

# Contrastors

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## Abstract

The present paper tries to explore one aspect of the theory of Rooth (1992) on focus and contrast: the logical relation between an utterance and the element(s) with which it contrasts. I will call these elements *contrastors* and the relation that I will try to say some new things about is the logical relation of a contrastor to the utterance it is a contrastor of.

In the second half of the paper intonationally marked contrast is compared to a number of other relations like correction, adversativity, concession, contrastivity and confirmation question that seem related.

## 1 Introduction

In this paper I want to defend a pragmatic notion of contrastor. A contrastor is a statement that could have been made instead of the utterance the speaker makes but of which the speaker by making the utterance indicates that she takes it to be not the case. Very obviously, the statements that are entailed to be false by the utterance given the context are contrastors, but their analysis seems fairly straightforward. Another important category of contrastors are relevance related contrastors. In the famous story of the three missionaries trying to use a ferry with a cannibal ferryman, we infer that it is false that there is a bridge. This would be so relevant for solving the problem that we expect we would have been told if there was one. From the fact that we were not told, we infer that there was no bridge.

Strictly speaking, these two kinds of contrastors do not fall under my definition. If the falsity of another statement is due to entailment, it is not clear that the speaker does anything to indicate that it is not true or even that the speaker intends the hearer to assume that it is not true. The speaker just puts the hearer in the position where the hearer can infer that the statement is not true according to the speaker. The same is true in the relevance based cases. It is more that the speaker does not say certain things that leads us to infer that they are false than that the utterance (of the complete story) lets us infer this. It is also not clear that the speaker intends the hearer to draw the inference, the whole issue may not even arise for the speaker.

But there are cases where the speaker indicates by syntactically or intonationally marked forms of what she is saying that there is a contrastor. The contrastors may

be of three kinds. They may be explicitly given in the linguistic context or may be inferrable from elements given in the immediate context. In this case, the utterance corrects the given element. They may have to be accommodated when the speaker uses intonation to mark a conflict between what she herself is assuming and what the other seems to imply. Or they can be directly constructed from the utterance as in contrastive pairs. Finally, they may be present as alternative plausible answers to a question. In my view, contrastors suffice for dealing with pragmatic inferences such as scalar implicatures, exhaustivity effects and contrast and there is no need for reconstructing questions or topics for giving an account of these phenomena.

My theory can be briefly stated as follows. Intonational prominence is the speaker's way of indicating that next to what she is affirming there are also one or more contrastors that she is simultaneously denying. It is up to the hearer to identify the contrastors. The hearer fails if no contrastors can be identified, or if the contextually given contrastor is not found. Grasping the set of contrastors is part of grasping the speaker's intention. Exhaustivity effects and scalar implicatures are immediate consequences of the theory, but so are the distinctness implicatures in contrastive pairs.

Several authors (among others, Steedman (2003) and Gussenhoven (2002)) have posited that different kinds of intonational prominence make for different kinds of pragmatic/semantic contributions. I am not denying that that is the case. I am merely claiming that contrastors form an ingredient in most of these cases.

Several other authors (Groenendijk and Stokhof (1984), Zeevat (1994), van Rooy and Schulz (2003), Krifka (1999)) have started from a theory of questions and developed treatments of focus intonation to account for exhaustivity effects. I am not disagreeing with such accounts provided they are seen as as a special case of the current account. A set of contrastors to an utterance  $U$  can be put together in a Hamblin question<sup>1</sup> (Hamblin (1973)). Given the fact that this set consists of closely related sentences it determines a question of the form:  $\lambda X(X \in A \wedge \varphi(X))$ , a *bona fide* wh-question abstract from which e.g. the partition semantics can be generated. The one remaining and important difference is the set  $A$ , determined by pragmatic factors. But that is nothing more than bringing in the fairly accepted view (Ginzburg (1995)) that the real questions in conversations are not purely determined by compositional semantics but involve a pragmatic resolution process. One of the ways in which this resolution process can be described is as determining a restricting set on the lambda-operator in the abstract. (It seems plausible that the type of the lambda variable has to be adapted as well in certain cases).

A reason for preferring a pragmatic account over a semantic one is that it is more general: we also treat contrastive pairs and other cases of contrast that can only with difficulty be squeezed into a question based framework. A second reason is that we are able to give a fairly naive and direct account and are not dependent on a logical analysis of questions or exhaustivity: these are emergent notions. It is not just that our account seems more natural and general. It also supports a

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<sup>1</sup>Krifka and Rooth can be seen as starting from the Hamblin question and provide accounts of exhaustivity that are close to the position I am taking here.

more plausible account of the genesis of intonation marking in which marking comes out of the functional use of intonational prominence to help recognition. Promoting recognition is particularly useful when confusion is possible, i.e. when something else and similar is expected. It is but a small step from there to the exploitation of intonational prominence to mark the presence of contrastors. And once that is possible, the development of *wh*-constituents and question-syntax is a natural further step. On the other hand, it is not easy to see how the semantics of questions can become an ingredient in the pragmatics of the normal assertion with an intonational centre. I am here merely following the traditional wisdom in historical linguistics that derives functional expressions from lexical elements and the observation that, even now, a good way of asking a *wh*-question is to ask a yes-no question with respect to one of the envisaged answers putting appropriate stress, or even by asserting that answer. Both of these are functionally fine, but show a lack of respect to the person that is consulted: the questioner suggests to know the answer already. Politeness may be important in explaining why proper question syntax and *wh*-constituents developed. The same remarks can be made about contrast. Here we find next to intonation a variety of contrast markers and—in the lexicon—the otherwise unexplained antonymy relation as a structuring principle. We can define antonyms as pairs such that the substitution of one by the other in a sentence automatically gives a contrastor. And this definition can be generalised to the *specifica* sharing a *genus*.

What I am trying to defend is a version of Rooth’s treatment of intonation, without alternative semantics or focus sets. But some of Rooth’s machinery comes back in hardly altered form. Contrastors must (1) be possible in the common ground in which they are invoked and (2) they must be relevant. And they must (3) be obtainable from the utterance by replacing the intonational prominent part by another constituent.

Quite clearly though, this does not tell us enough. There are many examples of candidate contrastors meeting these three constraints that are not proper contrastors. The aim of this paper is to fill the gap: to explain when something is a good contrastor in a context by giving a fourth constraint. The explanation will turn out to go two ways: it is not just helping us to identify contrastors, we can also explain distinctness implicatures arising if two things are put in contrast while the would-be contrastor is not yet a proper one with respect to the common ground.

There are two remaining issues I want to deal with in this introduction: association with focus and exhaustive answers. I will argue that it is not obvious that association with focus is the way to obtain a treatment of the associating particles in the first case and in the second case that it stands in need of a theory like the one in this paper.

Focus sensitive particles are exemplified in (1).

- (1) John also likes BEANS.  
John even likes BEANS.  
John doesn’t like BEANS.  
John only likes BEANS.

In alternative semantics, the semantics is split into two parts: a focus semantics and a topic semantics. This provides two arguments on which a logical operator can be defined to give the semantics of the particle. The argument for doing that is that it would be impossible to give the truth-conditions of the sentences without having access to the abstract obtained by abstracting over the position occupied by the stressed constituent. I find this questionable. First of all, the strongest case for this argument is “only”. But the semantics of “only” provided by Rooth and others just expresses exhaustivity, something that is already part of the semantics of the intonation pattern itself, without “only”. It seems more promising to regard “only” as expressing that the sentence falls short of the expectations. This makes it clear that the speaker knows what is really the case and forces the assumption of all possible contrastors. Negation does not need an association with focus at all. The contrastor is of the form “John does not like X” and the existence of this —false— contrastor gives the “existential presupposition” generated by this kind of negative sentences.

*Also* and *even* are additive markers in the sense that they mark that a topic that was addressed before now receives an answer that comes on top of the earlier answer. In our setup, that means that at the earlier occasion the current utterance was a contrastor and we can explain the intonation as a contrast with that earlier denied contrastor, which is now corrected. “Even” brings the extra conventional implicature that the current utterance is surprising.

This discussion is very brief, but I hope to have created some doubt about the necessity of “association with focus”, “alternative semantics” “focus semantic value” and the like. It should be admitted however that what I am doing here is just a way of doing alternative semantics without constructing extra semantic values.

The second issue is the “second” treatment of exhaustivity of Groenendijk and Stokhof (1984), the exhaustification of answers, a treatment that is needed over and above the exhaustivity of questions in their partition semantics. Here the answer (and utterances which are reconstructed as answers to a question) is split into two parts: a quantifier and a question abstract. The quantifier is exhaustified into an exhaustive quantifier and the exhaustive quantifier is applied to the question abstract. In the original treatment —limited to monotone increasing quantifiers— exhaustifying the quantifier is taking the minimal elements from the quantifier. But it is easily generalised to all cases by taking the informationally maximal elements as in Zeevat (1994).

$$(2) \quad exh(Q) = \{A \in Q : \neg \exists B \wedge Q(B) \wedge B \neq A \wedge \Box(Q(B) \rightarrow Q(A))\}$$

Also the limitation to quantifiers is not essential. In a flexible system anything can be lifted and composed to be a quantifier.

It is interesting to note that this gives a theory of contrastors:  $Q'(A)$  is a contrastor to  $Q(A)$  iff

$\Box(exh(Q)(A) \rightarrow \neg Q'(A))$ . The following lemma gives the connection:

- (3) Lemma:  $exh(Q)(A) \leftrightarrow (\forall Q'(\text{contrastor}(Q'(A), Q(A)) \rightarrow \neg Q'(A)) \wedge Q(A)$   
 Proof. ( $\Rightarrow$ ) Let  $Q(A)$  and  $\neg exh(Q)(A)$ . Then there is a  $B$  such that  $\Box(Q(B) \rightarrow Q(A))$ . Now put  $Q'(w) = \{A\}$  if  $B \in Q(w)$  and  $Q'(w) = \emptyset$  otherwise.  $Q'(A)$  is a contrastor of  $Q(A)$  and true. Contradiction.

So what is wrong with this theory? The arguments I gave before apply here as well. It does not deal with contrast, and it can be seen that the theory is dependent on the selection of the question, to which every condition applies that Rooth had to invoke. Consider Rooth's example (4).

Well, I passed.

$I$  must be turned into a quantifier and by exhaustification we obtain the statement that the set of people who passed is the singleton of the speaker. But this is dependent on relevance: the speaker is the only *relevant* person who passed, not necessarily the only person. We can use the same solution as before by reanalysing the question as  $\lambda x(x \in A \wedge pass(x))$  where  $\{pass(x) : x \in A\}$  gives the utterance and its set of contrastors and  $A$  is obtained by a pragmatic resolution process, but that seems like cheating, if the aim is to use exhaustification for defining contrastors as a pragmatic notion. Also, we normally obtain a far larger set of contrastors than the set we started with. Assuming that the original set  $A$  is just composed of Bill and Paul, with Bill the speaker, we find that the theory now predicts that also *George Bush passed* is a contrastor. That is maybe unproblematic since we know he did not sit the exam, but we may know that Susan took the exam. Susan does not belong to the set  $A$  in these circumstances, but *Susan passed* is a contrastor (and the speaker may know she passed) because she is just not a member of  $A$ . It is not incorrect, but unintuitive. The idea of a set of alternatives from which the speaker is choosing is the basic intuition. We should not blow up that set of alternatives to include elements that intuitively do not belong to it. Any vagueness in the theory of Rooth or in the version I am giving here comes back in the logical accounts of exhaustivity. It also follows that the logical accounts do not help us in solving the concrete interpretation problems around intonational prominence: in fact, they presuppose solutions to them<sup>2</sup>.

## 2 The Distinctness Problem

Rooth gives us a formal criterion for contrastors: they can be obtained from the actual utterance by substituting an expression of the same syntactic category for the intonationally prominent constituent.<sup>3</sup>

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<sup>2</sup>van Rooy and Schulz (2003) employs utility functions to formalise relevance. This is a sympathetic attempt, but it does not give crisp boundaries for the set  $A$  either. In the actual interpretation process the set of contrastors can be left fairly unspecific, as long as we have some. This problem therefore does not arise for the pragmatic view I am developing here.

<sup>3</sup>This makes the notion of a contrastor dependent on the inventory of a naturally language. It is probably better to formulate the criterion independent of a language and base it on a suitably chosen

It is reasonable to put three further constraints on contrastors. First of all, they should be possible. It must not be the case that they are already known to be not false or not to meet the preconditions for being true. Second, it must be the sort of thing that the hearer is interested in, roughly as interested as in the actual utterance. Third, it should be plausible that the speaker knows whether or not the contrastor is the case. The first demand rules out such inferences as: *George Bush failed.* from *I passed*, since we know he did not sit the exam. The second rules out inferences to *The person with the curly hair on the last row failed.*, if it is clear we are not interested. The third rules out the inference to a contrastor if the speaker does not know.

The problem is however that there are still many problems when we adopt the constraints I have given. In (4), presumably we can take any other property of John as giving a contrastor.

(4) John SWAM

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Even if we are interested in whether John was breathing (it is certainly possible to either breathe or not while swimming) and the speaker knows, we should not infer that John was not breathing as he swam.

What I am interested in is a further restriction on contrastors. A contrastor must be distinct from what is said and what is more if the speaker intends it to be a contrastor the speaker must assume that it is (or can unproblematically be accommodated to be) common ground between her and the interlocutor that it is distinct.

Let us go through some examples of good and bad and sometimes good and sometimes bad contrastors. We assume throughout that there is not a problem with relevance, that the speaker knows the truth or falsity of the contrastors and that the common ground has no opinion in the matter.

- (5) a. JOHN and BILL had pizza.  
 b. John had pizza.  
 c. John, Bill and Susan had pizza.

In (5b) does not give a good contrastor. If it would be false, the utterance (5a) is false as well. This means it cannot be a contrastor. But (5c) can be a contrastor even though it entails (5a) and it normally is. If the speaker has said (5a) she implies that (5c) is false. This is the standard pattern for explanations of scalar implicatures. We assume a topic partially ordered by entailment. The answer implicates the falsity of the part of the topic that it does not entail. Horn's definition of scales guarantees that the set of substitutions of members of the scale is a topic set ordered by entailment. There is therefore nothing unusual about a contrastor entailing the utterance. (6) (Jasinskaja (2002)) is another example.

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formal language that can represent more than just the inventory of any particular language. We want to avoid the problem that in a language where there is a largest natural number, we could not have scalar inferences with higher numbers.

- (6)        a. Eleanor has a CHILD.  
              b. Eleanor has a son.  
              c. Eleanor has a daughter.

In this example we see exactly the same pattern. The would-be contrastors entail the utterance. But if we take the two negations, we get a conflict with the utterance itself. They are obviously not proper contrastors.

The situation in the next examples is similar.

- (7)        Mary painted a portrait.  
              Mary painted a red rose.

One possibility here is that the red rose was painted as part of the portrait, e.g. that the rose was part of the hat the model was wearing. In that case, we do not want to conclude that Mary did not paint a red rose. So again there is no proper contrastor. If the second sentence however gives the description of something else Mary might have painted instead of the portrait she painted, (7b) is a proper contrastor and the speaker implicates its falsehood.

- (8)        The butler is the murderer.  
              The driver is the murderer.

Here we find the same situation as above. If we do not know whether the butler is the driver, the speaker does not exclude the driver as the murderer, otherwise he does.

- (9)        a. Some people got drunk at the party.  
              b. John got drunk at the party.  
              c. Few lawyers got drunk at the party.  
              d. Many students got drunk at the party.  
              e. The hosts got drunk at the party.  
              f. I got drunk at the party.  
              g. All guests got drunk at the party.

The would-be contrastors (9b-g) can all be contrastors, but it depends on the common ground whether they really are. In some cases, it is more plausible that reasoning will lead to the assumption that John, me, or all guests are not included or identical with the set of people who got drunk. The speaker may be assumed to know whether he himself got drunk and since we assume it is relevant, she is expected to indicate so if she did. The same for John and all guests. But in principle, it is possible in all cases that the drunks at the party were all the guests, included only few lawyers, many students etc. None of (9b-g) is guaranteed to be a contrastor.

### 3 Contrastors

What we want to define is a relation between an actual utterance and a possible utterance that could have been made instead at the same time and place by the same speaker given the same common ground. The possible utterance is the contrastor. The above examples should indicate that if  $u$  has a contrastor  $c$ ,  $u$  is not automatically a contrastor of  $c$ . The examples should also have made it clear that there is a strong dependency on the common ground: the relation can only very rarely be taken to be a formal one between utterance and contrastor<sup>4</sup>

We want to give an explicit definition here. Contrastors must be distinct propositions from the utterance they contrast with. They must not be identical with or part of the content of the utterance.

Unfortunately this is not an interesting relation on the level of propositions. Propositions are non-identical iff they are non-equivalent. One proposition being part of another is naturally defined by entailment.

A naive application of this criterion would be that the contrastor should not be a logical consequence of the utterance given the common ground. This defines a relation between utterances (given a context of utterance). The common ground has information about the context of utterance, it gives all the possible values that it might have given the incomplete knowledge of the speakers. So there are two ways in which the common ground may strengthen the entailment relation: by restricting the possible values for the context of utterance and by extra information about the content. But even if we strengthen our entailment relation by allowing extra information from the common ground, it is far too weak, because nearly all the possible utterances that were not contrastors in our examples were not logical consequences of the utterance that was made.

An improvement is obtained following Kripke (1980), Kaplan (1989) and Haas-Spohn (1995) in our analysis. Kripke allows for synthetic necessities, necessary statements that are not analytic. This applies directly to equivalence and entailment: the proposition expressed by one sentence can entail the proposition intended by another sentence, without the one sentence having the other as a logical consequence. This would happen with different names for the same person. If John Smith and John Wesley Smith are the same person, the proposition that John Smith is ill is the same as the proposition that John Wesley Smith is ill, but neither sentence is a logical consequence of the other. We need it to be common ground that John Smith and John Wesley Smith are the same person to know that the content expressed by the sentences is the same.

In the work of Kaplan, synthetic necessities are supported by the distinction between content and character. The character expressed by a sentence is the general recipee that gives its content in a context of utterance and is formalised as a function that

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<sup>4</sup>*This* and *that*, *me* and *him*, *the man* and *the woman* are possible exceptions. But, following Kaplan, *this* can be *that*, I can be the man whose pants are on fire and —as we all know— men can turn out to be women.

maps contexts of utterances to functions from circumstances of evaluation to truth values. Analytic truths are due to character, knowledge of the context of utterance can lead to knowledge of identity and entailment between content.

In Kaplan's system, synthetic necessities can arise not just from proper names and kind terms, but also from demonstratives and deictic expressions. Sentences may express the same proposition, but there is no guarantee that people will be aware of this identity or that it follows from logic. The referential uses of definite descriptions are also considered to be directly referential (unlike their attributive uses).

For the purposes in this paper, we need a notion that goes even further: we want to say that utterances denote facts. A definite description always denotes the object it refers to, since it is the object (and not something that describes it) that is part of the object that partly constitutes the fact that might make the sentence true. And this situation is the same for indefinites, quantifiers or predicates. The whole notion of *de dicto* makes no sense on the level of facts. We may not know which fact is denoted by an utterance, but two utterances can denote the same fact or facts in which one is a constituent of the other.

My thesis is that bad contrastors are contrastors that might denote a part of the fact denoted by the utterance.

Facts are a kind of meaning. We assume there is a notion  $[[\varphi]]^{t,w}$  which assigns to  $\varphi$  the fact it denotes. The trouble is that there may not be a unique fact when we are considering indefinites or disjunctions. We can solve this by assuming that  $[[\alpha]]^{t,w}$  denotes a set of facts. We can then restate the theory as:

$\psi$  is not a good contrastor to  $\varphi$  in  $w$  at  $t$  iff every fact denoted by  $\varphi$  in  $w$  contains a fact denoted by  $\psi$  in  $w$ .

And *might*  $p$  is analysed in the standard way: the common ground contains a world in which  $p$  is the case. This can lead to accommodation of distinctness when it is clear which other statement the speaker considers to be a contrastor. Accommodation eliminates those worlds from the common ground in which the given contrastor is a bad one. The common ground has an important second role in the proper understanding of contrast: it gives a stronger version of logical consequence, equivalence modulo the common ground. If on a given common ground,  $\varphi$  entails  $\psi$  we want any fact denoted by  $\alpha$  to contain a fact denoted by  $\beta$  as well.

There are various ways to develop formal theories of facts. Very natural is an approach where we assume an event calculus, with a notion of subevent, thematic role filling operators and various kinds of event building operations. The one problem with such a theory is negation and this problem ramifies into further problems with quantification.

I will do something less ambitious: primitive facts will be identified with positive and negative atomic sentences and complex facts with sets of facts. This allows for a simple way of avoiding the problems with negation.

Before giving the construction, one philosophical remark. In my view, utterance meanings can be identified with facts in the actual world denoted by the utterance.

It is something in the world corresponding to the utterance and what it is depends on the form of the utterance. Falsehood is equated with non-existence of a denotation so that the theory treats sentences and referring expressions in the exactly the same way.

There are two objections to meanings as facts. The first argues that for a proper notion of meaning, a unique meaning is necessary. If that is a problem, we might add the notion of a disjunctive fact. But this may be capitulating too early. There are arguments showing that speakers have particular object in mind when they use indefinites and that chains of reference can be based on them. The hearer knows that in principle many meanings are possible but decides that it is the speaker's meaning she will adopt. The same principle can operate with multiple meanings (even after disambiguation): the hearer can adopt the speaker's meaning without being able to determine which one it is.

The second objection, that one should be able to know the meaning, can be leveled against all theories of meaning that have direct reference in some form as a component. It is for human beings not possible to have direct epistemic access to the haecceities of objects (if there are such entities). It follows that we cannot know the sort of meanings proposed by direct referentialists like Russell (1910), Kripke (1980) or Kaplan (1989), but can at best decide that one out of a range of meanings is the one intended. The problem is just worse here.

In a common ground, the Kaplan style content can change considerably per world and only the diagonal proposition gives an approximation to the informational content. This is the same here: any true information can be seen as the concept of a fact. An information state can be seen as a set of such concepts, with epistemic possibilities being the derived notion of complete states of affairs in which there is a fact for each of the concepts of facts making up the information state. One can contrast the meaning of an utterance with what is attributed to a belief subject. In the meaning of an utterance, any possible *de re* or *de dicto* way of construing the content of the sentence is a commitment of the speaker. It is only in belief attributions that some of the meanings that can be construed for the sentence can be ruled out by inconsistency with other information about the belief subject. Meanings as facts is merely the farthest one can go in constructing the meaning of sentences in a *de re* way. It still holds —I think— that for a belief attribution to a subject, it suffices that the subject is acquainted with a fact denoted by the complement.

## 4 Facts

I will define  $\llbracket \varphi \rrbracket^{t,w}$  for a language with generalised quantifiers.

We allow bound variables only. For  $Q$  a quantifier like **most**, **some**, **few**, etc. and  $\varphi$  and  $\psi$  formulas  $Qx\varphi\psi$  is a formula. The language further has connectives:  $\neg, \vee, \wedge$ .

We further assume that with respect to any world  $w$ , we have a set of domain constants  $A_w$ , one for each object in the domain  $D_w$  of  $w$ .

$\llbracket \alpha \rrbracket^{t,w} = \alpha$  iff  $\alpha$  is a positive or negative literal with domain constants only.

Other literals can be handled by replacing other constants and terms in the literal by the suitable domain constant.

Conjunction and disjunction.

$$\llbracket \varphi \vee \psi \rrbracket^{t,w} = \llbracket \varphi \rrbracket^{t,w} \cup \llbracket \psi \rrbracket^{t,w}$$

$$\llbracket \varphi \wedge \psi \rrbracket^{t,w} = \llbracket \varphi \rrbracket^{t,w} \times \llbracket \psi \rrbracket^{t,w}$$

Negation

We define negative facts by pushing negations towards the inside. Negative literals count as facts.

$$\llbracket \neg(\varphi \vee \psi) \rrbracket^{t,w} = \llbracket \neg\varphi \wedge \neg\psi \rrbracket^{t,w}$$

$$\llbracket \neg(\varphi \wedge \psi) \rrbracket^{t,w} = \llbracket \neg\varphi \vee \neg\psi \rrbracket^{t,w}$$

$$\llbracket \neg\neg\varphi \rrbracket^{t,w} = \llbracket \varphi \rrbracket^{t,w}$$

$$\llbracket \neg Qx\varphi\psi \rrbracket^{t,w} = \llbracket Q_1x\varphi\neg\psi \rrbracket^{t,w}$$

$Q_1$  is obtained as follows.

$$\llbracket \neg\text{most } x \varphi\psi \rrbracket^{t,w} = \llbracket \text{most or just as many } x \varphi\neg\psi \rrbracket^{t,w}$$

$$\llbracket \neg\text{less than } 5 \ x \varphi\psi \rrbracket^{t,w} = \llbracket 5 \ x \varphi\psi \rrbracket^{t,w}$$

$$\llbracket \text{less than } 5 \ x \varphi\psi \rrbracket^{t,w} = \llbracket \text{all except at most } 5 \ x \varphi\neg\psi \rrbracket^{t,w}$$

$$\llbracket \neg\text{all } x \varphi\psi \rrbracket^{t,w} = \llbracket \text{some } x \varphi\neg\psi \rrbracket^{t,w}$$

$$\llbracket \neg\text{some } x \varphi\psi \rrbracket^{t,w} = \llbracket \text{all } x \varphi\neg\psi \rrbracket^{t,w}$$

Quantifiers

We treat any quantifier as *de re* with respect to its first argument  $\varphi$ . This gives a set  $A = \{a \in A_w : w, t \models [a/x]\varphi\}$ .

1. Any fact  $f \in [a/x]\psi]^{w,t}$  and  $a \in A$  is a member of  $\llbracket \text{some } x \varphi\psi \rrbracket^{w,t}$ .
2. If  $\{f(a_0) \dots f(a_4)\}$  such that  $f(a_i) \in \llbracket [a_i/x]\psi \rrbracket^{w,t}$  and  $a_i \in A$  for  $i < 6$  then  $\{f(a_0) \dots f(a_4)\} \in 5 \ x \varphi \psi$
3. Let  $B$  be a majority of a's from  $A$  such that  $[a/x]\varphi$  is true in  $w$ . If  $f = \{f(b) : b \in B\}$  and each  $f(b) \in \llbracket [b/x]\psi \rrbracket^{t,w}$  then  $f \in \llbracket \text{most } x \varphi \psi \rrbracket^{t,w}$ .
4. Let  $B \subseteq A$  be such that  $|A - B| < 5$ . If  $f = \{f(b) : b \in B\}$  and each  $f(b) \in \llbracket [b/x]\psi \rrbracket^{t,w}$  then  $f \in \llbracket \text{for all except at most } 5 \ x \varphi \psi \rrbracket^{t,w}$ .
5. If  $f = \{f(a) : a \in A\}$  and each  $f(a) \in \llbracket [a/x]\psi \rrbracket^{t,w}$  then  $f \in \llbracket \forall x \varphi \psi \rrbracket^{t,w}$ .

etc.

This gives us a first step only. The full notion is

$$f \in \llbracket \varphi \rrbracket_1^{t,w} \text{ iff } f \in \llbracket \varphi \rrbracket^{t,w} \text{ or if there is a } \psi \text{ such that } CG, \psi \models \varphi \text{ and } f \in \llbracket \psi \rrbracket_1^{t,w}$$

Facts determine sets of atomic facts by a function  $flatten(f)$  that collects the basic facts from which it is composed.

A fact  $f$  contains a fact  $g$  iff  $flatten(g) \subseteq flatten(f)$ .

And now we can define our definition of a bad contrastor  $\psi$  to  $\varphi$  w.r.t. a common ground CG.

$\psi$  is a **bad contrastor** to  $\varphi$  w.r.t. to a common ground  $CG$  iff  
 $\exists \langle w, t \rangle \in CG$  such that  $w, t \models \varphi$  and each fact  $f \in \llbracket \varphi \rrbracket_1^{w, t}$  contains a fact  $g \in \llbracket \psi \rrbracket_1^{w, g}$ .

Let us run through some examples.

- (10) Eleanor has a child.  
 Eleanor has a son.

As long as the CG does not rule out that a child of Eleanor might be a son. (The CG can believe to know that Eleanor has a condition that prevents her having male children). Otherwise, there is a possibility in the CG where Eleanor has a child who is also her son. By assumption, the CG supports the conceptual connection that sons are children. So *Eleanor has a son* is a bad contrastor on normal CGs.

- (11) Paul and Mary had a pizza.  
 Paul had a pizza.  
 Paul and Mary and Tom had a pizza.

*Paul had a pizza* is ruled out directly by our construction as a contrastor. (It cannot be purely indirect evidence: if *Paul and Mary ate a pizza* is just CG-entailed by something that is true in  $t, w$ , the sentence is also true in  $t, w$  and thereby denotes a proper conjunctive fact that contains the fact denoted by *Paul had a pizza*.)

Unless the CG has worlds where it logically follows from the fact that Paul and Mary had pizzas that Tom also had some (not a completely absurd idea, e.g. if Tom and John are the same person), the facts denoted in the elements of the common ground by *Paul and Mary had a pizza* do not contain a fact denoted by *Paul and Mary and Tom had a pizza*.

So again, on normal common grounds, (11b) is a bad contrastor for (11a) and (11c) a good one.

- (12) The BUTLER is the murderer.  
 The driver is murderer.

The common ground must guarantee that the driver is not the murderer for the sentence to be a proper contrastor.

- (13) a. Some student attended the lecture.  
 b. John attended the lecture.

(13b) is a bad contrastor if the common ground cannot rule out that John might be the student who attended. There is however a pragmatic reason for thinking that that it may be ruled out by the speaker. If John is a student friend of us, we would

expect the speaker to have preferred the utterance of (13b) over that of (13a), if in fact John was the student who attended and the speaker would know whether he was or not<sup>5</sup>. If the conditions for this pragmatic reasoning are fulfilled, (13b) is good contrastor. In fact we can assume —when the speaker is really well-informed— that the student in question was not anybody we know better. So the speaker can imply that (13b) is a contrastor which has to be accommodated in the common ground.

- (14)      a. Less than 3 students attended the lecture.  
             b. John attended the lecture.

This is at first sight a counterexample to our theory. Less than three students attended is taken to be a negative fact: all except at most three students did not attend. The fact here contains facts showing students not attending and can never contain a fact showing that John did. But a. pragmatically implicates that some students attended and we enter the realm of our last examples: if John was there, why did the speaker not tell us? So, it is not a counterexample after all.

So I take it that we can explain the examples using our facts. An obvious extension would be to develop facts for modal statements and attitude ascriptions.

## 5 Other Theories

### Kratzer

The lumping of Kratzer (1989) may be seen as an alternative way of working out the same intuition.  $B$  cannot be a contrastor of  $A$  in case it is not known that  $A$  does not lump  $B$  in some possibility in the common ground. If  $A$  lumps  $B$  in some possibility  $w$  the set of situations that make  $A$  true in  $w$  is a subset of the set of situations that make  $B$  true. My theory has a better account of what goes on when negation comes along and is less abstract. My way of dividing worlds in facts of that world can be seen as a way to give content to the containment relation between situations.

Still, an account of contrastors can be based on lumping and is not very different, once it is combined with the epistemic framework, except of course for negative sentences.

### Hendriks

Hendriks proposes a condition  $A \not\subseteq B$ , as the meaning of contrast. The generalisation can be motivated from the observation that various special cases (non-identity,  $B \subseteq A$ ) fall out from it and that we can say:

- (15)      That is not a car, it's a limousine.

but not:

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<sup>5</sup>Compare Grice's *I saw John in town with a woman*. Here it is ruled out that the woman was his sister or wife.

(16) That is not a limousine, it is a car.

The theory applies to extensions of predicates, but it is not difficult to look at our contrastors as involving similar set comparisons. In a bad contrastor,  $A \subseteq B$  will hold if we take for  $A$  and  $B$  the sets of facts that contain a fact they denote.

It is however easy to be trapped into equating contrastors with the elements involved in correction constructions of the form

(17) not  $A$ , but  $B$ .

Horn (1989) has shown that  $B$  can correct  $A$  on different levels, its content, its presupposition, its implicatures, its connotation, its verbal expression and even its pronunciation. And  $B$  would then just state what the speaker of  $A$  should have said instead.

Nevertheless, there is a relation. The pitch accents on  $A$  and  $B$  are naturally interpreted as contrastive accents, and if that is correct, the contrastors are also clear:  $B$ 's contrastor is  $A$  and  $A$ 's contrastor is  $B$ . Our notion of contrastor is however designed for content, not for the "metalinguistic" forms of correction.

In (16) we are clearly dealing with the correction of an implicature of what the corrected speaker said: that the car is a normal one. Similarly, in a case like:

(18) John did not have two but three cookies.

Clearly John had two cookies, if he had three cookies, but the negation and the accent target the implicature that John did not have more than two cookies. We will disregard those cases where the negation attaches to another level than the content of the utterance.

An example like (17), an incorrect correction, is a case where the negation attaches to the content. And it is one where our theory and Hendriks' generalisation are in harmony. Any fact that makes something a limousine is a fact that makes it a car. So *it is a car* cannot be a contrastor of *it is a limousine*. (insertion of *allright* after *car*, or *normal* before it, make it correct again. *Allright* indicates that speaker makes a concession and *car* loses its contrastive accent.

### Aloni

Aloni (2002) defends the view that in epistemic models, a question abstract needs to be strengthened by a conceptual cover for the variable introduced by the *wh*-expression. This is a set of individual concepts  $CC$  that covers each epistemic alternative  $w$  in the sense that the domain of that epistemic alternative  $D_w = \{f(w) : f \in CC\}$  and that for no epistemic alternative  $w$  and  $f \in CC$  and  $g \in CC$   $f(w) = g(w)$ . This gives the condition under which the abstract can be used to define a partition of the epistemic model. But it also is the condition under which it is guaranteed that each alternative answer (i.e. concept from  $CC$ ) has all the other answers as contrastors. The approach in this paper aims at the same problem: that answering a question is a choice between proper alternatives. Aloni's position seems the only way to save the

classical theory in an epistemic setting. In my view, a question is better regarded as a pragmatically determined set of contrasting answers, i.e. not as a set of different bindings for a variable, but there are conditions under which the contrasting answers give us a conceptual cover, e.g. if the answers are a set of definite descriptions which are contrastors of each other.

## 6 Contrast, Concession and Adversativity

Contrastive stress merely functions to differentiate the utterance in which it occurs from another possible or actual utterance that is very similar. The stress falls at the point where the difference with the other utterance occurs.

- (19) And where are YOU going?  
Give me a BEER!  
John likes BROCCOLI

The function of the prominence is clear: it is to avoid confusion with the other possible or actual utterance. This is achieved without any convention at all because the extra phonetic prominence increases recognisability and thereby produces the effect by itself. But as a side effect, it also draws attention to the fact that the speaker is not making the other speech act. The speaker implicates (20) (when it is clear what the alternative utterance is which the speaker is avoiding).

- (20) I am not asking: where is PETER going.  
I am not requesting: Give me a GLASS OF WINE.  
I am not saying: John likes PEAS.

There can be trivial reasons why the speaker is not doing those things (she may not like wine, she is not interested in that question or does not know the John likes peas or it is just not the case), but the reason why she wants to contrast her utterance with the other one are not. The other utterance must be active in some way. It may be active in quite a number of ways and one may wonder if this notion of active can be precisely defined. It may have been asserted or suggested, it may be a precondition of the ongoing conversation, it may be a possible answer to a question under discussion, it may be expected, etc.

- (21) Where am I going?

may be the question under discussion in the preceding conversation, perhaps even without having been specifically asked. The request for beer may be prompted by the ordering of drinks that is taking place in which wine is an option. John's liking of peas may be active because of the plan to eat peas when John is coming for dinner or by somebody else's liking for peas. While it is a reasonable assumption when an assertion is contrasted with another assertion that the speaker does not use the other assertion because she thinks it is false, something stronger seems to be going

on here: a convention that in such cases the other assertion is false. With questions and requests something similar is going on: she implies that she is not (anymore) interested in the contrasting question or implies that she does not want the course of action in the other question as much as she wants the course of action in her request.

Another special case is the retraction statement in the correction, the *A* in: not *A* but *B*. *A* typically contains stress on the part where the speaker thinks *A* is wrong and for which she will supply an alternative in the stressed part of *B*.

(22) No, John did not go to LONDON. He went to BERLIN.

The denial contrasts with another possible denial, nl. that John did not go to BERLIN, and that is a denial that the speaker does not want to make. Likewise, the correcting second clause is an assertion and one that contrasts with another assertion, nl. the one that the other speaker made: that John went to London.

Without second correcting clause, it is wrong to put stress on London: no alternative denial would be giving. The second clause can be used by itself (with stress, possibly with an added *no*) to make the correction.

I will run through some constructions that involve contrast, but do not coincide with it.

### 1. answering a question with an answer containing a focussed constituent.

(23) Where is John?  
John is in AMSTERDAM.

The contrast is with other locations where John might be. Some other locations are ruled out by *Amsterdam*, e.g. Holland, the Dam Square, since these are not proper contrastors.

### 2. answering an implicit question with an answer containing a focussed constituent

(24) John will go to TOKYO.

The stressed constituent suggests the contrastors and thereby the question the sentence may be answering.

### 3. confirmation questions.

A confirmation question seeks confirmation to something that the hearer has seemed to say or imply. They are triggered by uncertainty of the speaker about her understanding of the hearer or about the content of what the speaker wants her to believe, e.g. due to having conflicting information or even conflicting CG information. In the latter case stress is in order to indicate the existence with a contrastor in the private or public information of the speaker.

(25) H has implied: John is in Amsterdam.  
CG: John is in Tokyo.  
S: John is in AMSTERDAM?  
S: Is John in AMSTERDAM?

In a second variant, the speaker asks for confirmation of her conflicting information using a negation to make it into a confirmation question again. The contrast is with what the hearer has said or implied.

- (26) H has implied: John is in Amsterdam.  
CG: John is in Tokyo.  
S: John isn't in TOKYO?  
S: Isn't John in TOKYO?

#### 4. corrections

- (27) H: John is in Tokyo.  
S: John is in AMSTERDAM.  
S: No, John is in AMSTERDAM.  
S: No, John isn't in TOKYO, he is in AMSTERDAM.

Characteristic of corrections is the fact that the corrected utterance is given, either by the immediately preceding context or by an explicit denied repetition. The denial contrasts with the possible denial derived from the second clause, the second clause with what the other speaker has said.

- (28) H: John is in Tokyo.  
S: No, he is in AMSTERDAM.

It follows from what I have said that a sentence with a single stress center which is not answering an implicit or explicit question is a correction of something given in the context. But it need not be something that the other speaker has said or implied as in (29).

- (29) H: Susan dreamt that John was in Tokyo.  
S: He is in AMSTERDAM.

#### 5. Double contrast pairs.

- (30) BILL had SPAGHETTI and MARY PIZZA.

Here the juxtaposition creates two contrastive relations and contrastors for each other are provided.

- (31) Mary had spaghetti.  
Bill had pizza.

#### 6. Marked contrast.

- (32) JOHN washed the DISHES, but BILL stayed in BED.

On the one hand, this is a straight case of a double contrast pair. There is an inference to *John did not stay in bed* and to *Bill did not do the dishes*. And there is an inference to the distinctness of staying in bed and doing the dishes.

This comes out better where there does not seem to be a direct incompatibility between the distinct items (it is possible but difficult to do the dishes while staying in bed).

(33) FRIDA went to the PARTY, but MARY washed her HAIR.

The inference is that Mary did not go the party. Frida did perhaps wash her hair as well, but not in the elaborate way in which Mary did so.

Umbach (2001) observes that there is a relation between topic and focus on the one hand and contrastive marking on the other hand. The first element of the contrastively conjoined pair addresses a topic T, and the second the negation of that topic or a topic that implies elements of the negated topic. The negated topic is obtained from the topic by negating the elements of the topic. In our current terminology that means that a set of contrastors is available for the first conjunct, possibly but not necessarily including the negation of the second conjunct. That would mean that the first conjunct can be a contrastor to the second, but need not be: it can contrast with the contrastors in the given topic, while the second conjunct is a contrastor to the first. *But* would in this view mark a change of the topic to its negation or to a topic implying the negation of some elements in the topic.

This view is fully consistent with concessive readings of the contrastive marker.

### 7. Concessive marking

In a concessive conjunction *although A, B* there is an appeal to a quasi-causal connection (34).

(34) If *A* holds, then normally *C*

*B* should entail that *C* is not the case and since *C* is expected, *C* must be a contrastor to *B*, and may include accents.

(35) Although Mary left, John had POTATOES.  
Mary left, but John had POTATOES.  
background: If Mary is away, John normally has rice.

The contrastor is here the hidden expectation from *C*.

### 8. Adversative marking

Dutch, German and other languages have adversative markers, indicating that the context has information from which the current utterance seems unlikely or plainly false. I will discuss only the Dutch *toch*. The immediate context for *toch A* contains a reason to think that *A* is the case. There is an etymological relationship with the English *though* and the origin of these markers may be pronominal versions of the concessive marker, where the complement of "although" is given by a resolution

process rather than as an explicit complement. *Toch* has a bewildering range of uses, including *old*-marking, i.e. indicating that A is already common ground. (These must derive from uses where the reason for disagreeing with the interlocutor is that the common ground had contrary information). The proper adversative uses are all that we are concerned with here. As in the case of the proper concessives, A may intonationally mark a contrast relation to some B in the context or to some B that becomes expected of some explicit element in the immediate context.

- (36) A: Jan nam een grote schep aardappels.  
John took a big spoonful of potatoes.  
B: Jan eet toch geen AARDAPPELS.  
But John does not eat potatoes.

## 7 Conclusion

I have tried to argue for a simple theory of the relation "is a contrastor of". The theory says that a contrastor to A cannot be true on the basis of the facts that make A true. It may be that A is a contrastor to one of its contrastors but that is not guaranteed. The relation between facts and utterances can be seen as an extreme form of *de re* propositions, but it is not necessary to take the view that the fact is the meaning: we can think of it as kind of realisation semantics, or as a relation between facts and utterances that exists independently of semantics.

The complexities in the relation are exclusively due to the fact that in pragmatics, it is necessary to take the viewpoint of the common ground or the epistemic state of the interlocutors. This means that Haas-Spohn's point of view must be taken seriously: an epistemic alternative is a state of affairs, possible or not, for which the subject lacks the information to decide that it is not the actual world. Consequently, the interlocutors do not necessarily know which facts make their utterances true and cannot always decide what alternative utterances are contrastors to it.

I have further tried to go through a number of utterance types in which contrast may play a role. I have maintained that in corrections, question-answer pairs, confirmation questions and assertions, contrastive marking, concessive and adversative marking contrast plays a role, but does not coincide with the speech act (conversational move, discourse relation) expressed in each of these cases. Contrastive intonation arises naturally from the need to prevent confusion and helps in expressing dissent from given contrastors or in finding the intended contrastors. The pragmatic effect of intonational prominence is always the claim that there is a contrastor and that contrastor is false. Sometimes the contrastor is given and, consequently, it must be accommodated that that given element is a contrastor.

My view on intonation semantics tries to be cautious. I need intonational prominence for my contrastors and nothing more. Variations in stress may be related to asking for acknowledgement from the interlocutor, indicating that one is only addressing part of the question at hand, expressing authority and confidence, common ground status and similar, but I do not want or need to be committed to any views on this

matter.

**Acknowledgments** This paper grew out of a difficult question by Maria Aloni on a talk I gave on Hamblin questions, Katja Jasinskaja’s inspiring talk on in essence the same problem and Katrin Schulz and Robert van Rooy’s paper on relevance based exhaustivity. I wish to thank all who reacted to earlier versions of this material for their helpful criticism.

## References

- Aloni, M. (2002). Questions under cover. In D. Barker-Plummer, D. Beaver, J. van Benthem, and P. S. de Luzio, editors, *Words, Proofs, and Diagrams*. Academic Press, CSLI, Stanford, CA.
- Ginzburg, J. (1995). Resolving questions i and ii. *Linguistics and Philosophy*, **18**, 459–527 and 567–609.
- Groenendijk, J. and Stokhof, M. (1984). *Studies in the Semantics of Questions and the Pragmatics of Answers*. Ph.D. thesis, University of Amsterdam.
- Gussenhoven, C. (2002). Intonation and interpretation: phonetics and phonology. In B. Bel and I. Marlien, editors, *Proceedings of the Speech Prosody 2002 Conference*, pages 47–57, Aix-en-Provence.
- Haas-Spohn, U. (1995). *Versteckte Indexikalität und subjektive Bedeutung*. Akademie-Verlag, Berlin.
- Hamblin, C. L. (1973). Questions in Montague Grammar. *Foundations of Language*, **10**, 41–53.
- Horn, L. (1989). *A Natural History of Negation*. University of Chicago Press, Chicago.
- Jasinskaja, K. (2002). Relevance and other constraints on the quantification domain of only. In *Proceedings of Stuttgart Workshop on Context and Information Structure*, IMS, Stuttgart.
- Kaplan, D. (1989). Demonstratives. In J. A. et al, editor, *Themes from Kaplan*, pages 81–163. OUP, Oxford.
- Kratzer, A. (1989). An investigation of the lumps of thought. *Linguistics and Philosophy*, **12**, 607–653.
- Krifka, M. (1999). Additive particles under stress. In *Proceedings of SALT 8*, pages 111–128, Cornell, CLC.
- Kripke, S. (1980). *Naming and Necessity*. OUP, Oxford.
- Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics*, **1**, 75–116.

- Russell, B. (1910). Knowledge by acquaintance and knowledge by description. *Proceedings of the Aristotelian Society*, **11**, 108–128.
- Steedman, M. (2003). Information-structural semantics of english intonation. <ftp://ftp.cogsci.ed.ac.uk/pub/steedman/prosody/santabarbara.pdf>.
- Umbach, C. (2001). Contrast and contrastive topic. In I. Kruijff-Korbayova and M. Steedman, editors, *Proceedings of the ESSLLI 2001 Workshop on Information Structure, Discourse Structure and Discourse Semantics*. ESSLLI2001.
- van Rooy, R. and Schulz, K. (2003). Exhaustification. In H. Bunt, editor, *Proceedings of the International Workshop on Computational Semantics*, Tilburg.
- Zeevat, H. (1994). Questions and exhaustivity in update semantics. In H. Bunt, editor, *Proceedings of the International Workshop on Computational Semantics*, Tilburg.