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Presupposition, Conventional Implicature, and Beyond:
A unified account of projection

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Abstract: We define a notion of *projective meaning* which encompasses both classical presuppositions and phenomena which are usually regarded as non-presuppositional but which also display projection behavior—Horn's assertorically inert entailments, conventional implicatures (both Grice's and Potts') and some conversational implicatures. We argue that the central feature of all projective meanings is that they are not-at-issue, defined as a relation to the question under discussion. Other properties differentiate various sub-classes of projective meanings, one of them the class of presuppositions according to Stalnaker. This principled taxonomy predicts differences in behavior unexpected on other models among the various conventional triggers and conversational implicatures, while holding promise for a general, explanatory account of projection which applies to all the types of meanings considered.

1. Projective meanings as a domain of study

The observation that presuppositions project is a venerable one: in the modern era, it goes back to Frege's (1892) observation that the implication that the name *Kepler* has a referent arises equally from the assertion that Kepler died in misery and from the assertion of its negation, and similarly for descriptions such as "whoever discovered the elliptical form of the planetary orbits". In the current literature, projection is understood rather differently—in more syntactic terms—than it is in Frege's brief remarks.[1] The phenomenon as standardly understood can be characterized as follows:

>A proposition p which is part of the meaning of a constituent φ **projects** over an operator O which takes φ within its syntactic scope iff p is interpreted as not within the semantic scope of O.

Projection is now recognized as a complex phenomenon, difficult even to describe accurately without theoretical machinery, involving interactions between presupposition, assertion and implicature, and in complex cases requiring careful diagnostics to identify what is projecting and where. But the basic phenomenon of *global* projection (Heim 1983) has nonetheless remained ensconced as a central diagnostic for presupposition, typically applied using the "family of sentences" tests (Langendoen and Savin 1971, Karttunen 1973, so-called by Chierchia and McConnell-Ginet 1990):

>**Family of sentences tests**: To test whether some meaning m can project globally, we make the following modifications of a simple sentence S containing a trigger for m. If m is implied by utterances of all of the modified sentences as well as by S, then m globally projects.

[1] Frege's remarks suggest an utterance-relative notion of projection: to say that an element of meaning associated with sentence S projects is to say that this element of meaning is conveyed by utterances of S and also by utterances of sentences in which S is embedded in certain ways. This and the notion that follows are equivalent in some cases, but not all. In particular, the more syntactic notion is only applicable to linguistically encoded content. We do not discuss this issue further here, given space considerations.

In *John has stopped smoking*, *m* = 'John used to smoke'
  a. embed under negation
          John hasn't stopped smoking
  b. embed under interrogation
          Has John stopped smoking?
  c. embed under a modal
          John might stop smoking.
  d. embed in the antecedent of a conditional
          If John has stopped smoking, we don't have to provide ashtrays.

However, it is now broadly recognized that all that projects is not (standard, classical) presupposition. Elements of meaning lacking other standard characteristics of presupposition can also project. Chierchia and McConnell-Ginet observe that the content of non-restrictive relative clauses projects, but hesitate to call this content presuppositional because it does not seem to be subject to any requirement to be old information for the addressee, and Beaver (2001) comes to similar conclusions regarding parentheticals. Levinson (1983), Kadmon (2001), and Simons (2005) have observed that certain kinds of conversational implicature can project (with each author drawing different conclusions from this observation), and Potts (2005) takes robust projection behavior to be a core property of the components of meaning he classes as conventional implicatures (including inferences triggered by parentheticals, expressives, and honorifics).

The observation that projection is a property shared by meaning types not comfortably categorized as presuppositional has significant theoretical consequences. It forces a revision of our understanding of the *source* of projection. As projection has typically been seen as a special behavior of presupposition, all recent accounts have attempted to explain it in terms of properties of or constraints on presupposition. In his early work on presupposition, Stalnaker (1974) suggested that his view that sentence presuppositions are conditions imposed on the (assumed) common ground could provide an account of projection facts. He proposes both a notion of agent presupposition and a related notion of sentence presupposition: To say that an agent A presupposes *p* relative to a group of individuals G is to say that A believes that *p* is common ground for G. The notion of sentence presupposition can then be understood as a requirement of speaker presupposition: to say that sentence S presupposes *p* is to say that felicitous utterance of S (usually) requires the speaker to presuppose *p*. The informal ideas proposed in that work are echoed in Karttunen's independent proposal (Karttunen 1974), and further developed in Heim (1983). It is now more or less standard to assume that projection of presuppositions follows from the requirement that presuppositions must hold in contexts of evaluation, though views vary as regards what the exact requirements on contexts are, and exactly which contexts those requirements must hold in.[2]

The conception of sentence presupposition as a constraint on speaker presuppositions in Stalnaker's sense has been contested even for standard cases of presupposition (see especially Abbott 2000, 2008). For example, definite descriptions and possessive descriptions are often used to introduce discourse-novel entities into the conversation. Factives are often used to introduce new information, and in some cases positing a conventional presupposition that the factive complement is in the common ground would predict unattested semantic anomaly, as in the frame *We regret to inform you that....* This suggests that there is no consistent informative implication associated with the presuppositions triggered by factives like *regret*, or that if there is, it is at least cancelable, and hence perhaps not conventional in the usual

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[2] Heim (1983), following Karttunen (1974), argues that presuppositions must be satisfied in the local context of the trigger, where satisfaction is essentially classical entailment. But for van der Sandt (1992), the requirement is not based on entailment but on identity of content in a DRS, and the presupposition need not hold in the local context, provided it holds in some appropriately placed nearby context (an *accessible* context, in the DRT sense). Yet another, more recent take on how presupposition projection relates to entailment in local context is found in recent work of Schlenker (2008, 2009).

sense. Furthermore, Stalnakerian common ground constraints are not standardly assumed to apply to Grice's conventional implicatures, such as those induced by *but*, *therefore* and so on. And it seems entirely implausible for non-restrictive relatives and other appositives, as in Chierchia and McConnell-Ginet's (1990) example:

(1) a.   Let me tell you about Jill Jenson, a woman I met while flying from Ithaca to New York last week.
    b.   Jill, who lost something on the flight, likes to travel by train.

They remark about this:

> Clearly [(1)a] does not suppose any already existing information about Jill and, more specifically, does not establish that Jill lost something on the flight. In such a context, [(1)b]...seems a perfectly fine thing to say.

This discussion, which concludes that non-restrictive relatives impose no constraints on the common ground relative to which they are interpreted, comes immediately after a demonstration that non-restrictive relatives project. From this it becomes clear that the standard explanation for projection in the case of ordinary presupposition is not available for non-restrictive relatives, because they are not presumed to be subject to local context constraints.

One way to proceed would be to assume that projection has multiple sources or explanations, and look for distinct accounts for different cases. We prefer an alternate approach. It's clear that the class of projective meanings encompasses a diverse collection of phenomena, and that projection is not a property of presuppositions alone. And that means that projection is not, by itself, an adequate test for presupposition. But rather than seeing projection as an imperfect diagnostic of presupposition, we propose taking it as an important property in its own right, one which carves out a large class of phenomena which, despite its heterogeneity, is theoretically unified. The question we ask is: Given that projection does not diagnose presupposition *per se*, what does it diagnose? And here is the answer we propose: Projective behavior is common to all and only those aspects of meaning which are not *at-issue* in the utterance, in a sense to be explicated. Hence, projective meanings form a natural class, despite their apparent heterogeneity, distinguished from other types of meaning by not being at-issue.

After explicating, in Section 2, the intended notion of at-issue content and the hypothesis that projective meaning is not-at-issue content, we will argue that in fact a significant sub-class of projective meanings do involve constraints on the common ground. More generally, what we will try to show, in Section 3, is that the common ground sub-class, as well as other sub-classes of projective meaning, can be distinguished using further diagnostics. We believe that these diagnostics, together with the basic family-of-sentences tests, take us towards a theoretically motivated taxonomy of projective meanings. In Section 4, we will return to at-issueness, discussing why not-at-issue content projects. We conclude the paper, in Section 5, by examining how the proposals we develop might help cast traditional notions of presupposition and accommodation in a new light.

2.   Projective meaning as not-at-issue content

Besides the family of sentences tests for global projection, a number of other tests have been proposed in the literature for determining whether a particular contribution to meaning is presuppositional. Beaver, Roberts, Simons & Tonhauser (2009) is a compendium of the tests we are familiar with. These include tests for merely local projection (over one operator, but still under the scope of another), cancellation and suspendability, and what we call *at-issueness*. The latter pertains to whether the content in question is directly relevant to the conversation at hand, or is somehow "backgrounded" or "not the main point". Tests for at-issueness of some particular content *p* of an utterance include whether one in replying with

denial (or confirmation) can be taken to deny (or affirm) the truth of *p*, and also the more indirect *Hey, wait a minute!* test (Shannon 1976, von Fintel 2004, 2008).

(2)   Have you stopped drinking beer for breakfast?
            m = 'You have been in the habit of drinking beer for breakfast'
        a. **direct denial**: "No" or "Yes"
            effect: Replying *yes* or *no* commits one to *m*, i.e. to having drunk beer for breakfast.
        b. **indirect rejection**: "Hey! Wait a minute!", "What d'ya mean?" etc.
            effect: *m* is rejected.

A standard intuition about presupposition is that presupposed content is "backgrounded," or "not the main point." But this property is also not restricted to presupposition: it applies to many kinds of elements of content. It is true also of conventional implicatures (both in the Gricean sense and in the sense of Potts), and of some conversational implicatures. It is true of content introduced by utterance modifiers and by evidentials. It is true of the prejacent of *only* and of the polar implication of approximatives. In fact, it seems to be true of all the kinds of content which also display projection behavior.

(3)   Jill, who lost something on the flight, likes to travel by train.
        No, that's false
            cannot be taken as a denial of the claim that Jill lost something on the flight
(4)   Gore almost won the election.
            Proximal implication: Gore came close to winning the election.
            Polar implication: Gore didn't win the election
        No, that's not true!
            denies the proximal implication that Gore came close, not the polar—that he didn't win
        Hey, wait a minute! Gore *won*!
(5)   Only Lucy came to the party.
            prejacent implication: Lucy came to the party.
            exclusive implication: No one other than Lucy came to the party.
        That's not true
            denies the exclusive implication—that no one other than Lucy came to the party, not the prejacent—that Lucy came
        Hey, wait a minute!—Lucy didn't come to the party!
        Hey, wait a minute!—#someone other than Lucy came to the party!

Exactly what counts as "backgrounded" will depend on what definition one gives of that rather murky notion. Here we develop the notion in terms of Roberts' (1996) model of information flow in discourse. The model is a simple one, taking information exchange to be the principal goal of discourse. There are two basic types of discourse move: questions (which establish immediate discourse goals) and assertions (which move the discourse towards accomplishment of these goals). All speech acts, or *discourse moves*, including assertions, are subject to a constraint understood as a consequence of Gricean Relevance: they must in some way address whatever question has most recently been accepted as the immediate goal of the discourse. This question Roberts calls the current Question Under Discussion, or QUD. Within this framework, we construct a distinction between what we will call *at-issue* and *not-at-issue* content of an utterance[3]. At-issue content is content which is intended by the speaker to accomplish a conversational move i.e. to address the QUD or to raise another QUD which is relevant to the present one. An utterance

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    [3] Potts 2005 uses this terminology too, but our usage differs from his.

may, however, convey a good deal of additional material, in some cases material which is new and of interest to the addressee. The intuition is that this material, although it may add to the information store of the addressee[4], does not in itself move the conversation forward in its established direction. This content is not-at-issue.

While there may be other linguistically relevant notions of backgrounding, we posit that the at-issue/not-at-issue distinction is the one relevant to, for example, the Stalnakerian distinction between presupposition and assertion, and to distinguishing between ordinary entailments and Potts' CI-entailments (as proposed in Amaral, Roberts and Smith 2007:729-733). Certainly, under this characterization, all of the projective meaning types listed above ordinarily turn out to be not-at-issue.

The at-issue/not-at-issue distinction cuts across another important distinction, between what is conventionally (linguistically) encoded, and what is inferentially derivable as a consequence of an utterance having been produced. Evidently, linguistically encoded content can be either at-issue or not. We see this in sentence (6), which encodes the propositions represented in (7) and in (8). Typically, given an utterance of (6), the content in (7) would be at-issue and that in (8) would not.

(6)   Jane, who likes to be physically active, runs, plays tennis and swims.
(7)   Jane runs, plays tennis and swims.
(8)   Jane likes to be physically active.

Roberts (1996) uses the term *proffered content* for that portion of the conventional content of the utterance which is at-issue in the present sense. But at-issue content may include non-conventional content as well, e.g. conversational implicatures which arise as a result of the utterance in context. Consider the following conversational exchange, based on an example from Kadmon (2001):

(9) A: I have to pay this bill.
        B: The customer accounts office isn't open today.

To see B's response as relevant, speaker A (or we as "overhearers") must infer that there is some connection between paying a bill and the customer accounts office. Given a network of background assumptions, we infer (i) that speaker B is assuming that one can (or must, or typically does) pay such bills at the stated office. It then follows that speaker B intends to convey (ii) that A will not be able to pay her bill (or at least not in the standard way). The second implication, a Relevance implicature, is what is directly at-issue in the utterance: it is what is intended by the speaker to help resolve the implicit question raised by A's utterance. So, (ii) is a case of inferentially derived at-issue content. Implication (i) is elsewhere dubbed a *background implicature* (Simons 2007: see also Thomason 1990, and Sperber and Wilson 1986/1995, who use the term *implicated assumption*): While conveyed by the utterance, it is not at-issue; it is not intended to constitute a conversational move—i.e. B's utterance would not normally be used by a speaker who intended her conversational move to consist in informing the addressee that certain bills can be paid at the customer accounts office. So, in (i) we see a case of inferentially derived not-at-issue content.

Above we observe that it is characteristic of all the meaning types which have the potential to project that they are typically also backgrounded, that is, are not-at-issue in the utterance in which they arise. These observations lead us to the following preliminary hypothesis: **projective meaning just *is* not-at-issue meaning**. The force of the envisioned hypothesis is that the explanation for projection resides in the

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[4] Roberts's model includes a representation of the common ground, which she assumes to be updated by all new information.

not-at-issue status of the information, and that predictions about projection can be made on the basis of the at-issueness of the content.

The crucial distinction between our view and the standard view is that we deny that projective meanings in general, and presuppositions in particular, are *in general* subject to any requirement that they be entailed by the common ground or by the context of evaluation. However, it is consistent with our view that this requirement could in certain cases be present. We will argue below that *anaphoric presuppositions* indeed are subject to this further constraint, but this by virtue of their anaphoric character and not as a consequence of presuppositionality.

There are two principal reasons why our hypothesis requires refinement:

I. Whether or not some component of the meaning of an utterance is at-issue is a function of its role in a speech act. A speech act is a discourse function performed by the use of a linguistic constituent in a particular context of utterance. But the linguistic literature on presupposition projection focuses on presupposition triggers, particular words and syntactic constructions that (generally or always) trigger projective meaning when uttered. So to capture the behavior of projective meaning triggers, we need to explain how the meanings associated with those triggers come to be understood as not-at-issue.

II. Presupposition projection is not always global. Intermediate projection is illustrated in (10):

(10)   If we pretend that we're married, we can get Gillian to think that I didn't invite her to my wedding.

What Gillian is supposed to think is that there was a wedding of the speaker to which she (Gillian) was not invited. That is, the existential presupposition induced by the definite *my wedding* escapes the scope of the negation, but remains under the scope of *think*. So, this element of content projects, but does not project globally. However, our preliminary hypothesis is about speech acts, and hence about global phenomena in discourse. The question now is whether there is some way to modify the hypothesis to extend it to such data.

An extension of the hypothesis which addresses these issues is beyond the scope of the present paper. In what follows, we offer a sketch of how this analysis might proceed, and suggest preliminary accounts of several types of trigger within the framework we propose. Ultimately, we believe that the following hypothesis can be maintained:

General Projection Hypothesis
All and only the not-at-issue content of a constituent projects, given an appropriate context of utterance.

Here, the hypothesis is framed in terms of the potentially *not-at-issue* content of a *constituent*, rather than the actually at-issue content of an utterance. We take it that constituents have conventionally given meaning potentials, along the lines of Heim's Context Change Potentials, which are realized when uttered in a context. The conventional semantic potential of a constituent may include not only its contribution to proffered content—the conventionally given contribution to at-issue meaning—but other entailments or presuppositions as well. And it is the latter that have the potential to project, given an appropriate context of utterance.

The content of an utterance may be a function of several factors, including its lexical content, syntactic structure, and prosody. For example, in the minimal pair in (11), *and* and *but* contribute the same proffered content, conjunction, but *but* has non-at-issue conventional content as well, implicating that the truth of the second conjunct contrasts with expectations one might have on the basis of the truth of the first. The *wh*-cleft construction in (12b) carries the implication that the question of what Maria saw

is under discussion (Prince 1978), but has the same proffered content as (12a). And in (13), the narrow prosodic focus on *ball* might lead the addressee to take the speaker to implicate that the boy had something that was red, though not a ball. By de-accenting the adjective, the speaker implies that the redness of what the boy has is not what's at issue in the denial.

(11) a. John is married and he's happy.
      b. John is married but he's happy.
(12) a. Maria saw a bat.
      b. What Maria saw was a bat.
(13) denial: The boy didn't have a red BALL.

We can see that the relevant components of the meanings of (11b), (12b) or (13) are not at-issue because direct denial in reply would not be taken to pertain to them. Replying *that's not true!* to (11b) has the same force as replying in that way to (11a); it cannot be taken to mean that there's no contradiction between being married and being happy. Similarly for (12b)/(12a)—denial of (12b) isn't a way of denying that what Maria saw is under discussion. And denying (13) could only be taken as insisting that that the boy *does* have a red ball, not as a way of suggesting that maybe whatever he has isn't red.

Abbott (2000) discusses the distinction between what she calls the *main point* and other entailments of an utterance at some length. If we take the main point of an utterance to be what is at-issue in the sense just discussed, then the present paper can be seen as an implementation of this idea. Abbott (2008) discusses a strong hypothesis according to which no cases of presupposition are subject to a common ground constraint, and observes that there may be exceptions to this principle. In the following sections we will argue that there is in fact a systematic distinction between a sub-class of projective meanings whose behavior does generally reflect Stalnaker's predictions, and other sub-classes which are paradigmatic Abbot-type presuppositions in that they have no inherent common ground constraint.

3. Types of projective meaning

A number of properties of presuppositions have been discussed in the literature, typically diagnosed with well-known tests. One way of understanding these tests is as providing categorical evidence of membership in the set of presupposition triggers. Presupposition projection in the family of sentences tests is usually regarded as such evidence. However, we would propose a rather different view of the tests: The classical tests for presupposition combined with a set of tests for properties observed in other types of projective meaning, provide evidence for properties which help to distinguish different sub-classes of projective meaning. An explanatory account of projective meaning generally would have to account not only for the projective properties of a given conventional trigger or implicature, but for how it comes to have the other properties it has, as well.

This kind of approach to the classical presupposition triggers was taken by Zeevat (1992); Beaver & Zeevat (ms) similarly consider a range of properties which distinguish classes of purported presupposition triggers, focusing especially on the potential of the meanings triggered to be accommodated in various kinds of context. Taking the broader view of projective meaning proposed here, Beaver, Roberts, Simons & Tonhauser (2009) offer a preliminary taxonomy of tests for projective meaning. This taxonomy groups tests according to the following underlying properties that they test for:[5]

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[5] See Beaver, Roberts, Simons & Tonhauser (2009) for lists of tests, examples of their application and more discussion.

Properties of projective meaning, and corresponding tests:
 I. Projective behavior (global and/or local or intermediate)
        Besides the family of sentences tests for global projection, there are a range of tests for non-global projection and other local context effects—filtering and merely local satisfaction of presuppositions, modal subordination, and behavior under propositional attitudes.
 II. At-issueness
        As discussed in section 2, this includes the possibility of direct denial, and tests for indirect rejection like *Hey! Wait a minute!*.
 III. Potential informativity
        It is clear that some triggers are more appropriate for use than others when their associated content is new to the addressees. Controlling for whether a projective meaning is known in the context of utterance probes for this property. It is closely related to the phenomenon of accommodation, to be discussed in the following section.
 IV. Cancelability and suspendability
        Cancellation involves preceding or following an utterance that has projective meaning m with an assertion, presupposition or implicature which is inconsistent with m; there are a variety of subtle variations on cancelation. Cancelability distinguishes between those projective meanings which are conventional vs. those which are merely conversational. Suspension involves preceding or following the triggering utterance with one which calls into question whether m or raises the epistemic possibility that m is not true. While suspension precludes global projection, it is compatible with at least some types of local satisfaction or intermediate projection.
 V. Effects of presupposition rejection (the Frege-Strawson property)
        Among cases where the projective meaning m of an utterance is believed to be false, we can distinguish those in which one might nonetheless judge the truth or falsity of the proffered content, from those in which one cannot make such a judgment. This property depends upon the relationship between m and the at-issue content of the utterance.

     We have argued above that all projective meanings—those which (potentially) display global projection (as indicated by the family of sentences tests listed under property I)—share one other property: They are not-at-issue, as indicated by the tests listed under property II. But much of the literature over the past forty years, focusing on presupposition projection, assumes some form of Stalnaker's hypothesis, assuming that the principal property which characterizes presuppositions and distinguishes them from other types of meaning is non-informativity (property III), captured in the requirement of prior satisfaction in the context of utterance (or Common Ground). Hence, explaining projection heretofore has focused on how to account for the affect on interpretation of the requirement of non-informativity. But, as discussed above, there are cases of projective meaning which are clearly not subject to this constraint. So a unified account of projection cannot take this as its starting point.
     Beaver and Zeevat (ms) suggest that the various diagnostics for presupposition can be used as the basis of a taxonomy of presuppositions. We extend this observation to the broader class of projective meanings, dividing them into sub-classes according to the properties in I-V above that members of the sub-class share. Exploring these properties in detail across the full range of projective meanings is beyond the scope of the present paper, but we would propose the following preliminary generalizations:

Some Classes of Projective Meaning:
     All of these project (property I), with some variations in how, and all are not-at-issue (property II).

A. Anaphoric presuppositions:

There are some projective meaning triggers whose intended meaning can only be determined by retrieving an intended antecedent in discourse. These include ellipses, pronouns and (at least some) definite descriptions, and adverbial *too* (Kripke 1990).[6] Use of one of these by a speaker presupposes something about the context of utterance, namely that the intended (coreferential) antecedent is readily retrievable in context. If this is not the case, then given the impoverished descriptive content of the trigger, the addressee cannot determine the intended meaning of the trigger or any constituents of which it is part. This is to say that these triggers are subject to something like Stalnaker's common ground constraint: they are associated with an assumption of salience of the intended referent in the common ground; they are non-informative (property III).

The presuppositions triggered by an anaphoric trigger always "project" to the level of preceding context where an antecedent can be found. Examples like the following (Roberts 2006) argue that some anaphoric presuppositions needn't be satisfied locally, in keeping with observations of Zeevat (1992) about the theory of van der Sandt (1992).[7] In (14), the existence (or familiarity) presupposition triggered by anaphoric *her* is explicitly denied locally, under the scope of the counterfactual *would* as restricted by the *if*-clause:

(14)   [Context: Javier has a daughter, to whom the speaker is married.]
        If Javier hadn't had a daughter, I wouldn't have married someone other than her.

Especially for those anaphoric elements for which the descriptive content of the trigger and its complement (e.g. *the* plus its common noun phrase) underdetermines the identity of the intended referent, this presupposition about the context of utterance cannot be canceled (property IV)—one simply cannot determine the intended referent of an anaphoric element in the absence of a sufficiently descriptive antecedent. Hence, theories which make presupposition satisfaction a precondition for determination of truth (property V) are most plausible for this class of projective meanings.

B. Independent, speaker-anchored projective meanings

Potts' (2005) CI triggers are independent of the proffered content of the utterance in which they occur. Amaral, Roberts & Smith (2007) argue that such triggers are deictic to the understood point of view in the discourse at the time of utterance, typically that of the speaker. Because such implications are independent of the proffered content and are anchored by the speaker's (or, rarely, some other) point of view, they generally are only taken to be true at the global level, as independent entailed meanings. Unlike the anaphoric presuppositions, they are typically informative (excepting perhaps politeness implications, which perhaps do not belong with the rest of Pott's CIs), and because they are conventionally triggered and globally anchored, are neither cancelable nor suspendable. Since they are independent of the at-issue content of the utterance, one can judge the truth of the latter while rejecting the speaker-anchored projective meanings (property V).

C. Locally entailed projective meanings

Some projective meanings are lexically encoded as ordinary, entailed content, and hence are potentially at-issue, but typically do not contribute the answer to a question under discussion. An example is the complement clauses of factive verbs like *discover*. The complement of a factive itself need not be the main point of the utterance: For example, with *discover* the main point of an utterance is typically not *what* one discovers, but *that* one discovers it (or in a negative matrix, that one does not discover it, or in the case of an interrogative, *whether* one discovers it, etc.). Moreover, because *discover* is factive, the

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[6] Roberts (2003,2009) argues that even when a pronoun, an ellipsis, or an utterances of *too* does not have a linguistic antecedent, in order to be felicitous it must have a unique, maximally salient discourse referent antecedent in prior discourse, a claim for which she offers minimal pairs of contexts of utterance.

[7] She argues that this is not the case for all anaphoric presuppositions, e.g. those triggered by *too*.

complement is entailed to be true, so when *discover* is the matrix verb presumably the speaker believes the complement, unlike the complements of non-factives like *believe*. Since typically the complement is not at-issue, one cannot deny it directly; if one wishes to take issue with such a complement, one must do so indirectly (property II). But at least for some factives, like *discover* (Karttunen 1971, Stalnaker 1974), the effect of presupposition, when it appears, is arguably pragmatic; several versions of this approach to the presuppositions of factive verbs generally, even under negation, etc., have been developed in the literature (e.g., Kempson 1975; Wilson 1975; Boër and Lycan 1976; Atlas 1977; Simons 2000, 2005). On this view, it is not surprising that the complements of factives are quite often informative (property III), and when under one of the operators in the family of sentences, may fail to project—i.e., in some contexts the global truth of these complements can be "canceled" or suspended (property IV), as in (15), where the speaker isn't taken be committed to the proposition expressed by the complement *Peter is in Paris*:

(15)   Will I discover that Peter is in Paris?

Because the complement of a factive is locally entailed, its projection behavior differs from that of the speaker-anchored projective meanings (class B above): Locally entailed projective meanings are always true locally, whether or not they project globally (16); speaker-anchored projective meanings always globally project but are not generally held to be true in the local context of an embedded trigger (17):

(16)   Joe believes that Marcia discovered that Peter was in Paris.
        believe is a filter, hence needn't pass along a global presupposition that Peter was in Paris. But the factive presupposition is still locally entailed, under the scope of *believe*, so (16) entails that Joe believes that Peter was in Paris

(17)   Joe believes that Marcia knew that that bastard Peter was in Paris.
        The implication that Peter is a bastard is attributed only to the speaker, i.e. globally entailed. It is neither entailed nor necessarily implicated that Mary takes Peter to be a bastard.

Hence, it is this class of projective meanings for which it is most plausible to claim that presuppositions must be locally satisfied (e.g., Heim 1983).

D. Conventionally backgrounded implications

This class includes the approximatives, whose polar implications are backgrounded, and *only* whose prejacent is backgrounded, as argued in both cases by the consistently projective behavior of the not-at-issue content and its behavior under denial (Horn 2002, Schwenter 2002, Roberts 2006); see (4) and (5) above. These triggers contribute compositionally to the proffered content of the utterance—with the exclusive implication of *only*, the proximal implication of the approximatives. But they are semantically complex and also contribute, as part of their conventional content, a distinct non-at-issue (or backgrounded) implication—the prejacent of *only*, the polar component of the approximatives. We can see that the backgrounded implications are conventionally contributed because they can only be globally suspended in case they are satisfied locally or at an intermediate level (Roberts 2006), hence cannot be truly canceled. As with the embedded complements of factives, the projective content is not-at-issue, but here it is conventionally so. But unlike the anaphoric presupposition triggers, the backgrounded content is fully retrievable on the basis of the utterance itself, not dependent on prior context, and hence is typically informative (Horn 2002, Roberts 2006).

The following table gives an overview of this broad comparison of the classes of projective meanings considered here, showing how the properties in I – IV distinguish them:

Properties: Classes:	I. Projective	II. At-Issue	III. Informative	IV. Cancelable
A. Anaphoric	yes to antecedent level	no	no	no

B. Speaker-anchored	yes global only[8]	no	usually	no
C. Locally entailed	yes always local	no	often	yes
D. Backgrounded	yes always local	no	usually	no

Table 1: Some classes of projective meanings

In sum, the conventional meaning of a given expression φ is of two kinds: proffered content vs. projective content. Proffered content is that aspect of the meaning of φ which contributes compositionally to what is at-issue in whatever context φ is uttered. Projective content does not contribute to at-issue content. Some projective, not-at-issue content is anaphoric, hence presupposed in Stalnaker's sense—requiring for felicity that the addressee can retrieve the intended interpretation from the context prior to utterance. But non-anaphoric projective content is typically informative.[9] Non-informativity is, thus, a reflection of what it is to be anaphoric (class A), and not a general property of presuppositions (cf. class C), let alone of projective meanings in general (cf. classes B and D).

4. Explaining projection

Linguistic theories of presupposition have been mainly concerned with how to account for the way that the presuppositions conventionally triggered by certain linguistic constituents project, so that they are preserved even when the trigger in question is embedded under the syntactic scope of negation or other operators, one of Karttunen's *holes to presupposition*. A number of theories have been proposed. Two of the more successful accounts have been couched within dynamic theories of interpretation, the presupposition satisfaction theory developed by Karttunen (1974) and Heim (1983) and the DRT-based anaphoric account of van der Sandt (1992) and Geurts (1996, 1999).

Heim attempts not only to predict the projection behavior of presuppositions, but to derive it from the mechanisms of context update.[10] Heim's thesis is that presuppositions are felicity conditions on update of a context with the context-change potential of the clause containing its trigger. Technically:

> Update of the local context of interpretation *c* with *S*, c+S, is defined just in case for all presuppositions *p* of *S*, *c* entails *p*. (after Heim 1983)

By calculating context update the way that she does for the operators and constructions of interest, Heim's theory predicts the projection behavior of presuppositions observed by Karttunen and others. Since the operators which Karttunen called *holes* don't by themselves change the local context by adding propositions or new discourse referents, the monotonic way in which contexts are updated in her theory entails that presuppositions under the scope of such an operator (including negation, interrogation, modals) at syntactic LF will always have to be entailed by the context which prevails prior to update with the operator, i.e. in the local context of interpretation for the operator itself. Hence, presuppositions project over these operators even when their triggers take narrow scope under one of them at LF. Correct

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[8] As Amaral, Roberts and Smith show, for some of Potts' triggers there are rare non-global cases, where the point of view is taken to be that of the agent of an attitude report. But these are the sole exceptions we know of.

[9] Even proffered content may sometimes be felicitously uninformative, as when we remind someone of the relevance to the QUD of a proposition already in the common ground. Similarly, not-at-issue non-anaphoric content can sometimes be uninformative.

[10] The question of whether Heim is completely successful in deriving projection behavior of presuppositions from the mechanisms of context update is a complex one, and showing how such derivations can be made watertight is the primary goal of recent work of Schlenker (2008, 2009).

predictions about (global and non-global) projection behavior are also made for Karttunen's *filters*, including conditionals, conjunction and disjunction.

Instead of entailment, van der Sandt requires an anaphoric antecedent for each presupposition, and the standard DRT constraints on anaphoric antecedence then predict that the presuppositions will "project" to the level of the satisfying antecedent. That is, since felicity requires that there be an antecedent in some accessible DRS superordinate to that containing the operator, the content of the antecedent will not fall under the semantic scope of the operator itself.

Should we explain projection as resulting from a requirement of an anaphoric antecedent, or a requirement that a proposition be locally satisfied? The crucial point here, in line with observations of Zeevat (1992), is that while some of the classes of projective meaning we propose display Heim's felicity condition, others seem to have conditions much more in line with those that would be expected on van der Sandt's account. For as we argued in the previous section, one property which distinguishes speaker-anchored projective meanings and some anaphoric presuppositions from the other classes is that they do not need to be locally satisfied in Heim's strict sense. But only one of the four classes considered requires an antecedent in van der Sandt's sense. And this is where we move beyond Zeevat's (1992) observations: We see both van der Sandt-style anaphoricity requirements and Heim-style local satisfaction requirements as special cases; the two types of requirement have something crucial in common.

In explaining projective behavior, we take the essential property of all the conventional triggers in question to be *that the associated projective meanings are merely assumed by the speaker in making the utterance, and hence not proffered in response to the QUD*; while the operators ("holes") from under whose scope the suppositions project are part of what's proffered, and themselves operate on proffered content. Since a denial or any other kind of direct response to an utterance is a response to what has been proffered (under the rules of the discourse game), one cannot reject a projective meaning in denying what someone has said. Projective meaning is backgrounded in the sense that the QUD and the content proffered to address it are what's central to the intentions of a cooperative player, whereas what's not-at-issue is not.

Consider the four classes of projective meanings discussed in the previous section. If an expression requires an anaphoric antecedent, à la van der Sandt, then clearly the existence of that antecedent is not at issue. Although a locally entailed projective meaning, like that associated with a factive, is an entailment of the at-issue content of the utterance in which it arises, it does not itself constitute, but only contributes to that at-issue content (unless, e.g., the matrix factive is merely parenthetical). If the proposition *p* denoted by a factive complement is taken by the speaker to be presupposed, this amounts to her assuming that *p* is entailed by the common ground. But such a locally entailed proposition could not be intended by itself to directly contribute to settling an open QUD, precisely because it is *already* common knowledge. The upshot of this is that if utterance of an expression places Stalnakerian presuppositional constraints on the common ground, it follows that those constraints will produce whatever behavior is common to all not-at-issue content. In particular, the presuppositions will project. Hence, the van der Sandt class of anaphoric presuppositions and Heim's locally satisfied class, including the (possibly only conversationally implicated) presuppositions of factives, share the property of being not-at-issue with both the independent speaker-anchored projective meanings and the backgrounded implications conventionally associated with approximatives and *only*. Hence, we expect all these classes to project, not to be affected by at-issue operators (the holes). Non-at-issue meanings are only potentially filtered (by conditionals, conjunctions, etc.) when the meanings in question are not speaker-anchored; speaker-anchoring amounts to a type of deixis, and hence can only be "satisfied" globally.

Our proposal, then, is that projection is a consequence of the not-at-issue status of the content which projects: Projection occurs because operators are themselves at-issue (unless embedded within the complement of a projective meaning trigger), and what they operate over is what is at-issue in their scope. Hence, the account subsumes the up-date mechanism proposed by Heim, as well as van der Sandt's

anaphora resolution: both these mechanisms work as well as they do because they implicitly presume that the content in question is not itself not-at-issue. But the present approach goes further, accounting at least for the two further classes discussed. We would claim, without presenting here a detailed argument, that neither Potts' CIs nor the backgrounded implications discussed by Horn fit naturally into the Heim or van der Sandt accounts of projection, for the consensus is that they are generally informative, not imposing constraints on prior context. Clearly, the cases of projective conversational implicatures do not fit into the earlier accounts either, as they are not even conventionally triggered, let alone anaphoric. Yet CIs and backgrounded implications (whether conventionally triggered or not) are aspects of meaning with a crucial property in common: neither is at-issue. And that, we claim, is sufficient to predict their projective behavior.

5. Discussion: a new take on presupposition and accommodation

Stalnaker's model was taken up by Lewis (1979), who proposed the following *Rule of Accommodation*: If at time *t* something is said that requires presupposition *P* to be acceptable, and if *P* is not presupposed just before *t*, then –*ceteris paribus* and within certain limits—presupposition *P* comes into existence at *t*." (1979:340). This notion of accommodation (which differs quite significantly from Stalnaker's, as discussed in Simons 2003) serves as the basis for the treatment of informative presupposition which has been developed in the linguistic literature. But theorists have continued to wrangle over just how to make the conception of presupposition as a hard constraint on contexts fully consistent with the fact of informative presupposition (for recent discussions, see Abbott 2008, von Fintel 2008, Gauker 2008); the issue has even led Stalnaker to offer a revised view of presuppositional constraints as involving beliefs about the common ground *after* the utterance has been made (Stalnaker 2002, 2008).

On the view proposed here, the problem of informative presupposition evaporates. Typical cases of so-called accommodation are no more than simple uptake of a speaker's publicly revealed private commitments (to borrow a phrase from Thomason, Stone and DeVault 2007). By producing a presupposing utterance—that is, by producing an utterance which has not-at-issue content—the speaker transparently makes the addressee aware of her acceptance of this proposition. If the addressee is willing to take the addressee's acceptance as sufficient for her own acceptance or even belief, belief change (and ultimately, common belief change) will result. There is then nothing special about ordinary cases of informative presupposition. The notion of accommodation required for these cases is much closer to Stalnaker's understanding: it "does involve adjusting a context, but need not involve repairing it; the adjustment is the normal adjustment that must take place as events take place, and people become aware that they have" (Stalnaker 2002:13).

There are constraints on which content can be so introduced. In the literature, we find constraints on accommodation; but these are no more than constraints on the introduction of content as not-at-issue. Controversial content, or content inconsistent with the current common ground, cannot be introduced as not-at-issue: general considerations of cooperativity require a speaker to make such content at-issue, in order to facilitate denials, questions and so on. Where a controversial proposition is so introduced, and is nonetheless accepted by the addressee, we have a case of real accommodation.

Note that a constituent might be part of the entailed content of an expression, and yet still be assumed to be true by the speaker, even presupposed by the speaker in Stalnaker's sense. Whenever a speaker takes a proposition to be uncontroversial, and it is clear to the addressee that this is so, the proposition pragmatically projects. But in such cases, the presupposition is always true not only at the global level, but at the local level, where the triggering expression is located, as well. This is a hallmark of non-anaphoric, locally entailed implications. Roberts (2007) argues that this is the case for what she terms *backgrounded implications*, the prejacent of *only* and the polar component of the meaning of an approximative, and we have discussed how this might work for certain factive presuppositions.

Also on our view, there are cases of true common ground constraints. These arise with anaphoric elements, whose interpretation absolutely requires the identification by the addressee of the intended referent. These are the cases acknowledged in the literature to be unaccommodable, in keeping with the view of Beaver and Zeevat (2007): An addressee cannot invent an intended antecedent. On our view, these true common ground constraints are inviolable because they follow from intrinsic features of anaphoric items; their failure leads to clear infelicity and often to difficulty in determining what proposition the speaker intended to express.

Our approach thus predicts a distinction between three kinds of cases where presuppositions are not already in the common ground: ordinary cases of informative presupposition, which involve simple belief revision in the face of evidence; special cases, where the addressee "goes along with" a speaker who has illegitimately introduced controversial content as not-at-issue; and cases involving inviolable constraints on use. In the first there is no sense of accommodation, and only the third results in difficulty in interpretation. These distinctions, predicted by the view of projective meanings as not-at-issue, better accord with speakers' intuitions than an all-or-nothing theory requiring a uniform procedure of accommodation for all cases where presupposition fails to be satisfied by proceding context. The fact that this theory also permits an account of speaker-anchored and conventionally backgrounded meanings, with the same constraints on acceptability as for presuppositions, is a powerful argument in its favor.

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