* a way of getting to Boston (much as if he had said "I'll brush my teeth in the morning."). Abe might then reason as follows: Bob must assume that the information he has given me is adequate for me to figure out how he intends to get to Boston. As he has told me that he will rent a car, I assume that he intends to get to Boston by a strategy that crucially includes renting a car: presumably, renting a car and driving it to Boston.

This reasoning of course relies heavily on world knowledge about modes of travel and car renting, which can be assumed to be shared by the interlocutors.

What about the second case? Again, we'll rely a good deal on background knowledge. First, Ann knows that Barb expects to spend the evening with Henry in a way that will be enjoyable for her. Second, we'll assume that when Barb answers Ann's question, she gives no indication that she's unhappy with Henry's plans for her. Finally, we'll assume that Ann does not think that Barb would not have much fun just watching Henry cook dinner for himself or for someone else. Consequently,

she'll assume that Henry's plans for Barb don't consist only of him cooking dinner. But, as before, she must assume that Barb believes that she (Ann) can figure out the plan on the basis of the information which Barb has given her. Ann can assume that Henry's cooking of dinner is an essential part of the relevant plan and so, given the available contextual assumptions, can reasonably conclude that Henry will cook dinner for both himself and Ann, and that they will eat it together.

4.1 The disjunction examples through the DRT lens

The account of the disjunction examples will rely on a crucial fact about disjunctive answers:

- (31) *Fact*: A disjunction S_1 or S_2 or...or S_n constitutes a possible answer to a question Q only if all of S_1 ... S_n constitute possible answers to Q . (Simons 1998)

Here, I will work with the idea that a question corresponds to a partition on W (or, more reasonably, on some subset of W consistent with the presuppositions of the question and other contextual assumptions). Each cell of the partition corresponds to a possibly true answer to Q . A sentence S counts as an answer to Q , relative to context c , only if the truth of S , relative to c , rules out one of those possible answers as the true answer to Q . (In other words, for some cell σ of Q , the truth of S guarantees that the actual world is not a member of σ .) Given this picture, it turns out that a clausal disjunction can only count as an answer to a question if each disjunct counts as an answer to that question.⁹

In what follows, I'll be using DRT to formulate the account of the disjunct-internal enrichments in my examples. To do this fully explicitly, I need to recast the fact in (31) in DRT terms. However, this would require rather a significant digression, so what I will do instead in the discussion below is rely on an informal understanding of how the fact gets cashed out in DRT.

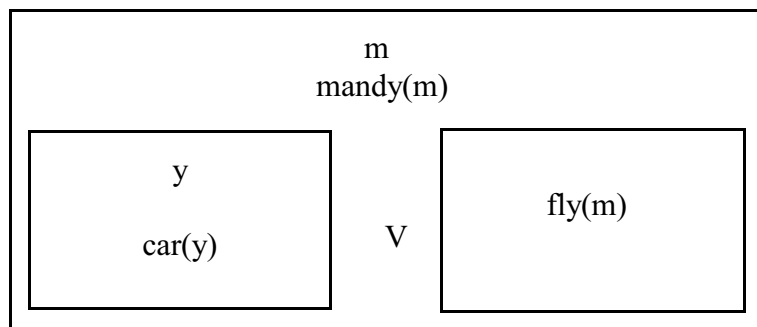
For our current purposes, then, all we need is the following: We'll assume a framework in which a DRS is embedded in a richer structure which keeps track not only of the current discourse but also of the question currently under discussion. We can then evaluate whether a particular update to a DRS successfully answers the current question. Then the fact in (31), cast in DRT terms, comes down to this:

9. This is because, if one of the disjuncts fails to be an answer to the question, then the union of the disjuncts also fails to be an answer. See Simons 1998 for a full explanation. Also, note that the constraint can easily be formulated for sentences containing phrasal disjunctions unembedded under any operator, e.g. *Anne or Bob sang*.

Update of a DRS with a disjunction *A or B* will constitute a possible answer to *Q* only if update with *A* and update with *B* would do so.¹⁰

With this background, let's work through the examples, beginning with (26). Below, I give a basic DRS such as we would expect to be generated by the standard construction rules for the disjunction in that example (ignoring proper treatment of the indexical). Recall that we have a record of some sort that this DRS is supposed to answer the question "How will you (Mandy) get to Boston?"

(32)



The story in DRT is now no different from the informal story told above: the proposition that Mandy will rent a car does not, in and of itself, answer the question "How will Mandy get to Boston?" and hence the disjunction (DRS update) as a whole fails to do so. But let us assume that the interpreter, who is constructing the DRS, assumes that the speaker intends to answer the question, i.e. intends that her utterance will allow the interpreter to update her DRS in such a way that the update will provide an answer. The interpreter must therefore consider two possibilities: either she is supposed to be assuming a context which includes information which renders the update an answer; or else (32) is *not* the update which the speaker intends to bring about by her utterance. Our intuitions tell us that in fact, the normal interpretation of the utterance in this context involves local enrichment, that is, a modification of the update. So let's consider how this modification comes about.

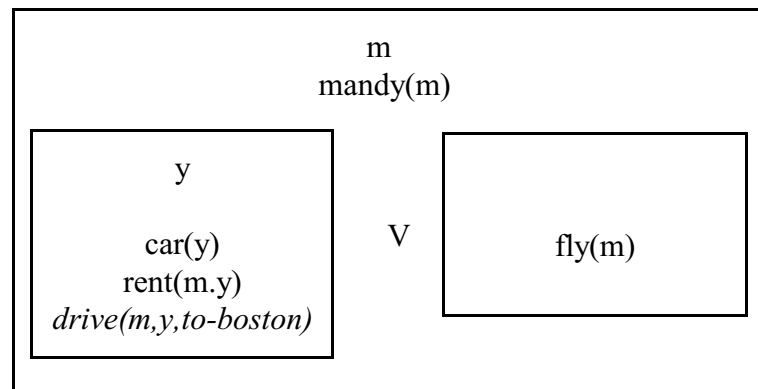
As we see from (32), the DRS update triggered by utterance of a disjunction consists of the construction of two substructures. These substructures are the most natural target for modification. A minor fix to the content of one or both of the substructures would be a less radical move than, say, ignoring the disjunctive form of the utterance and updating with a distinct structure. And clearly the substructures,

10. Fact (31) can be cashed out in this way only under the assumption that there can be no anaphoric relations between the disjuncts. In Simons 1998, I explicitly argue against this assumption. However, as it is standard to take disjuncts to be anaphorically inaccessible from one another, I help myself to the assumption for current purposes.

once created, have contents about which the interpreter can reason and which can be modified in accordance with this reasoning.

The details of how the local modification is actually determined will be speculative. I will assume that interpreters know, at least implicitly, that Relevance of the disjunction as a whole requires independent Relevance of each disjunct. Having recognized that the disjunction as a whole fails to be Relevant, the interpreter might then check on each disjunct. At this point, the same reasoning that we invoked above will apply: the interpreter recognizes that renting a car is not a way to get to Boston, but infers from this the more extensive (possible) plan which crucially involves renting a car. She'll then enrich the first disjunct to produce the DRS in (33). The material in italics represents the enrichment.

(33)



This explicit representation of the enrichment brings out a further argument in favor of seeing this pragmatic modification as truly local: the implicit content in the first disjunct (at least as represented here) is *bound* by the explicit content of the disjunct.¹¹ This material could not be introduced into the main DRS, because then the discourse referent y occurring in the new condition would fail to be bound. In the DRT literature, such binding is standardly used to provide evidence as to where a particular piece of content must be inserted in the DRS. (Cf. Geurts & Maier 2003, Geurts 2010 on issues of anaphoric binding between explicit and implicit content.)

This is not to say that there is no possible strategy for generating the observed interpretation of the utterance using global reasoning from the disjunction. Suppose the interpreter's knowledge includes a default rule something like the following (where x ranges over people, l ranges over locations, and c ranges over vehicles):

11. You might want to get around this point by simply denying that this is the content of the enrichment; perhaps what the interpreter infers is merely that, in the car renting scenario, the speaker will drive to Boston. But I'd be willing to bet that any interpreter, if asked, "Which car will Mandy drive to Boston, if she drives?" will answer "The car that she rents."

- (34) $\forall x, l, c [(x \text{ intends to go to } l, x \text{ rents } c \text{ as part of plan to go to } l) \rightarrow x \text{ drives } c \text{ to } l]$

The context in which our target utterance is produced contains the information that Mandy intends to go to Boston. Given rule (34) (or some properly formalized version thereof), Mandy's disjunctive utterance entails that either Mandy will rent a car and drive it to Boston, or Mandy will fly.¹² So, the point is not that the interpretation *cannot* be generated globally. Rather, the point is that the resources made available to us by DRT allow for a plausible account in which the interpretation is generated by manipulation of a sub-DRS, the representation of an embedded clause. That is, DRT allows for embedded pragmatic effects.

I think that the plausibility argument carries over to a Heim-style context change system (although there are complications which I will return to in the concluding remarks). Suppose that we adopt the simplest possible CCP for disjunctive sentences, repeated from above:

- (35) $c+[A \text{ or } B] = [c+A] \cup [c+B]$

As before, we assume that the interpreter recognizes that an update reflecting only literal content fails to provide an answer to the question, and so concludes that this is not the update intended by the speaker. The assumption of incremental update suggests that pragmatic "intervention" should take place at the level of the individual sub-updates. On the Heimian view, updating the context with the disjunction as a whole just *is* a matter of carrying out the specified sub-updates and combining the results. Therefore, if the initial update with the disjunction as a whole is infelicitous, the only thing to do is to modify the sub-updates. As before, if we assume that interpreters are aware of the requirement for each disjunct to constitute a possible answer to the question, we can make use of the same reasoning to generate the necessary modification of the sub-update.

The strategy I am proposing is one which allows for embedded pragmatic effects in the sense that some process of pragmatic inference results in modification of content which falls under a semantic operator. But the pragmatic reasoning which results in this modification is not itself purely local. In the disjunction cases discussed, the motivation for the observed enrichments is the need for the disjunction as a whole to be relevant to a current question. On the account I've offered, the threat of *global* infelicity leads to a modification of *local* content, because this is the most straightforward way to address the global problem.

12. The idea for this strategy developed out of a comment by Mats Rooth in response to my talk at SALT.

In my presentation of the pragmatic reasoning, I've suggested that interpreters first generate a literal interpretation for the target utterances, identify a global infelicity, and then backtrack. This may well not be how interpretation proceeds in practice. It seems plausible (at least in the cases discussed here) that disjuncts are enriched as they are encountered.¹³ But knowing what sort of enrichment is needed requires knowing what role the target clause plays in the utterance as a whole, and what role that utterance plays in the ongoing discourse. To put the point simply: a disjunct in a clausal disjunction is subject to pragmatic requirements distinct from those to which the antecedent of a conditional is subject, which may in turn be distinct from those to which a clause embedded under an attitude verb is subject. In particular, while a disjunct is always required to constitute an answer to the current question, the other types of embeddings will only sometimes be subject to that requirement. So in order for an interpreter to reason effectively about the speaker's intentions with respect to the content of a particular embedded clause, she must first know what role that clause is to play.

Hence, the reasoning which drives this kind of pragmatic enrichment is never fully local, in the sense of involving no reference to the larger context in which the target clause occurs. It may be that this reasoning is always ultimately driven by the goal of rendering total utterance content felicitous in its context. This makes pragmatic enrichment of this sort different in kind from coercion phenomena, at least some of which are plausibly fully local. For example, if an interpreter encounters the string *the bat bit the child*, the choice of the "flying mammal" interpretation for *bat* will be forced regardless of the grammatical or discourse role of the clause.¹⁴

These observations suggest, then, that care must be taken in describing pragmatic effects as local or global. In particular, it should not be assumed that local *effects* involve purely local *generation*.

4.3 On "What is said" vs. "What is meant"

One thing which has made some theorists – particularly philosophers – concerned about the notion of embedded pragmatic effects is that this notion seems to lead us to a completely unconstrained notion of what is said. Indeed, one might worry that we lose altogether the Gricean distinction between what is said and what is meant. However, it is not clear that this is so. As illustration, let's consider an elaboration of our scenario from above involving Barb's birthday plans with Henry. The relevant discourse is repeated in (36):

13. This is certainly a testable claim.

14. Unless, of course, we are in a discourse environment in which we are allowing baseball bats to have teeth.

(36) [Context: It's Barb's birthday, and she is planning to spend it with her friend Henry]

A: So what does Henry have planned for tonight?

B: Oh, I'm not sure. Either he'll cook dinner or we'll go out and eat. Then we'll probably go to a movie.

Now, suppose that when the evening comes, Barb turns up at Henry's house to find that he has just finished eating the nice dinner that he cooked for himself, and is now all ready to go out to a movie. Barb subsequently reports this to her friend Ann (of the original conversation), who remarks:

(37) Well, you were right. He did cook dinner. And then you went to a movie!

At first blush, this might seem to undermine my claims that the interpretation of Barb's disjunctive utterance in (36) involves enrichment of the first disjunct. For under that interpretation of the disjunction, Barb was *not* right about Henry's plans.

But I would counter that what this shows is only that the enriched content I have posited is not necessarily part of what is said. More concretely, it shows that interpreters can distinguish between conventionally encoded content and intended-but-not-encoded content, even where the latter is embedded. To account for the felicity of this follow-up, we need only allow that Ann is capable of "undoing" the pragmatic enrichment she carried out earlier, and treating the original utterance as if intended literally.

If this understanding of these data is correct, it means that we can indeed allow for embedded pragmatic effects, and still distinguish between what is said and what is meant — just not in the traditional Gricean manner. In particular, what is meant cannot be represented as a simple conjunction between what is said and some additional proposition, for the formulation of what is meant involves modification of what is literally conveyed by sub-parts of the utterance.

5 Concluding remarks

I began the paper by offering some intuitive motivation, based on simple observations about possible discourse moves, for a theory of interpretation which allows for interpreters to engage in pragmatic reasoning about the content of embedded clauses.¹⁵ I moved from there to a theoretical observation: that in some

15. Although I can't claim any familiarity with the relevant literature, my general impression is that this is consistent with findings in psycholinguistics that hearers build interpretations online and incrementally, on the basis of what they've heard so far, and that these "forward-looking" interpretations take into account pragmatic factors. While it doesn't follow from this that interpreters

dynamic semantic frameworks, it is entirely natural to assume that the contents of embedded clauses are accessible for reasoning to some extent independently of the content of the sentence as a whole. Moreover, within these frameworks – most specifically in DRT, but also in Heimian Context Change Semantics – certain *global* pragmatic failures are most straightforwardly addressed by reasoning which results in modification of a substructure (in a DRS) or sub-update (in CCS).

We should now consider what it is about these theoretical frameworks which renders the idea of local pragmatic inference so natural. The relevant property is not their dynamic nature per se. Nothing in any of the arguments given or in the proposed analyses relies on any specifically dynamic feature of the theories in question. What is relevant is that the theories discussed both treat content as structured, although in different ways.

The ideas suggested here are particularly natural within DRT, because the theory posits the construction of highly structured semantic representations. Moreover, these structures are taken to be indispensable elements within the interpretation process (and are taken at least by Kamp himself to be, in some sense, cognitively real (Kamp 1990)). Because, in DRT, subordinate clauses are represented by identifiable substructures, it is straightforward to suggest that their semantic content is accessible for pragmatic modification. In contrast, when we assume a theory where interpretation involves a direct mapping from a syntactic structure to a proposition construed as a set of possible worlds, we are led to the (standard Gricean) conclusion that the contents of embedded clauses are not accessible for pragmatic reasoning.

Because it is the structured nature of semantic representation in DRT which is relevant to my purposes, and not the dynamic system itself, similar analyses could be given in static frameworks assuming a structured notion of meaning. In particular, the idea that pragmatic inference could serve to modify sub-structures could be put into effect in a theory of structured propositions such as that advocated by King 2007.

How the idea of subordinate-clause accessibility plays out in Context Change Semantics is a little less clear. On the one hand, as I've suggested in the paper so far, CCS seems compatible with the accessibility claim, because of the way subordinate clauses are treated in incremental update procedures. When a context is updated with a complex sentence, update consists of a sequence of sub-updates. Consequently, if the interpreter determines that the (global) update intended by the speaker is not identical to the update conventionally determined by the sentence uttered, the best strategy available for modification of the global update might well be modification of some sub-update.

On the other hand, my understanding of CCS is that it is proposed and advocated as a purely formal semantic theory, with no commitment to approximating

can engage in pragmatic reasoning about embedded clauses, I think it does follow that the conservative Gricean model – semantics first, then pragmatics – is not a psychologically plausible one.

psychological reality. Indeed, the treatments of semantically complex constructions such as quantification or propositional attitudes are clearly not intended in this way. But the claim made here about the accessibility of embedded clauses for pragmatic inference is both a theoretical and a psychological one. I think then that I can only claim compatibility with a semantic theory to the extent that that theory is taken to have some psychological reality. This observation raises difficult questions about the relation between semantic theory, pragmatic theory, and theories of processing, which I cannot pursue further here.

On a different topic, it should be noted that in the paper, I have engaged in a certain sleight of hand, by implicitly redefining the Calculation Problem. Before ending, I should come clean on this point.

Here again is the Calculation Problem, as I originally presented it: implicatures are a pragmatic consequence of saying something in a particular context; the contents of embedded clauses are not said; therefore these contents cannot be the input to a Gricean implicature calculation. In the ensuing discussion, I switched from a consideration of this problem to the more general problem of accessibility of contents of embedded clauses. While I hope to have made a reasonable argument both that these contents are accessible, and that allowing for accessibility does not necessarily require a complete revision of semantic theory, I have not said anything to justify the idea that the contents of embedded clauses are subject to Gricean principles and can be the input to Gricean reasoning.

First and foremost, I should emphasize that in the analyses I have suggested for the disjunction cases, the disjuncts are *not* taken to be directly subject to Gricean principles. Modification of the contents of the disjuncts is driven by the need for the disjunction as a whole to be relevant (i.e. to provide an answer to the question under discussion), which in turn requires each disjunct to have this property.

I think the situation is similar with the conditional cases, although my suggestions here should be taken as tentative. Consider again this example, repeated from above:

- (38) [In the context of a conversation in which speaker and addressee are planning how to spend an evening together]
If you cook dinner, I'll bring dessert.

In the context given, the speaker of (38) commits to bringing dessert only if the addressee cooks dinner for both of them, that is, the antecedent is pragmatically enriched. I would propose that this enrichment is driven by the need to make sense of the conditional *as a whole* in its context of utterance. ("Making sense" might be seen as some broad extension of being relevant; it has to do with good fit not only with the topic of conversation but with all the rest of the interpreter's beliefs.) Given all the relevant social conventions, the speaker's offer to bring dessert makes sense given the enriched interpretation of the antecedent, but not necessarily given the

unenriched interpretation. More generally, in the context, any relevant suggestion involving the addressee making dinner is most likely to be one involving the addressee making dinner for both people to share. So it's plausible that the enrichment takes place before the consequent is even heard.

So, returning to the question of why (structural) accessibility presents a solution to the Calculation Problem, the answer given so far is that the Calculation Problem isn't really a problem at all for the cases I have considered. In fact, those who have argued against the possibility of embedded pragmatic effects on the basis of the Calculation Problem have been guilty of a mistaken assumption, namely, the assumption that local effects must involve local application of Gricean principles.

However, while the cases under consideration did not require the application of Gricean principles at the embedded level, I think the view presented does in fact give us a way to make plausible the idea that they could.

First, let's just note that the Calculation Problem, as presented, represents a *very* conservative view of implicature, ruling out the possibility of implicatures generated by questions or imperatives. Yet I think that we would generally consider that utterances of whole sentences which perform these speech acts are subject to Gricean constraints — that they should, in some sense of these terms that applies to such acts, be relevant to the current conversation, contain as much information as necessary but no more, and be formulated appropriately.¹⁶ So I think that there is already a fairly clear consensus that Gricean principles apply to non-assertoric utterances, although we may not have well worked out formulations of the relevant principles for these cases. (However, see Roberts 1996/8 for a formulation of Relevance for questions.)

Now, it is clear that a speaker who utters an embedded clause does not thereby assert anything. However, I think it can be claimed that this speaker does perform *some* act, an act whose function can be identified by the interpreter. Recall the intuitions I reported at the beginning of section 3, that as hearers, we can both identify the sub-parts of a complex utterance (accessibility), and can also recognize their function within the larger utterance. We recognize a disjunct as “doing something” different from a conjunct, or from the antecedent of a conditional. We recognize a clause embedded under *believe* as the characterization of the subject's belief state. And so on.

Hence, I think it is plausible to say that speakers use embedded clauses to carry out specific discourse functions; we might think of these as sub-acts within the overall speech act being performed. Interpreters recognize the discourse functions of

16. Consider, for example, Searle's (1975) application of the notion of speaker cooperativity in his account of the indirect speech act force of an utterance of *Can you pass the salt?* Searle suggests here that a general condition on utterances is that they have “some aim or point,” and that the asking of a question generally has a point only if the speaker is interested in the answer.

particular embedded clauses, and can thus reason about why the speaker used the particular linguistic means that she did to carry out that function, and about exactly what intention the speaker had with respect to the content of the sub-act she has performed. This reasoning will be driven by standard Gricean assumptions about speakers: that they intend to be cooperative, to speak relevantly, to be reasonably efficient, etc. In some cases, the interpreter's judgment of the pragmatic success of a sub-act may rely on judgments about how successful the global speech act is; these are the cases we've considered here. But there may be other cases where an interpreter can draw out pragmatic consequences from the performance of the sub-act itself. If such cases occur, these would involve truly local implicature.

But (I hear you asking), what are these sub-acts? How should we characterize the act performed by the utterance of a disjunct, or of the antecedent of a conditional, or of the complement of an embedding verb? Well, one way to characterize the acts is in terms of the context/DRS update which utterance of the clause induces. That is, the act performed by utterance of a disjunct is the act of instructing the addressee to carry out a disjunct-update to the context/DRS. The act performed by uttering the antecedent of a conditional is the act of instructing the interpreter to carry out an antecedent-update to the context/DRS. And so on, for each type of subordinate clause. We can then make sense of the idea of "the intended content of the sub-act" as the intended content of the relevant sub-update to be performed.

So (you now ask), is it the case that utterance of each and every word has an identifiable discourse function? After all, just about every word (or at least phrase) makes a particular contribution to context/DRS update. Indefinite NPs, for example, introduce a new discourse referent and predicate a property of it. Verbal predicates (in standard versions of DRT) introduce an event variable which may then be entered in a number of different DRS conditions.

In reply, I would observe first that the logic of the proposal does not commit me to this view. I have suggested that where sub-parts of utterances have identifiable functions, these functions can be characterized in terms of the update induced by that sentence sub-part. This claim does not entail that all sub-parts of utterances which have update effects have identifiable functions.

But in fact it may well be that each update step *is* subject to on-line pragmatic revision; in fact this is probably the most plausible model for actual interpretation. This is in line with the proposal in Poesio & Traum 1997. In this proposal, each *locutionary* act results in update of the common ground, represented in their system by a DRS. These updates are, in their terminology, "radically underspecified." Following such an update, "the task of the listener is to complete this initial interpretation by inferring the initiator's intentions, i.e., how this micro-conversational event combines with other MCEs to generate [a complete speech act]." Similarly, Geurts 2010: 176-177 suggests that some embedded scalar effects

arise due to pragmatic inference on the contents of DRS conditions pertaining to discourse referents.

This approach involves a radical intertwining of semantic composition and pragmatic inference, and thinking about such maneuvers again raises questions about the relations between theories of semantics, pragmatics and processing. The more limited step I have taken above is to suggest that, once we recognize that subordinate clauses have identifiable functions, we can also allow that interpreters can ask why a cooperative speaker would choose to carry out that function in just the way she did; and this leads to the calculation of truly local implicatures.

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