

Projection as a function of Information Structuring¹
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1. Introduction

The phenomenon of projection is familiar from almost every introductory textbook in semantics and pragmatics. Projection is conventionally identified by application of what, following Chierchia & McConnell-Ginet 1990/2000, is called the Family of Sentences (FoS) test, illustrated in the set of sentences below:

- (1) a. S: Jane forgot to submit her paper.
b. ~S: Jane didn't forget to submit her paper.
c. ?S: Did Jane forget to submit her paper?
d. *if*S: If Jane forgot to submit her paper, she'll be really upset.
e. \diamond S: Jane might have forgotten to submit her paper.
- (2) Jane intended to submit her paper.

We observe that sentence S entails that Jane intended to submit her paper; and that "typical" utterances of all of the sentences in (1)b.-e. would imply that Jane intended to submit her paper, even though, in all of these sentences, sentence S is embedded under an entailment canceling operator. Consequently, we say that this implication of sentence S *projects*.²

¹ NSF acknowledgment goes here. This paper represents the combined ideas of all four authors. However, the draft was single-authored by the first author, and some of the implementations proposed have not been vetted by the full committee. So everyone gets credit for all the good ideas, but the first author takes the blame for the bad ones.

² I examine the workings and proper application of this test in rather excruciating detail in my not-quite-complete ms. "All in the Family: A close reading of the Family of Sentences diagnostic for

The phenomenon of projection has always been studied in close connection with the phenomenon of presupposition. Presuppositions (whatever they may be) are the epitome of projecting implications. The observation that presuppositions project originates (I believe) with Frege, in "Sense and Reference." And in a great deal of the literature on presupposition, projection, as diagnosed in (some version of) the FoS test, has been taken as a diagnostic for presupposition. Thus, we find the assertion in Beaver 1995/2001 that survival of an implication is "a linguistic test for presupposition on a methodological par with, for instance, standard linguistic constituency tests." (2001:13)³

Given the view that it is all and only presuppositional content which projects, it has been natural to look for explanations of projection in terms of properties of presuppositions. In particular, the most robust current accounts make use, one way or another, of the idea that presuppositions are propositions which are required to be established in some context (understood in different ways in different accounts) in order for the presupposing clause or sentence to do its normal semantic work.⁴ Projection is explained in terms of the interaction between this requirement and the compositional process.

But the idea that all that projects is presuppositional has been under pressure for some time. Chierchia & McConnell-Ginet themselves, after formulating the FoS test, identify it *not* as a diagnostic of presupposition, but of backgroundedness of implications (1990: 281). This interpretation of the diagnostic is motivated by the observation that the contents of non-restrictive relative clauses (NRRCs) project in the FoS test, as partially illustrated in (3).

projection." There is a lot to say about this, which shows that the simple formulation of the diagnostic just given is far from precise. But we will make do with it for current purposes.

³ Beaver no longer agrees with his former assertion; but the assertion represents what was then a fairly uncontroversial view.

⁴ Some researchers object to accounts of projection of this sort because they reject the associated account of presupposition, that is, they reject the view that presuppositions are required to be part of the context, typically invoking cases where there is a lack of evidence of any such constraint. As will become clear, our own investigation leads in a similar direction. But unlike existing rejections of the standard view, our view is that the class of what have been called presuppositions is heterogeneous.

- (3) a. Jill, who lost something on the flight from Ithaca to New York, likes to travel by train.
- b. If Jill, who lost something on the flight from Ithaca to New York, likes to travel by train, she probably flies infrequently.
- c. Perhaps Jill, who lost something on the flight from Ithaca to New York, likes to travel by train.

NRRC's, although intuitively backgrounded, seem to be required to be *new* information for the addressee, and hence cannot be assimilated to the general category of presupposition, nor could their projection be accounted for in the standard terms. Beaver (2001) comes to similar conclusions regarding English parentheticals. 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)⁵, while at the same time arguing that conventional implicatures are not presuppositions. Of special importance in the development of our own view is the observation that non-focused material is typically projective. Although in early work on focus, non-focused material was described as presupposed, and although there are some current views which identify the two phenomena (see in particular Geurts & van der Sandt 2004), this identification remains controversial.

In addition, the literature contains a host of observations that suggest that not all projective implications behave in quite the same way. Curiosity about these observations led us to an exploration of the empirical properties of projective meanings, carried out without the assumption that standard classifications (e.g. presupposition vs. conventional implicature) would be predictive of empirical results.

Our re-examination of the phenomenon of projection has produced some robust empirical conclusions: we have identified four distinct sub-classes of projective implication⁶, sub-classes which cross-cut standard theoretical categories. These findings are reported in detail in Tonhauser et al. 2013. The identification of these sub-classes of projective implications requires the development of an account (or accounts) of projection which explain the observed differences. But of course some account is also needed of the commonalities in projection behavior that hold among these classes. Hence, we seek to develop a framework for an account of projection which can be adapted for the full range of cases, and with which we can model both commonalities and differences. In this workshop

⁵ For Potts, NRRCs are also a class of conventional implicatures.

⁶ We don't rule out that further empirical investigation might identify further sub-classes.

paper, however, I will focus on the account we are developing for one particular subclass, which I will identify below.

The development of the account is still at a preliminary stage. In what follows, I will first present the evidence for our taxonomy of projective content. This presentation will be relatively brief, to leave space for the presentation of the less developed part of our work: a discourse model appropriate for modeling projection, and a proposed account for one of our subclasses.

2. A Taxonomy of Projective Meanings

The taxonomy we offer is based on empirical observations about the behavior of projective elements of content in two languages: English and Paraguayan Guaraní.⁷ In this work, we examined two properties that a projective implication associated with a given trigger may have: (i) being subject to a *Strong Contextual Felicity Constraint* and (ii) giving rise to an *Obligatory Local Effect*. I turn next to an explanation of each of these two properties. First, let me note that in the cited paper, we explain in detail the diagnostics we developed for these properties, diagnostics usable with linguistically untrained native speaker consultants, which were used in the field by Tonhauser. I omit discussion of these diagnostics here, noting only that the results presented here were obtained through application of diagnostics and not merely through introspection of the researchers.

2.1. Strong Contextual Felicity Constraint

As noted, the standard view of presuppositions is that they must be established in the (local) context prior to use of the presuppositional expression, in order for that use to be fully felicitous. Sophisticated versions of this view allow that the context which is required to entail the relevant presupposition (the *local context*) may be distinct from the actual discourse context at the time of utterance of the expression (even in cases where the expression is unembedded). In cases of unembedded presuppositional expressions, this difference between the discourse context and the relevant local context must be accomplished by accommodation. However, there are expressions which seem to be subject to a particularly strong version of this constraint, expressions whose felicitous use indeed

⁷ All results pertaining to Guaraní were obtained during fieldwork carried out by Judith Tonhauser.

requires some proposition to have been established in the explicit prior discourse context. We call this constraint the *Strong Contextual Felicity Constraint*. An application of the diagnostic for this property is illustrated below, for Guaraní:

- (4) (Context) Malena is eating her lunch, a hamburger, on the bus going into town. A woman who she doesn't know sits down next to her and says:
 #~Nande-chofeur o-karu empan'ada avei.
 A1pl.incl-driver A3-eat empanada too
 #'Our bus driver is eating empanadas, too.'

This example tests for the presence of a SCFC for the implication, triggered by *too*, that some other salient individual is eating empanadas. Consultants judge this use of *too* in the context described as unacceptable. When offered the same utterance in a modified version of the context where they are told that Malena herself is eating empanadas, they take the utterance to be acceptable. We take this to indicate that this implication of *too* indeed must be established in the pre-utterance context in order for use of *too* to be felicitous.⁸ Similar results are found in both English and Guaraní for the implication associated with the use of a personal pronoun that the context contains an appropriate referent.

But some other standard presupposition triggers give different results. Consider the following cases:

- (5) a. (Context) A woman who is being interviewed by a school director for a job as a teacher says:
 A-ha-va'er~a a-me~e-ha-gu~a che-rymba jagu'a-pe hembí'u-r~a.
 A1sg-go-MUST A1sg-give-NOM-PURP B1sg-domesticated.animal dog-at B3.food-NOM.PROSP
 'I have to go now to feed my dog.'

⁸ In investigating properties of projective implications, we always consider trigger/implication pairs. We cannot simply investigate properties of a trigger, as a given trigger may give rise to multiple projective implications which have different properties. On the other hand, we cannot simply investigate properties of implications. For example, the implication that there is a king of France is projective when triggered by use of the NP *the King of France*, but not when triggered by use of the clause *There is a king of France*.

- b. (Context) Laura asks her parents to sit down with her because she has to tell them something:

Nd- a-je- droga-v'e-i-ma.

NEG-A1sg-JE-drug-more-NEG-already

'I've stopped doing drugs.'

- c. (Context) A girl backs out of a driveway and hits Susi's car. A woman comes running out of the house, apologizes that her daughter hit Susi's car and says:

Ha'e oi-kuaa o-mo'ỹ-va'er'a-ha i-l'ente o-maneja-ha-gu'a.

pron.S.3 A3-know A3-put-MUST-NOM 3-glasses A3-drive-NOM-PURP

'She knows that she has to use her glasses to drive.'

Native speaker consultants judged each of these utterances acceptable in the context given, despite the fact that the relevant projective implications had not been established in the discourse context. Speakers of English will probably find this unsurprising, as utterances of the English translations of these sentences similarly seem acceptable in the contexts given. This tells us that the projective implications triggered by the possessive, by *stop* and by *know*, as well as by their Guaraní equivalents, are not subject to the Strong Contextual Felicity Constraint.

Of course, on many standard views, these expressions *are* assumed to impose a felicity constraint at least on the *local* contexts in which they are used. As noted earlier, this assumption can be rendered consistent with our empirical observations by invoking accommodation. From this theoretical perspective, those triggers which test positive on the diagnostic for the Strong Contextual Felicity Constraint are subject to a particularly strong version of the standard constraint which cannot be satisfied by accommodation. Those which test negative on the diagnostic might either be subject to a weak version of the constraint, allowing for satisfaction via accommodation, or might not be subject to the constraint at all. Simons et al. (2010) present arguments against the accommodation view, and we interpret the results presented here as distinguishing between projective meaning types which impose conditions on the information in the prior context, and those which don't. However, we acknowledge that these observations are not inconsistent with the standard view.

2.2. Obligatory Local Effect

The property *Obligatory Local Effect* distinguishes projective contents according to their behavior with respect to embedding operators like propositional attitude verbs, modals and conditionals. Because this property is perhaps not very familiar, we begin by illustrating it with some cases from English. The embedding operators considered here are contributed by propositional attitude verbs such as *believe* and *think*. An utterance of a sentence containing such a belief-predicate attributes to the attitude holder the belief that the proposition denoted by the embedded clause is true, i.e. it expresses that this proposition is part of the attitude holder's epistemic state. For example, an utterance of the sentence *Jane believes that Bill is a rock star* attributes to Jane the belief that Bill is a rock star (while remaining neutral as to whether Bill actually is a rock star). In the examples considered in this section, belief-predicates embed clauses that contain projective content triggers. We are interested in the interaction between the belief-predicate and the projective content of the embedded clause.

Consider the examples in (6):

- (6) a. Jane believes that Bill has **stopped smoking** (although he's actually never been a smoker).
- b. Joan is crazy. She's hallucinating that some geniuses in Silicon Valley have invented a new brain chip that's been installed in her left temporal lobe and permits her to speak any of a number of languages she's never studied. Joan believes that her chip, **which she had installed last month**, has a twelve year guarantee. (Amaral et al. 2007:735f., bold-face added)

The projective contents of the embedded clauses are, in (6)a., the pre-state implication of *stop* that Bill has been a smoker, and, in (6)b., the implication of the NRRC that Joan's chip was installed last month. The example in (6)a. attributes to Jane the belief that Bill has stopped smoking, which necessarily also attributes to her the belief that Bill has been a smoker in the past. Example (6)b. attributes to Joan the belief that her chip has a twelve month guarantee, and also that it was installed last month. Since the projective contents of *stop smoking* and of the NRRC are part of the attitude holders' belief states in these two examples, we say that these projective contents of *stop* and of the NRRC have **local effect** here.

We can also construct examples where the content of a NRRC does *not* have a local effect: example (7) below is one such case.

(7) Jane believes that Bill, who is Sue’s cousin, is Sue’s brother.

Here, the content of the NRRC is *not* understood to be part of the belief attribution: the speaker of (7)b. does not attribute to Jane the belief that Bill is Sue’s cousin, but only the belief that Bill is Sue’s brother, i.e. the utterance does not attribute contradictory beliefs to Jane. In combination with example (6)b. above, this shows that NRRC content may, but need not, have local effect.

In contrast, there are no cases where the projective content of *stop* fails to have local effect. Consider:

(8) Jane believes that Bill has stopped smoking and that he’s never been a smoker.

Sentence (8) necessarily attributes to Jane inconsistent beliefs: the first conjunct necessarily implies that Jane believes that Bill has been a smoker, which is contradicted by the second conjunct. The fact that the projective contents of change of state predicates that occur embedded under a belief-predicate always have local effect is what we refer to as *Obligatory Local Effect*.

In Tonhauser et. al., we present a diagnostic for Obligatory Local Effect and relevant data from Guaraní. I omit these here, as they are only tangentially related to the main issues I explore below. The examples given here suffice to show that this property distinguishes among cases of projective meaning, and hence furthers the classification we develop.

2.3. The taxonomy

On the basis of the two properties we have explored so far, then, we find a four-way classification of triggers of projective content, as illustrated in table 1:

Classes	Properties of contents		
	Projection	Contextual Felicity	Local Effect
A.	yes	yes	yes
B.	yes	no	no
C.	yes	no	yes
D.	yes	yes	no

Table 1: Four classes of projective content in English and Paraguayan Guaraní

So, which projective contents go where? Broadly speaking, class A and D involve various implications of anaphoric and indexical triggers. For example, the existence implication carried by the use of a pronoun (i.e. the implication that the referent exists) falls into class A; but the implication that the referent is contextually salient falls into class D, as it does not have a local effect. Class B contains Potts' (2005) conventional implicatures, including the contents of NRRCs, but also e.g. the implication generated by demonstratives like *that man* that the thing indicated is a man, or the implication generated by Guaraní *ha'e* (3rd person human pronoun) that the referent is human. Class C includes a mixture of cases standardly described as presuppositions along with implications whose analysis is more controversial, such as those associated with approximatives (e.g. *almost*) and exclusives (e.g. *only*). Among the "standard presuppositions" in Class C are those triggered by factives, change of states, and other predicates, those which Abusch 2002 calls *soft triggers*. In what follows, we develop an alternate account of projection for implications of class C triggers.

3. An alternative account of projection for soft triggers

The empirical results presented above help to motivate the following idea: not all projection has exactly the same account.⁹ In particular, we are inclined to take seriously our result that class B and class C triggers do not impose a Strong Contextual Felicity constraint. In our view, this shows that these triggers are *not* anaphoric in nature: they do not require antecedents in the same way as anaphors (or anaphoric triggers like *too*). We are also inclined to take seriously the idea of Chierchia and McConnell-

⁹ This is a departure from what was at least suggested, if not explicitly claimed, in our 2010 SALT paper, where we argued that all projective meanings share the feature of not-at-issueness, and that this shared feature accounts for their projectiveness. While we still maintain that all projective meanings are indeed not-at-issue, we no longer derive their projectiveness directly from this property, and have come to the view that there are distinct mechanisms of projection for different types of not-at-issue content. I am inclined to the view that there are exactly two mechanisms of projection: one type of projection is driven by the requirements of anaphora, and the other by the mechanism to be developed below. But I can't actually substantiate this view yet.

Ginet that projection is a feature of *backgroundedness* of content. The questions that arise then, are these:

- How can we interpret the notion of backgroundedness other than in terms of what is required of the utterance context?
- How does backgroundedness result in projection?
- Why does backgroundedness-related projection pattern so similarly to anaphora-related projection?
- How does content get to be backgrounded, or recognized to be backgrounded?

In what follows, we will propose a framework for the treatment of projection which offers at least partial answers to all of these questions. We will focus on what is for us the most difficult case: the case of class C triggers of projective meanings, i.e. those that do not impose a strong Contextual Felicity Constraint but which obligatorily have Local Effect.

The core intuition that drives our account is that projection in class C cases is fundamentally an information-structural phenomenon. By this, we mean that projection is to be understood in terms of the informational role of content within a discourse: whether content is presented as answering, or addressing, a current topic, or is presented as *assumed* by the current topic.

Crucial to our model is the notion of a Question Under Discussion (QUD). A QUD should not be thought of as an actual question that is posed, but rather as a set of alternatives: the alternatives that are indicated to be the currently relevant alternatives, given the goals and shared beliefs of the discourse participants. Building on much existing work, we take focus structure to impose constraints on the set of alternatives which a given utterance can be used to distinguish among. Where the alternatives all agree on some proposition, that proposition is presented as assumed. Propositions that have this status are the ones that, intuitively, project.

Focus thus has a vital role to play in the account that we develop. However, although focus *constrains* the possible QUD, it is not determinate of it. Pragmatic factors, in particular factors relating to the information structure of the discourse, also play an important role. In the account we develop, it is the interaction between surface indicators of the QUD and pragmatic constraints on the QUD which determine projection behavior. One consequence is that, unlike other standard accounts, our treatment of projection requires examination of heavily contextualized utterances. While most accounts of projection deal primarily with “out of the blue” examples, and invoke various pragmatic mechanisms to account for “exceptions,” we take contextualized utterances as our standard case and work backwards from there to try to understand intuitions about purportedly “out of the blue” cases.

3.1. Focus, alternatives and projection

As already indicated, the notion of contextually relevant alternatives is central to the account we develop. The idea that the work of an assertion is to differentiate between such alternatives is already established in Stalnaker's work on assertion. In the Stalnakerian view, to assert something already established as true (at least for purposes of the current conversation) is redundant; to assert something already established as false is pointless.

For Stalnaker, though, the alternatives amongst which utterances must distinguish are unconstrained by anything other than the information which the discourse participants have already exchanged (although of course considerations of Relevance introduce additional requirements). Rooth's theory of focus and of focal alternatives offers a refinement of this view of alternatives (Rooth 1985, 1992, i.a.). This work, in particular as elaborated by Roberts 1998/2012 and by Beaver & Clark 2008, establishes the idea that uttered sentences often give an overt indication of the set of alternatives among which they are intended to differentiate. Focus marking in sentences triggers the construction of a set of *focal alternatives* amongst which the uttered sentence distinguishes. Following Roberts 1998, we can think of this set of alternatives as providing information about the question which the triggering utterance is intended to address.

For our purposes, the crucial feature of focal alternatives is that they differ from one another in certain limited respects, but not in all respects: some things are true across all alternatives. For example, consider an utterance of *Jane reads [_F the NYT]*, with focus marked on the object NP. The semantics of focus generates a set of alternative propositions of the form *Jane reads x* – or, in possible world terms, a set of sets of possible worlds in each of which there is some specific thing which Jane habitually reads. The form of these alternatives is fixed by the focus marking on the sentence. While *what* Jane habitually reads varies across these alternatives, various things are constant across them all. In all alternatives, Jane exists, is sentient, etc.; and in all alternatives, Jane habitually reads *something*. We'll adopt the following locution for this case: We'll say that this set of alternatives (question) *entails* that Jane habitually reads something. (Strictly, it is the disjunction of the alternatives which does so.)

The speaker who utters the sentence *Jane reads [_F the NYT]* with focus on the object thus indicates that she intends her utterance to distinguish among alternatives that differ only with respect to what it is that Jane habitually reads. What alternatives are available for consideration? This will depend on the larger discourse situation in which the utterance occurs. When encountered out of the blue, it's

natural to imagine the NYT being contrasted with other major newspapers, like the Washington Post and the WSJ. But suppose the utterance occurs in a conversation between the parents of two fifth graders. One has been talking about her daughter's love of fiction. The other parent responds: "I can't get Jane to read any fiction at all. Jane just reads the NYT." Clearly in this case the set of alternatives is different. So although the form of the alternatives is fixed by focus structure, the domain of alternatives is fixed by prior discourse. This illustrates a central point that we will return to below: what we might call the *discourse-significant alternatives* — the ones which, as discourse participants, we wind up caring about — are constrained in two very different ways: by surface form, and by discourse constraints.

Now let's make the following assumption (see Beaver & Clark's Current Question Rule, p.36): When a speaker introduces some set of alternatives, she indicates an assumption that at least one of those alternatives is true. The speaker who says *Jane reads the NYT* might be prepared for a challenge or objection to the alternative she has asserted; but she doesn't expect an objection to what is true across all the alternatives, namely, that Jane habitually reads something. So, the speaker of *Jane reads [_F the NYT]* indicates an assumption that Jane habitually reads something. This is the essence of the account of focus-induced projection given by Beaver & Clark.¹⁰

Now let's take the idea one step further: It seems plausible that almost all utterances (and in some cases, non-asserted subordinate clauses) are intended to distinguish among a limited or constrained set of alternatives. It is the rare utterance which is intended only to address what Roberts 1998 calls "the big question": What is the way things are? Many utterances mark less-than-maximal focus. Many utterances respond to an explicit or implicit question. And even where there seems to be no explicit contextual clue or conventional marking of the intended question or set of alternatives, we are generally inclined to try to identify one. As argued by Abbott 2000, there seems to be a preference to understand utterances – or perhaps clauses – as having a single "main point." She argues that whatever is not main point is, intuitively, presupposed. We suggest, in a similar vein, that there is a preference to understand utterances – and in some cases clauses – as addressing a particular question or set of constrained alternatives. Whatever utterance content corresponds to what is invariant across the alternatives is, intuitively, projected.

¹⁰ Beaver & Clark don't actually set out to give an account of focus-induced projection, but of association with focus. This account is proposed for one subclass of cases of association; and for this class, projection is simply the flip-side of association.

Let's apply this idea to a specific case, the case of factives, for example an utterance of *Jane doesn't know that it's raining*. We propose that when an utterance of this sentence is given a "projective" interpretation – i.e. when it is understood as implying that the content of the complement is an assumption of the speaker – it is because the utterance is understood to invoke a set of alternatives in all of which it is true that it is raining. In the simplest case, the alternatives might be (expressible by): *It's raining and Jane knows it; it's raining and Jane doesn't know it*.

The idea to this point echoes the proposal due to Abusch 2002, 2010. But unlike Abusch, we do not claim that the alternatives induced by factives are lexically encoded. Indeed, central to our proposal is the idea that the alternatives addressed by a factive sentence may vary, and that this variation leads to differences in projection behavior. Consider, for example, the following case:

- (1) A: Putin is a straightforward, trustworthy guy.
B: Why do you say that?
A: George Bush said so.
B: Yes, but Bush didn't KNOW he was a straightforward, trustworthy guy. He just BELIEVED it, or maybe HOPED he was.

Here, narrow focus on the main verbs in B's final utterance shows that the alternatives the speaker intends to introduce are alternatives that vary with respect to the relation that holds between George Bush and the proposition that Putin is a straightforward, trustworthy guy. And indeed, what projects here is that some relation holds between the two, not that Putin is a straightforward, trustworthy guy.¹¹

Similarly, projection behavior changes when narrow focus is introduced in the complement. Consider:

- (2) A: George is really upset. He just found out that Harriet is having a graduation party and didn't invite him.
B: He didn't find out that HARRIET is having a graduation party, he found out that HARRY is having a graduation party, and HARRY is his best friend.

¹¹ This is the kind of case which, following Horn, is often said to involve metalinguistic negation. But to say that is merely to offer a description of the case; by invoking the focus structure, we move towards an account.

Observe that the utterance of *He didn't find out that Harriet is having a graduation party* does not lead to projection of the content of the complement (even though that content is consistent with the continuation of the utterance). Narrow focus on the subject of the embedded clause results in the sentence as a whole addressing alternatives of the form *George found out that x is having a graduation party*. What projects is the proposition that George found out that someone is having a graduation party.

Note that in our approach, where projectivity in factives is directly tied to the set of alternatives triggered by the utterance, the interaction between factivity, focus marking and projection falls out directly. In standard treatments, the presuppositionality or projectivity of factive complements is taken to be a lexical feature of the verb; although the interaction with focus marking can no doubt be accounted for by some mechanism, on our approach this interaction is predicted and indeed needs no separate account.

In what follows, we lay out a model for the development of this type of account.

3.2. A DRT model with Alternative Sets

To model our proposal, we adopt an extension of DRT.¹² We take each utterance (and in some cases, sub-parts of utterances)¹³ to induce the introduction into the DRS of a *question* (or rather, of a DRS

¹² I want to confess up front that we have not yet worked out all the technical details of the DRT extension. The discussion here will suffice to make clear what our intentions are. Most of what follows is a first pass attempt at rendering precise our ideas about what's going on. I look forward to ironing out issues with this attempt at the workshop.

¹³ One issue we are still wrestling with is how to specify which linguistic units we will allow to trigger the introduction of a set of alternatives. The general picture we have is that clauses which trigger alternative sets must contain the focus domain associated with a pitch accent. This has the consequence that some but not all subordinate clauses may trigger an alternative set. Compare utterances of (i) and (ii), where capitals indicate pitch accent:

- (i) John KNOWS that it's raining.
- (ii) John knows that it's RAINING (but he doesn't know that there's a tornado warning).

representation of a question). As noted, the question is to be interpreted as a set of alternatives. For current purposes, we take the alternatives to be non-exhaustive and hence not mutually exclusive, i.e. to correspond to Hamblin-style denotations for questions. The main reason (for us, for now) of adopting this treatment of questions/alternatives is that it allows us to see questions as having just the same structure as Rooth-style focal alternatives. Crucially, we use the term *question* to denote a semantic object, a set of alternatives, and not a speech act or discourse move. In some cases, it is appropriate to construe sets of alternatives triggered by clauses as (implicit) questions; but not in all cases.

Following many standard accounts (van der Sandt 1992, Asher and Lascarides 2003), we assume a DRS construction procedure for multi-utterance sequences in which a provisional DRS is constructed for each non-initial sentence. The sentence-level DRS is then merged with the existing or context DRS. The construction of the provisional DRS will proceed as in standard accounts. In addition, though, we also construct a representation of the set of alternatives which the sentence generates.

Let's begin by considering the most straightforward case of a single clause with no "presupposition trigger"¹⁴. Our example:

(3) Jane sang [_F an aria].

The provisional DRS for this utterance will have the standard form:

(4) [x, y : x=jane, aria(y), sang(x,y)]

At the same time, we construct a representation of the set of alternatives triggered by the focus marking in the utterance. For what is in effect a *wh*-question, we adopt the representation shown in (5).

In (i), there is no pitch accent within the complement clause. The sentence as a whole constitutes a single focus domain with no subordinate domains. In this case, only the main clause can trigger an alternative set. In (ii), there is a pitch accent inside the subordinate clause, hence this clause may trigger its own alternative set.

¹⁴ I'm ignoring here the possibility that past tense itself might be a presupposition trigger.

(5) $Q_1: ?_z[w, z: w=jane, sang(w,z)]$

In the case where sentence (3) is discourse initial, we will simply construct a DRS consisting of the content in (4) and the question (representing a set of alternatives) in (5).¹⁵ We now come to the question of the function of alternative sets with respect to interpretation of the DRS.

There are two approaches to understanding DRS's. On one view, a DRS is simply a means for the representation of the truth-conditional content of sequences of sentences, its special feature being the ability to represent inter-sentential truth-conditionally relevant effects. On another view (perhaps that of Kamp), a DRS is not merely a convenient representational tool, but in fact has some kind of psychological reality: in the most straightforward terms, it is a representation of a mental model constructed by an interpreter in the process of interpreting a sentence. Once a DRS is construed in this way, it is natural to allow that some elements in the representation have functions other than contributing to the evaluation of the DRS relative to a model.

We don't necessarily want to commit to any strong claims of psychological reality. However, we do want to utilize the machinery of DRT to represent non-truth-conditional features of what is communicated or signaled, to an interpreter, by an utterance. The effects of focus are one such feature.¹⁶ The sentence *Harriet saw George* is true iff Harriet saw George, regardless of focus marking. However, focus marking constrains which discourse sequences an utterance of the sentence can be inserted into. Given that we want to express these constraints in a DRS, we are committed to allowing that some aspects of a DRS are relevant, not to the embedding conditions which determine truth in a model, but to some other aspect of the evaluation of a DRS.

The idea that DRS's can be understood as subject to evaluation in pragmatic terms is present already in van der Sandt 1992, where constraints on informativity and consistency of sub-DRS's are proposed. These constraints have a Gricean flavor: roughly, they require that utterances have no redundant sub-parts. These constraints are not conceived as affecting the embedding conditions of DRS's. Rather, they determine the felicity of the discourse which results in the construction of a particular DRS.

¹⁵ Of course, the utterance could be discourse initial only if the interlocutors' common ground was rich enough to support it.

¹⁶ As is well known, focus can have truth-conditionally relevant effects; this is not being denied here.

We similarly want to use our enriched DRSs to represent not merely truth conditional content, but what Roberts 1998/2012 calls “the intentional structure” of discourse. As Roberts argues, the fact that discourse is so structured, and is subject to basic requirements of relevance, imposes constraints on discourse contributions. These constraints are expressed in terms of constraints on question-raising and on responding to questions.

In order to capture both the truth conditional and discourse-structural effects of an utterance, we interpret a DRS both relative to a model and relative to a Roberts-style Conversational Scoreboard. Sets of alternatives/questions have no effect on the embedding conditions of a DRS: they do not affect truth conditional content. They have an effect elsewhere on the scoreboard. In particular, when a set of alternatives, triggered by a given sentence or clause, is introduced into the main DRS, it typically triggers the introduction of a new QUD on the top of the existing QUD stack. The new QUD is subject to the pragmatic constraints on question introduction discussed by Roberts: for example, the new question must be appropriately related to whatever was previously on the top of the stack. But the new QUD is also subject to standard Focus Congruence requirements. Specifically, it must be a subset of the alternative set introduced by the triggering clause. In the case under consideration, focus marking on (3) triggers the introduction of the question representation in (5). The set of alternatives corresponding to (5) are, roughly speaking, all propositions of the form *Jane sang x*, which might include *Jane sang the first note of Ave Maria*, *Jane sang the first and second note of Ave Maria*, etc. However, in most discourses, what would really be of interest is something like *What pieces did Jane sing?* The QUD that would be added to the QUD stack, then, would be the set of alternatives corresponding to this question.

The introduction of a new QUD has a further discourse consequence: it indicates that the speaker who introduces the QUD accepts (in Stalnaker’s sense) that the question has an answer, that is, that one of the alternatives is true. In cases where the disjunction of the alternatives entails some proposition *p*, introduction of the question indicates that the speaker accepts *p*. Hence, by her utterance, the speaker makes manifest her acceptance of *p*.

What further consequences this has will depend on many factors, including the consistency of *p* with the beliefs of the other interlocutors. The proposition that the speaker has indicated her acceptance of *p* necessarily becomes part of the common ground. The proposition *p* itself may, but need not, become part of the common ground. What matters for our purposes is that by linking the introduction of a set of alternatives to Roberts’ notion of the QUD, we can explain how the existential implication arises.

So far, we have considered the simple case where an utterance consists of a single clause. In cases of utterances of sentences with embedded clauses, the embedded clauses may introduce their own sets of alternatives. In the most straightforward cases, these sets of alternatives are also introduced into the main DRS. Consider an utterance of:

(6) If Jane sang [_F an aria], she probably brought the house down.

The antecedent clause is itself a focus domain, with the focus pattern already discussed. The sentence as a whole will trigger the construction of a provisional DRS with the standard form, and also a representation of the alternative set triggered by the antecedent. When this is merged with the context DRS, the set of alternatives is entered in the main DRS.¹⁷ This results in a representation along the lines in (7) (after anaphora resolution).

(7) [$x : x=jane, Q_1: ?_z [z:, sang(x,z)], [y: aria(y), sang(x,y)] \Rightarrow [bthd(x)]]$]

The formal details of the procedure that results in this representation are yet to be worked out, but something like the van der Sandt procedure for accommodation seems to make sense: we will assume that all alternative sets are to be introduced at the global level, unless this results in the violation of a pragmatic constraint. In this case, we look for a “lower” site to introduce the alternatives. By allowing the alternatives generated by the antecedent to be merged into the main (global) DRS, we account for the fact that the existential implication triggered by the focus marking in the antecedent projects, that is, the conditional as a whole implies that Jane sang something.

I have not said anything here about the alternatives triggered by the conditional as a whole, or about the alternatives triggered by the consequent. There are various difficulties to be addressed here that we have not yet resolved. I’ll return to some brief discussion of these in the conclusion.

I will make one more remark before concluding this presentation of the basic model. The example discussed here is one in which the triggering clause has narrow focus, and consequently the set of alternatives which is triggered corresponds to a *wh*-question. In other cases (typically associated with

¹⁷ We have been assuming that clauses which trigger alternatives will be indexed with the questions they trigger. I don’t think that this indexing will play a role in my discussion here, so I omit it.

verum focus), an utterance will trigger introduction of polar alternatives. For example, the sentence *Jane sang an aria* might be associated with the two member set of alternatives: {Jane sang an aria, Jane did not sing an aria}. Note that where this is entered into the main DRS, it can only trigger introduction of the same set of alternatives as the new QUD.

3.3. Extending the model to factives

So far, we have in effect given a DRT model of the account of “focus projection” that is implied by Beaver & Clark 2010, which in turn extends the proposals of Roberts 1998. But our target is the broad class of projective implications which are not plausibly anaphoric (at least, are not associated with a Strong Contextual Felicity condition). For this paper, we will apply the idea to a single case, that of factives.

One of the crucial features of projection in factives was illustrated in section 3.1. above: this is the observation that focus marking affects what, if anything, projects from a factive utterance. Looking at the examples, we might make an even stronger claim: narrow focus in a factive sentence – whether in the main clause or in the complement clause – *overrides* what is typically considered the “default” projective behavior of a factive. Once we have any kind of non-maximal focus marking, the projection that occurs is focus-driven projection, and the “typical” projection of the content of the complement goes away.

We propose that this is because projection of the content of the complement in factives, when it occurs, is due to exactly the same mechanism that generates focus projection: the generation of an alternative set resulting in the introduction of a new QUD. In the focus case, the focal alternatives typically have an entailment, which will also be an entailment of any subset of the set of focal alternatives, therefore of any admissible QUD to be added to the QUD stack. In the case of factives, we propose the following:

(8) **Projection Hypothesis for Factives**

The complement of a factive sentence *S* receives a projective interpretation just in case the most plausible QUD consistent with focus marking on *S*, with pragmatic constraints on the QUD stack, and with general considerations of relevance entails the content of the complement.¹⁸

The evidence we've given for this claim so far has come from examples where the focus marking on the factive sentence has triggered a set of alternatives, and hence a QUD, which does not entail the content of the complement clause.

Another set of cases which provide evidence (although less direct evidence) for this claim is provided by the many attested examples in Beaver 2010 of non-projective readings of factive sentences. We do not have space here for a systematic review of the full set in terms of our analysis, but let's look at a couple of representative examples.

- (9) In response to a question by Judge Hunton whether the Pulaski County lawsuit had settled; Dale Evans stated that they did a claim, but **he is not aware that it ever went into a lawsuit.** (Beaver, example 41)

It seems reasonably plausible that the factive sentence (shown in bold) has verum focus, hence triggers the polar alternatives: Dale Evans is aware that..., Dale Evans is not aware that... As the second alternative includes both possible worlds where the claim went to a lawsuit and possible worlds where it didn't, these polar alternatives don't entail that the claim went to a lawsuit i.e. do not entail the content of the factive complement. Given the discourse context, it's entirely coherent that the speaker intends exactly these alternatives to be under consideration. If Evans *were* aware that the claim went to a lawsuit, he could (presumably) answer the judge's question; but as he is not aware of that, he can't. These are the relevant alternatives, given the information structure of the discourse.

Here's another example for consideration:

- (10) They also work well to deter rabbits & foxes from digging into the chook-pen (Hen-run). Dig a shallow trench the width of a single mattress, then place the springs flat in the trench.

¹⁸ Recall that, for brevity, we say that a set of alternatives *Q* entails *p* just in case the disjunction of the elements of *Q* entails *p*.

Drive your fence posts in the mid-line, so half the spring is outside & half inside the pen. I haven't tried this with wombats, though, & **if anyone discovers that the method is also wombat-proof**, I'd really like to know! (Beaver 2010 ex. 32)

This is another example where the clause plausibly has *verum focus*¹⁹, and where once again the simple polar question is a coherent one to add to the QUD stack: if someone discovers that the method is wombat-proof, then the method *is* wombat proof, and that's useful information (if you happen to have wombat problems). If no-one discovers that the method is wombat-proof, then I still don't know whether to use it against wombats: maybe it *is* wombat-proof, but I'm not going to start burying springs until someone has confirmed this for me.

There's obviously some relation here to the fact that the writer has just made clear that he or she doesn't know whether the method is wombat-proof. Ultimately, we want to be able to incorporate this intuition into the account; we'll return to this below.

The examples just discussed illustrate only a corollary of the hypothesis in (8), namely, that when a factive sentence *can* be construed as introducing a QUD which does not entail the content of the complement, a non-projective reading arises. We have yet to show that the projective reading arises only as stated in the hypothesis. The issue most likely to raise skepticism is decades-worth of intuitions that in an "out-of-the-blue" example, a factive verb embedded under an entailment-canceling operator is given a projective reading. This suggests that there is a *default* projective interpretation of factives which must be accounted for.

We agree that these intuitions require an account. We strongly suspect that at least part of the correct account will involve an account of how out-of-the-blue utterances are implicitly contextualized. The correct account must also take into consideration what focus marking is being assumed when we read example sentences presented out of context. And we would also expect the final account to make use of considerations of simplicity and plausibility in the construction of the QUD and the assumed context. We don't yet have a general account to offer, but discussion of a case will illustrate what we think might be relevant considerations.

Suppose I overhear a speaker saying:

¹⁹ It also might be taken to have narrow focus on *wombat*, in which case the alternatives would be of the form "Someone discovers that the method is *x*-proof", and no implication of the truth of the complement is predicted.

(11) John didn't discover that the door was unlocked.

Assume a pitch accent on *door*, but not a contrastive one, with secondary accents on *John*, *discover* and *unlocked*. This is a fairly "neutral" assertion intonation, and most plausibly the entire complement clause is focused.

As an over hearer, I (apparently automatically) do semantic composition of the utterance. I also have to generate a discourse structure relative to which to interpret it. The claim here is not simply that if I will do this if for some reason I am particularly interested in the utterance I've just overheard. I'd like to claim that this is an automatic part of the process of interpretation: there simply is no such thing as "out of the blue" interpretation.²⁰ But given that I have only the most general information about the interlocutors (e.g. that they speak English, other things I might glean from their appearance), the main constraints that will restrict the discourse structure are surface features of the utterance, in particular focus marking; and general considerations of plausibility and simplicity.

Given the intonation pattern described, it is most plausible that the entire complement clause is focused. Hence, the alternatives generated are of the form: *John didn't discover X*. In other words, the utterance provides an answer to the question:

(12) What didn't John discover?

Now, in what discourse circumstances would it be reasonable to raise this question? There are obviously lots of uninteresting, trivial alternatives that would probably provide true answers to the question (e.g. *that the earth goes around the sun*). So the over hearer is likely to assume that the common ground of the interlocutors provides some domain over which the alternatives are intended to range. Presumably, the domain will be given by:

(i) things John was trying to discover *or*

(ii) things the interlocutors might expect John to discover

Note that if I take the domain to be constrained in the first way, I might not actually get a projective reading for the utterance. Suppose I actually heard a slightly more extended discourse:

²⁰ The claim here is not dissimilar to the Relevance Theory view that the interpretation of an utterance requires the construction by the interpreter of the intended context. While the construal of context may be different, I find this claim of RT completely persuasive.

(13) A: Did John find out anything about how those guys got into his office?

B: He didn't discover that the door was unlocked.²¹

But now suppose we take the domain to be constrained in the second way, by things that John might be expected to discover. Well, John can only be expected to discover things that are true. So, as interpreter, I infer that it is part of the conversational common ground that the door was unlocked.²²

This analysis of the case brings out two important features of the kind of account we envisage. Unlike in previous cases, we *don't* suggest here that the initially generated alternatives entail the projective implication (i.e. that the door was unlocked). That implication arises from the restriction on common ground that is assumed in order to render the implied QUD reasonable. (To repeat: the question is only reasonable if the alternatives are constrained to things that John might be expected to discover.)

The other important observation is that the analysis requires careful attention to specific features of the individual case. This is a move in the opposite direction from the now well-established trend in accounts of projection, where the goal is to provide a robust algorithm relatively immune to contextual effects. Hopefully, the examples discussed here will provide some indication of why we think a more context-sensitive approach to projection is warranted. By embedding our discussion of context sensitivity in the QUD-based framework, we make clear the contextual parameters which should be expected to affect projection.

4. Concluding remarks

In this paper, we have tried to do two things: First, we have sketched an argument, based on empirical findings, that not all cases of projection are the same. In particular, when looked at relatively "naively," a large class of projective implications are not plausibly taken to be anaphoric.

²¹ The overall intonation pattern here would probably be slightly different than in the utterance we started out discussing.

²² Perhaps we can really only say something weaker i.e. that the over hearer can infer that the speaker believes that the door was unlocked. I'm just as happy to tell the story that way, it just gets more complicated.

Given that conclusion, we have presented a framework for an account of projection for non-anaphoric cases. The central idea is that utterances are typically understood as distinguishing among some quite constrained set of alternatives. What those alternatives are is to some extent signaled by the surface form of the utterance, in particular by prosodically marked focus. But the intended alternatives are also constrained by the prior context, and by general considerations of relevance. Considerations of relevance introduce restrictions on what alternatives can be raised at a given point in the discourse, in light of what has happened before.

When these two sets of indicators — surface form and conversational constraints — interact to suggest a set of alternatives which agree with respect to some proposition, that proposition is implied by the utterance. Where the clause which triggers the construction of that set of alternatives is embedded, the effect is the phenomenon we call projection.

While we have chosen to emphasize empirical differences among classes of projective meanings, there are also well-known similarities. Past work has mostly emphasized the similarities, and hence pushed theorists towards a completely homogeneous account of projection. Given our shift in emphasis, it is clear that we need to explain, not only why projection behavior differs between different classes, but also why some things are the same.

The most salient similarity amongst types of projective content is their behavior in the well-known Karttunen filtering cases i.e. conjunction, disjunction, and conditionals. Van der Sandt 1992 demonstrated quite beautifully that presuppositions triggered by standard anaphors and other types of presuppositions display parallel behavior in these sentences. Roughly, in cases where an anaphor finds its antecedent inside the same sentence, there is no “projection”: i.e. no implication of existence of a satisfying entity, as in the conditionals in

- (14) a. If there is a king of France, then he is bald.
b. If there is a king of France, then the king of France is bald.

But as Karttunen had already noted, in the case where the antecedent of a conditional entails the presupposition of the consequent, the presupposition of the consequent does not project i.e does not become a “global” implication, as illustrated by

- (15) If it’s raining, then Jane knows that its raining.

It is incumbent on us to provide an account of this parallel.

We cannot give a full account of the Karttunen cases here (partly because we don't have one yet). But we can give an indication of the type of account we foresee, and show how we will account for the observed parallels.

For the cases of truly anaphoric projective meanings, we propose to adopt the van der Sandt analysis, or something very close. Like van der Sandt, we view the projectivity of these elements of content as deriving from their anaphoricity. In van der Sandt's framework, patterns of projection and non-projection arise through the interaction between the anaphoricity requirements of triggers, and various pragmatic constraints on DRSs. For example, as discussed earlier van der Sandt proposes informativity and consistency constraints on sub-DRS's: every sub-DRS is required to be *locally informative* (i.e. its content must not be entailed by the content of superordinate DRS's) and *locally consistent* (i.e. its content must be consistent with the content of superordinate DRS's). These principles are transparently pragmatic in nature. These principles constrain possible accommodation sites for antecedents for anaphors (which, in van der Sandt's account, includes all presupposition triggers).

Consider how this works in the case of (14)b. above. Very simply: suppose that we accommodate in the global DRS an antecedent for the NP *the king of France*, which appears in the consequent. Then the global DRS would entail the existence of a king of France, which would render the antecedent of the conditional locally uninformative.²³ Because this accommodation would result in a DRS which violates informativity, this accommodation option is inadmissible. Hence, the definite must be resolved or accommodated no higher than the antecedent. The availability of an admissible interpretation for the conditional derives in part from the accessibility relations which hold between sub-DRS's: because the antecedent is accessible to the consequent, the anaphor can find its antecedent there.

We thus see that patterns of projection and non-projection in van der Sandt's framework are a consequence of the interaction between three things:

- (i) the requirement that an anaphor have an antecedent
- (ii) pragmatic constraints on information structure, which constraint accommodation sites for antecedents

²³ As a matter of fact, a conditional whose antecedent is entailed by prior discourse can be perfectly felicitous. That shows that van der Sandt's conditions require some tweaking. That's beside the point for current purposes.

(iii) discourse structure, as articulated in accessibility relations between DRSs

Our account of the projection of focus-triggered implications, of factives and of other Class C cases similarly entails that projectivity will be sensitive to pragmatic constraints on information structure, and to discourse structure. In our account, these constructions always involve the introduction of a set of alternatives, which must be introduced in an appropriate location within the DRS, a process similar to (but not the same as) accommodation of an antecedent. But the introduction of alternatives will also be subject to pragmatic constraints, as the examples discussed in the previous section show. Similarly, the introduction of alternatives will also be constrained by accessibility. We assume that alternatives must be introduced in a DRS which is accessible to DRS representation of the triggering clause: so, alternatives triggered by the consequence of a conditional may be introduced into the global DRS or into the antecedent; but alternatives triggered by an antecedent may not be introduced into the consequent.

Let me conclude by sketching a possible treatment of the conditional case in (15) above, repeated here:

(15) If it's raining, then Jane knows that it's raining.

The most natural intonation to give to this sentence would place a pitch accent in both the antecedent and the consequent. So each clause triggers the construction of its own alternative set. In the consequent, the pitch accent most naturally falls on the main verb *knows*, plausibly indicating verum focus. Verum focus in this case is associated with the alternative set {Jane knows that it's raining, Jane doesn't know that it's raining.} As we saw earlier, in many utterance situations where this alternative set is triggered, the interpreter will choose to restrict the domain of the alternatives to worlds in which it is raining, in order to construct a conversationally plausible QUD. We'll now argue that to do so in the case of (15) would result in an inadmissible discourse structure.

Let's assume for current purposes that in principle, either the antecedent or the consequent of (15) could be used as the basis for identifying the QUD. Suppose we go with the consequent. Suppose further that we restrict the domain as just suggested, in order to construct a plausible QUD. Now, in effect, we have *assumed* that it's raining immediately prior to indicating *ignorance* about whether it is

raining, as we do (typically) by saying *if it's raining...* This, we would assume, is a pragmatic violation.²⁴ Hence, any interpretation of (15) on which it triggers a QUD which entails that it's raining is ruled out.

The bottom line of the account is perhaps not very sophisticated: it says that you can't assume that it's raining while simultaneously wondering whether it's raining. This was also the essence of Gazdar's account of non-projection in these cases. Many details of the account remain to be worked out. But hopefully this brief presentation suffices to show that this account has available to it the same resources for predicting projection and non-projection as does van der Sandt's anaphoric account of projection. Projection deriving from anaphora resolution is subject to constraints deriving from discourse pragmatics and discourse structure; so too is projection deriving from the construction of alternative sets and QUDs. Hence, the parallel patterns that van der Sandt observed.

References [incomplete]

- Abbott, Barbara. 2000. Presuppositions as nonassertions. *Journal of Pragmatics* 32, 1419-1437.
- Abusch, Dorit. 2002. Lexical Alternatives as a Source of Pragmatic Presuppositions. In B. Jackson (ed.), *Proceedings of SALT 12*. Cornell University, CLC Publications.
- Abusch, Dorit. 2010. Presupposition Triggering from Alternatives. *Journal of Semantics* 27(1), 37-80.
- Amaral, Patricia Matos, E. Allyn Smith & Craige Roberts. 2007. *Linguistics and Philosophy* 30:707-749.
- Beaver, David, 2001: *Presupposition and Assertion in Dynamic Semantics*. CSLI Publications.
- Beaver, David. 2010. Have you noticed that your bellybutton lint colour is related to the colour of your clothing? In R. Bauerle, U. Reyle, and T. E. Zimmermann (eds.), *Presuppositions and Discourse: Essays offered to Hans Kamp*, Elsevier, Oxford. (pp. 65-99).

²⁴ There are lots of different ways we might spell out the details here. We could invoke a Gazdar-style clausal implicature from the antecedent. We could (probably our preference) assume that the antecedent also introduces a polar question into the discourse (i.e. the question {it's raining, it's not raining}). We also could invoke van der Sandt's consistency constraint: once we limit the domain to worlds in which it's raining, then the antecedent of the conditional would be locally uninformative. (To work this out, we'd have to spell out in more detail the interaction between the CG as represented on the scoreboard, and the truth conditional content of the DRS.)

- Beaver, David and Brady Clark 2008. *Sense and Sensitivity: How Focus Determines Meaning*. Malden, MA: Wiley-Blackwell.
- Chierchia, Gennaro and Sally McConnell-Ginet: 1990, *Meaning and Grammar*, MIT Press, Cambridge, Mass. Second edition published 2000.
- Bart Geurts and Rob van der Sandt. 2004. Interpreting focus. *Theoretical Linguistics* 30: 1-44
- Frege, Gottlieb, 1892: 'On Sense and Reference.' Reprinted in Martinich, A.P. (ed.), 4th edition, *The Philosophy of Language*. New York: Oxford University Press, 2000.
- Karttunen, Lauri, 1973: 'Presuppositions of Compound Sentences', *Linguistic Inquiry* 4, pp. 167-193.
- Roberts, Craige. 1996. Information Structure: Towards an integrated formal theory of pragmatics. In Jae Hak Yoon and Andreas Kathol (eds.) *OSUWPL Volume 49: Papers in Semantics*. The Ohio State University Department of Linguistics. Reprinted with revisions in *Semantics and Pragmatics* 2012.
- van der Sandt, Rob, 1992. 'Presupposition Projection as Anaphora Resolution.' *Journal of Semantics* 9, pp.333-377.
- Simons, Mandy, Judith Tonhauser, David Beaver and Craige Roberts. 2010. "What Projects and Why." In Li, Nan and D. Lutz (eds.), *Semantics and Linguistic Theory* 20,, 309-327.
- Judith Tonhauser, David Beaver, Craige Roberts & Mandy Simons. 2013. Towards a Taxonomy of Projective Content." *Language* 89(1), pp.66-109.