Disjunction and Alternativeness
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0. INTRODUCTION

There is a requirement which a disjunction must satisfy in order to constitute a felicitous contribution to an ordinary conversation: its disjuncts must be interpretable as relevant alternatives. When such an interpretation is not available, the disjunction is highly anomalous. The disjuncts of sentence (1), for example, appear unrelated to one another, and the disjunction is concomitantly odd. The effect is similar when the disjuncts are related but do not constitute *distinct* alternatives, perhaps by virtue of one disjunct entailing another, as in (2).

(1)   Either there is dirt in the fuel line or it is raining in Tel-Aviv.
(2)   Either there is dirt in the fuel line or there is something in the fuel line.

There is thus a requirement that the disjuncts of a clausal disjunction uttered in a conversation constitute relevant and distinct alternatives. Let's call the first part of this requirement the *relatedness condition* and the second the *distinctness condition*. The goal of this paper is to uncover the source of these conditions

The approach I take is Gricean. I assume that these two pragmatic conditions can be derived from general principles of conversation, interacting with the truth conditions of *or* – which I take to be those of inclusive disjunction. This is a rather uncontroversial position. However, to uphold the position, we need an explicit account of just how the pragmatic constraints can be derived, including the precise nature of the conversational principles which produce them. This paper will give such an account.

The two pragmatic conditions identified above will be treated separately. The relatedness condition turns out to be the more interesting of the two, and most of the paper will be concerned with it. I will show that there are two plausible accounts that can be given, which I will call the *evidence-based account* (section 1) and the *information-based account* (section 2). The evidence-based account develops suggestions made by Grice himself, and shows the relatedness condition resulting from an interaction between the Maxims of Quantity and Quality. According to the information-based account, on the other hand, the relatedness condition is a consequence of the interaction between the Maxims of Quantity and Relation. I will turn to the relatedness condition in section 3. The concluding section will discuss the

relation between the evidence-based and information-based accounts, and will tie up some remaining loose ends.

1. THE EVIDENCE-BASED ACCOUNT OF RELATEDNESS

Under normal circumstances, the utterance of a disjunction must be supported by evidence of a particular kind: evidence that the disjunction as a whole is true, which is not adequate evidence for the truth of any disjunct. The first part of this requirement follows from the Maxim of Quality: "Do not say that for which you lack adequate evidence." The second part is a consequence of the first Maxim of Quantity, which obliges a speaker to give as much information as is required for the current conversational purposes. A speaker should thus not assert, say, *A or B*, if she has evidence that A is true, for an assertion that *A* would be more informative. (We can assume that in most situations in which *A or B* is relevant, *A* would be relevant too. We will turn to an exception below.) In this section, I show that the relatedness requirement can be derived from the requirement for this special type of evidence.

In "Further Notes on Logic and Conversation," Grice (1989, p.44) suggests that to have this special kind of evidence, a speaker must be in possession of a "reasonable ... argument with A∨B as conclusion which does not contain one of the disjuncts as a step (does not proceed via A or via B)." Thus, for example, the argument in (3) could underlie a felicitous utterance of (4):

(3)   i.   Jane's telephone has been busy for an hour.
        ii. The only person she talks to for a long time on the phone is her mother, but occasionally she spends time surfing the web.

(4)   Either Jane is talking to her mother or she's surfing the web.

We can think of such arguments as arguments to possibilistic conclusions. Given the premises in (3), a person could reasonably conclude both:

(5)   It's possible that Jane is talking to her mother.
(6)   It's possible that Jane is surfing the web.

Both (5) and (6) are *reasonable inferences* from (i) and (ii), in something like the sense of Stalnaker (1975)[1]. Moreover, nothing which entails either (5) or (6) is a reasonable inference from these premises. The two propositions disjoined in (4) are thus related in the same way to a single set of propositions: if the propositions in this set are accepted, both disjuncts of (4) are reasonably considered possible. In contrast, the proposition that fleas are pesky is *not* related to this set of propositions in the same way, and this explains the oddity of (7):

(7)   Either Jane is talking to her mother or she is surfing the web or fleas are pesky.

Any argument to the conclusion in (7) based on just the premises in (3) must include (4) as a step. And as (4) is stronger than (7), to utter (7) in these circumstances would be a violation of the Maxim of Quantity. Moreover, there seems to be no reasonable argument to the conclusion in (7) which would not include a step involving a statement stronger than (7). Hence, there seems be no argument of the appropriate kind which could underwrite an utterance of this disjunction.

We thus have the following picture: in ordinary circumstances, the cooperative utterance of a disjunction requires the speaker to have evidence of a particular kind for her utterance. If a hearer judges that a particular disjunction could not possibly be supported by that kind of evidence, she will judge utterances of the disjunction infelicitous. This will almost certainly be the case when the disjuncts are unrelated to one another. The relatedness condition thus reduces to the requirement that there be some argument of the relevant kind relating the disjuncts. This, then, is the evidence-based account of the relatedness condition.

It is important to note that judgements of felicity can easily be changed by providing the premises that would be necessary to support an appropriate argument. Consider again the disjunction in (1):

(1)   Either there is dirt in the fuel line or it is raining in Tel-Aviv.

As observed above, given our ordinary assumptions, these disjuncts appear entirely unrelated, and the disjunction unacceptable. However, suppose it were the case that the car in question is in Jerusalem, that when it rains in Tel-Aviv it is humid in

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1. Stalnaker defines a pragmatic notion of reasonable inference, which is a relation between speech acts, rather than propositions, and is defined as follows: an inference from a sequence of assertions or suppositions (the premises) to an assertion or hypothetical assertion (the conclusion) is reasonable just in case, in every context in which the premises could appropriately be asserted or supposed, it is impossible for anyone to accept the premises without committing himself to the conclusion (Stalnaker 1975: 270-271).

Jerusalem, and that dirt in the fuel line and excessive humidity cause identical malfunctions in cars. In the context of such assumptions, we could easily construct an argument of the appropriate kind to the disjunction in (1), and its utterance would be felicitous.

It follows from the evidence-based account that in a situation in which utterance of a disjunction on truth-functional grounds would be licensed, the relatedness condition should not hold. This indeed seems to be the case. Suppose that you have sent some children on a treasure hunt. Asked for a clue as to where the prize is, you might say:

(8)   Either the prize is in the garden or the square root of 36 is greater than 6.

The children will realize that they must figure out the truth of the second disjunct in order to find out whether or not the prize is in the garden[2]. They will not, of course, reject the disjunction as lacking appropriate evidence, for they know to begin with that the speaker is able to make a stronger assertion than she has made. In this case, though, the stronger assertion is ruled out by the point of the game[3].

There is a further class of cases in which a speaker clearly has truth-functional grounds for her assertion, and in which the disjuncts are not required to be related. These are what I call "monkey's-uncle" disjunctions, such as:

(9)   Either George is in love, or I'm a monkey's uncle.

Clearly, a speaker could have only truth-functional grounds for such an utterance. What makes these disjunctions usable is the fact that it will be immediately obvious to any hearer which disjunct the speaker has evidence for, and that the speaker intends this to be obvious to the hearer. "Monkey's-uncle" disjunctions rapidly become less acceptable when the "monkey's-uncle" disjunct is less than completely obviously false. In any context, (9) will have the effect of communicating the proposition that George is in love, as well as some further proposition to the effect that the speaker strongly believes that George is in love.

The evidence-based account can also be extended to some more complex cases. Consider the difference between (10) and (11), assuming no relationship to exist

2. In figuring out this clue, the children will no doubt assume that at most one disjunct is true, suggesting an exclusive reading of the disjunction. This may appear at odds with my assumption that *or* has the semantics of inclusive disjunction. Many authors have argued that apparently exclusive readings of disjunction are themselves a consequence of pragmatic effects, and do not bear on the truth conditions of *or*. See, among many others, Gazdar (1979), Horn (1989), Groendijk and Stokhof (1984), Simons (2000).

3. This is a modification of an example due to Grice (1989, p.44).

between Jane and the Bishop of Canterbury. (11) is obviously odd in some way in which (10) is not.

(10)   Either Jane drives a Subaru, or her husband drives a Subaru and she drives a Toyota.
(11)   Either Jane drives a Subaru, or the Bishop of Canterbury drives a Subaru and she drives a Toyota.

Both of these examples are of the form 'Either A or [B and C].' Given the evidence requirements, utterances of such sentences require that both disjuncts be possibilistic conclusions (reasonable possibilistic inferences) from a single set of premises. Thus, the felicity of (11) requires that there be some set of premises Γ from which both of the following can be reasonably inferred:

i.   It is possible that Jane drives a Subaru.
ii. It is possible that the Bishop of Canterbury drives a Subaru and Jane drives a Toyota.

Assuming that there is no relationship whatsoever between the kind of car driven by the Bishop of Canterbury and the kind of car driven by Jane, it is hard to see how there could be a set of premises from which (ii) itself, but nothing stronger than (ii), could reasonably be inferred. The evidence-based account thus explains the observation that where one disjunct in a disjunction is itself a conjunction, the conjuncts must be related to one another too[4]. We will return to examples of this kind later on.

2.   THE INFORMATION-BASED ACCOUNT OF RELATEDNESS

There is a second route we can take to derive the relatedness condition on disjuncts. This route bypasses the evidence requirements of Quality, but involves a somewhat more complex understanding of the requirements of Quantity. On this information-based account, to judge a disjunctive sentence felicitous is to judge that it could constitute an informative contribution to a conversation. To develop this account, then, I will need a notion of informative contributions. I'll begin by reviewing Groenendijk and Stokhof's (1984) account of pragmatic answerhood, which formalizes the notion of an informative answer, and will show how this notion

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4. This is not particularly surprising, as conjuncts are in general required to be related to one another. See Lakoff (1971).

applies to disjunctions as answers. I will then show how the treatment of informative answers can be extended to provide a notion of informative contributions generally.

2.1.   Conditions on answerhood and disjunctive answers

The fundamental idea I will borrow from Groenendijk and Stokhof (henceforward, G&S) is that in order for an assertoric response to a question to count as an answer, it must reduce the number of possible *semantic* answers to that question compatible with the questioner's information state. A semantic answer is a proposition which provides a true and exhaustive answer to the question; a possible semantic answer is one which is possibly true (true at some world).

To understand this idea, consider first a questioner who asks:

(12)   Which countries fought in the Hundred Years' War?

Assume that the questioner has no idea at all which countries fought in this war. For her, any proposition which states that some country or countries fought in the war and that no others did is a possible semantic answer to the question. All such propositions are compatible with what she knows when she asks the question.

Suppose that in response to her question, she is told:

(13)   France fought in the Hundred Years' War.

This response does not give her a complete answer to her question, but it is nonetheless informative for her. She now knows something about the answer which she did not know before. Consequently, any proposition which entails that France did *not* fight in the Hundred Years' War is no longer compatible with her information state.

Similarly, if the questioner is told:

(14)   China did not fight in the Hundred Years' War

she will be able to eliminate certain semantic answers that were originally compatible with her information: namely, any propositions which entail that China *did* fight in the Hundred Years' War.

Now, suppose that our questioner does know a little bit about the Hundred Years' War. She knows that it involved some European countries, although she doesn't know which. In this case, her information state at the time of asking the question *already* excludes some possible semantic answers, including (14). Consequently, (14) would no longer provide an informative answer to her question, for it would not

eliminate any additional possible answers. For the same reason, (15) could never count as an answer to the question about the Hundred Years' War:

(15)   Saudi Arabia fought in the Gulf War.

Although true, (15) could not reduce the number of possible semantic answers to (12) compatible with the information state of *any* questioner, for there is no relation at all between the two wars.

Let us make this talk of compatibility more precise by introducing the notion of an individuals *information set*: the set of possible worlds compatible with the individual's information[5]. This set is updated in response to assertions accepted by the individual, resulting in elimination of any worlds incompatible with the new information. The result of updating an information set i with a proposition φ (represented as "i+φ") is thus the intersection of i and φ, i.e.:

(16) $i+\varphi = i \cap \varphi$

A semantic answer can also be treated as a set of possible worlds: those worlds at which the answer is true. To say that an individual's information state is compatible with a particular semantic answer is to say that the individual's information set has a non-empty intersection with that answer. For any question Q, let A/Q represent the set of possible semantic answers to Q, and let A/Q^i represent the set of answers to Q which have a non-empty intersection with a particular information state i [6].

We can now use this terminology to formulate a notion of informativity for responses to questions.

(IA)   *Definition of informativity for answers*
            φ is an informative response to Q relative to i just in case $A/Q^{i+\varphi} \subset A/Q^i$
            [i.e. i+φ intersects fewer semantic answers to Q than does i].

Notice that informativity is defined relative to an information set. Whether or not a response is informative for a particular hearer will depend crucially on the state of the hearer's information set.

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5. This possible worlds formulation is also borrowed, in modified form, from Groenendijk and Stokhof.

6. For any question Q, A/Q determines a partition on the set of possible worlds. This partition constitutes the semantic value of a question in G&S's framework.

The significance of this notion of informativity is that it imposes a pragmatic constraint on assertoric responses to questions. Questioners expect their respondents to at least attempt to meet this standard of informativity, and uninformative responses are generally considered infelicitous, unless the failure of informativity is offset by some other factor. For example, an uninformative response which can be interpreted as a refusal to answer the question is pragmatically acceptable. Similarly, a conditional response such as that in (17), while not informative in the sense defined, provides a strategy for finding an answer to the question[7].

(17)   Q: Is Smith in her office?
         A: If her light is on, then she's in.

But assertoric answers which cannot be interpreted as refusals or as answer-finding strategies are in general required to meet the level of informativity specified in (IA). This observation will provide us with an explanation of the infelicity of certain disjunctions as answers.

2.2. Disjunctions as answers

Disjunctive answers are subject to just the same informativity requirement as any other form. This general requirement, interacting with the truth conditions of disjunction, enforces the relatedness condition on the disjuncts. To see this, let's begin by considering a good case:

(18)   Abe: What's wrong with my car?
         Betty: Either there's dirt in the fuel line or the carburetor is gummed.

Recall that I assume that *or* has the truth conditions of inclusive disjunction. Hence, if Abe accepts Betty's assertion, he keeps in his information set all worlds in which there is dirt in the fuel line and all worlds in which the carburetor is gummed, and eliminates all others, as illustrated schematically in Figure 1. (The oval represents the starting information set i; the shaded area represents the worlds to be eliminated, resulting in the new information set i'; each rectangular segment within the frame represents a possible semantic answer to the question.)

7. For discussion of conditional answers, see Groenendijk and Stokhof (1984). Responses which serve to establish strategies for answer-finding are also discussed by Ginzburg (1995) and Roberts (1996).

**Figure 1:** Update with felicitous disjunction
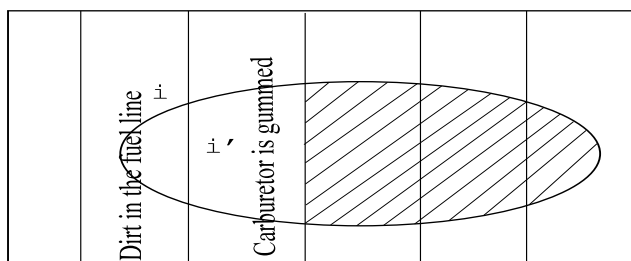
This update reduces the number of possible answers compatible with Abe's information state. Hence, the disjunction constitutes an acceptable response to the question. Notice that update with either of the disjuncts alone would also provide an informative update with respect to the question; this is what is crucial for informativity of the disjunction as a whole.

Consider now the infelicitous discourse below:

(19)　　Abe:　　What's wrong with my car?
　　　　Betty:　Either there's dirt in the fuel line or it's raining in Tel-Aviv.

If Abe accepts this assertion, he eliminates from his information set worlds in which there is neither dirt in the fuel line nor rain in Tel-Aviv. But on the assumption that his information set does not reflect any relationship between the weather in Tel-Aviv and the state of the car, then, for every possible mechanical state of the car, there is a world in which the car is in that state and it is raining in Tel-Aviv. This information update thus does not eliminate any possibility with respect to the state of the car. As illustrated in Figure 2, the disjunctive response in (19) fails to provide an informative answer relative to the questioner's information set, accounting for its unacceptability as a response.

Figure 2: Update with infelicitous disjunction
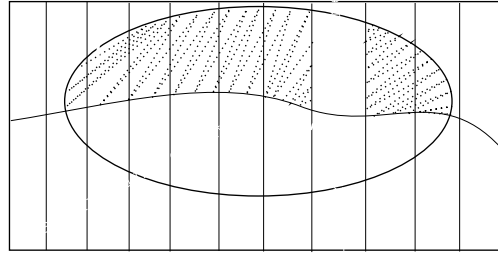
As I observed earlier, the disjunction in (19) could be felicitously uttered given the right set of background assumptions. Suppose that Abe and Betty both assume that the car in question is in Jerusalem, that when it rains in Tel-Aviv it is humid in Jerusalem, and that humidity causes a particular kind of malfunction in a car. In this case, one possible answer to the question is the proposition that it is humid in Jerusalem. In addition, the proposition that it is raining in Tel-Aviv will contextually entail, relative to Abe's information set, that it is humid in Jerusalem. The effect of update will thus be similar to that shown in Figure 1, and this is because each disjunct in the disjunction now provides at least an answer to the question asked.

This turns out to be a completely general result. A disjunction can provide an informative answer to Q, as specified in (IA), only if each disjunct is an answer to Q, i.e.:

(20)   For any information set i and any question Q:
            $A/Q^{i+[A \text{ or } B]} \subset A/Q^i$ only if
            $A/Q^{i+[A]} \subset A/Q^i$ and $A/Q^{i+[B]} \subset A/Q^i$

We now see why the disjuncts in a disjunctive answer to Q must all themselves be possible answers to Q: this is required in order for the disjunction as a whole to be an informative answer to Q. And this in turn is required in order for the disjunctive utterance to be an acceptable response.

There is one type of exception. A disjunctive response interpretable as a conditional answer can be acceptable, even if it is not informative in the sense of

(IA). One's mechanic might reply, in answer to the question *What is wrong with my car*:

(21)   Either you need a tune up or my instruments aren't working.[8]

This response suggests a strategy for finding an answer, and as such is pragmaticaaly acceptable. The question this raises is why answers like (19) are not also interpretable as conditional answers. Why does the hearer not reason that he should determine whether or not it is raining in Tel-Aviv, and thereby perhaps discover that he has dirt in his fuel line?

   Example (21) differs from (19) in two ways. First, (21) offers an answer to a related question, namely:

(22)   Why are the instruments behaving as they are?

The disjunction introduces this new question, by virtue of constituting an answer to it. (See discussion of topics below.) The answer to this new question might provide an answer to the original one asked. Sentence (19) does not introduce any such question. In addition, (21) satisfies the requirements of evidence, while (19) does not. (19) is interpretable as a conditional answer only on the assumption that the speaker knows which disjunct is true, and thus is in violation of the informativity requirements.

When informativity requirements are in force (the usual case), conditional answers are acceptable only if they can be interpreted as being the strongest relevant assertion the speaker can make in accord with her evidence. This observation suggests an interaction between the requirements of evidence and informativity which I will discuss further below.

2.3.   Disjunctions alone

It now remains to show how the information-based account can be extended to disjunctive utterances which are not given in answer to a question, and to do this I need to extend the notion of an informative contribution to non-answer assertions generally. The crucial observation for this extension is that it is not only answers to questions which are required to be informative in a particular way. Any assertoric

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8. This example was provided by an anonymous reviewer. The reviewer also pointed out that the explicitly conditional form, *Unless my instruments aren't working, you need a tune up*, would be the more natural response. Note also that this disjunction is likely to be given a "monkey's uncle" interpretation; your mechanic probably thinks that his instruments are working.

contribution to a discourse is constrained by the requirement that it be relevant to the current conversational purposes (Grice 1967). A conversational contribution must provide information with respect to some topic or issue which is of interest to the conversational participants. Following Carlson (1983) and others[9], I will adopt the view that a discourse topic can be characterized as a question. To address a topic, then, is to provide an answer to the corresponding question.

Further following Carlson, we can identify the discourse topics of particular assertoric utterances. These are the questions to which the utterance provides a (partial) answer. We have observed that whether or not an utterance provides an answer to a given question depends upon the information set of the questioner, and thus it will be useful to distinguish between the *potential discourse topics* of an utterance and the *identifiable discourse topics* of an utterance. A *potential discourse topic* for an assertoric utterance A is any question Q to which A provides an answer with respect to some information set. The more useful notion is the notion of an identifiable discourse topic, which is relativized to discourse participants. I define it as follows:

(IDT)   A question Q is an *identifiable discourse topic* for an assertoric utterance A
and discourse participant P with information set i only if
(i) All presuppositions of Q are entailed by i and[10]
(ii) A provides an informative answer to Q relative to i.

The set of identifiable discourse topics of any utterance will be a subset of the set of its potential discourse topics.

Suppose that a sentence S is uttered in a conversation and that for P, a participant in the conversation, S does not have any identifiable discourse topics. Then, at least as far as P is concerned, the utterance of S must be unacceptable. This is because any contribution to a discourse must provide an answer to some question under discussion and thus, *a fortiori*, to some question. But a sentence which lacks any identifiable discourse topics for P is one whose utterance (as far as P is concerned) cannot provide an answer to any question. This leads us to a minimal condition on discourse contributions, which I call the Topic Condition:

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9. See, among others, van Kuppevelt (1995), Ginzburg (1995, 1997), and Roberts (1996).

10. Condition (i) is intended to capture the idea that Q is a "possible question" for P: roughly, a question which P is in a position to ask. Further conditions might be necessary to fully capture this notion.

(TC)   *Topic Condition*
         For an assertoric contribution to a discourse to be acceptable for a participant
         P, the contribution must have at least one identifiable discourse topic for P.

That is, there must be at least one question to which the assertion provides an informative answer relative to P's information set[11]. The Topic Condition provides a notion of informative contribution for assertions.

We can now extend the conclusions of the previous section to disjunctive utterances which are not answers to explicit questions. An identifiable discourse topic for a disjunction δ and discourse participant P is a question to which δ provides an informative answer for P. From our earlier conclusions, we know that δ can provide an informative answer to a question Q only if all disjuncts of δ are possible answers to Q. Therefore in order for δ to have an identifiable discourse topic for P, there must be a question Q such that each disjunct of δ is an answer to Q for P. The disjuncts of any disjunction which is to be an acceptable contribution to a discourse must, therefore, all bear this relation to at least one question. When this is not the case, the disjunction will lack any identifiable discourse topic, and will be judged an unacceptable contribution.

It seems that in judging the acceptability of disjunctions, especially when these are presented as linguistic examples "out of the blue," informants do not judge solely on the basis of their actual information sets. Rather, they consider whether there is any plausible information set with respect to which the proffered disjunction would satisfy the Topic Condition. When informants judge a disjunction unacceptable, they are determining that there is no such information set. The judgment can generally be changed by suggesting background assumptions which, incorporated into a "reasonable" information set, would have the necessary effect, as we saw above.

We can now see a little more clearly what it means for two disjuncts to be related in the required way: both must be possible answers to some single question. This requirement is a consequence of the Topic Condition, which applies to assertions generally.

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11. Generally, it will not suffice for an utterance to have just any identifiable discourse topic. Some identifiable discourse topic will generally have to be a topic under discussion in the discourse, or relevant to the discourse. The topic condition is thus a necessary but not sufficient condition on felicity. By framing the discussion in terms of the weaker condition, however, we leave room for utterances which serve to introduce new discourse topics, and for felicity judgements about sentences "out of the blue."

3. THE DISTINCTNESS CONDITION

Recall that for a disjunction to be acceptable, its disjuncts must not only be related to one another but must be in some sense distinct from one another[12]. A disjunction which violates this condition is given in (23), repeated from above:

(23)   Either there's dirt in the fuel line or there's something in the fuel line.

(23) suffers from a rather obvious redundancy. The disjunction as a whole expresses the same proposition as its second disjunct, so a speaker could just as well utter that disjunct alone without change in information conveyed. However, (23) seems to suffer from a more serious failure than mere wordiness. This, I attribute to the fact that the operation of disjunction itself is vacuous, in the sense that the result of the operation is identical to one of the inputs. Let us then posit the following principle:

(NVP) *Non-Vacuity Principle*
    The output of any logical operation in the interpretation of an utterance must differ in informativity from any input to the operation.[13]

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12. Hurford (1974) formulates a version of the distinctness condition, claiming that "the joining of two sentences by *or* is unacceptable if one sentence entails the other; otherwise, the use of *or* is acceptable. As will be clear by now, this biconditional formulation of the condition is too strong.

13. As pointed out by an anonymous reviewer, this Non-Vacuity Principle is related to the first condition on assertion posited in Stalnaker (1978): A proposition asserted is always true in some but not all of the possible worlds in the context set. This condition rules out vacuous assertions, i.e. the assertion of a proposition entailed by the presuppositions (background assumptions) of the discourse participants.
    Van der Sandt (1992), in giving admissibility conditions for DRS updates, applies Stalnaker's principle also at the subsentential level. Cast in terms of the information update framework adopted here, Van der Sandt's condition says that update of an information set i to a revised set i' is inadmissible if there is a step in the update procedure which gives rise to a set i" s.t. either i ⊆ i" or i∩i"=∅. This condition, of course, presupposes that information update is procedural. Van der Sandt, working within a DRT framework, assumes that each disjunct of a disjunctive sentence introduces an independent sub-DRS. In our framework, this is to assume that the procedure for updating an information set with a disjunction requires updating the starting set with each disjunct independently and then calculating the union of these intermediate operations. I adopt this update procedure for disjunction in my dissertation, and discuss there some further desirable consequences of the assumption. However, note that even with the adoption of this assumption and of Van der Sandt's principle, the unacceptability of "entailing disjunctions" is unexplained, for the disjuncts in these disjunctions may each be independently informative with respect to the starting context. (If each disjunct entails that Jane has a truck, and this is new information in the context, then each disjunct is informative relative to the context.) The infelicity of entailing disjunctions has to do with the informativity of the disjunction as a whole relative to its parts.

What makes the Non-Vacuity Principle interesting is that the notion of informativity it requires is just the same relative notion of informativity introduced earlier. What matters is not simply that the disjunction as a whole express a different proposition from any of its disjuncts. What matters is that the disjunction give a different *answer* to whatever question is under consideration than any of its disjuncts alone. To see this, consider example (24).

(24)   Q: What kind of car does Jane drive?
        A: #Either she drives a Subaru station wagon, or George drives a Toyota and she drives a Subaru.[14]

Neither disjunct of (24)A entails the other, and consequently the disjunction as a whole expresses a proposition distinct from that expressed by either of the disjuncts. Moreover, it entails that Jane has a Subaru, so it provides an informative answer to the question asked. However, the answer which this disjunction offers is identical to the answer which would be given by utterance of the second disjunct alone (were this to be assertible), or that would be given by saying simply "Jane drives a Subaru." In other words:

(25) $A/Q^{i+\text{ J. drives a Subaru s.w. or G. drives a Toyota and J. drives a Subaru}}$ =
        $A/Q^{i+\text{ G. drives a Toyota and J. drives a Subaru}}$ =
        $A/Q^{i+\text{J. drives a Subaru}}$

The violation involved is thus a complex one. With respect to informativity *simpliciter*, the disjunction does not violate Non-Vacuity. It expresses a proposition distinct from that expressed by either disjunct, and thus is differently informative than either. But with respect to the question being answered, the disjunction *does* violate Non-Vacuity: it is as informative with respect to this question as its second disjunct alone[15].

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14. A reviewer points out that there is a truth conditionally equivalent response to the question which is acceptable, namely: *Jane drives a Subaru, and unless George drives a Toyota, it's a station wagon.* Crucially, this response involves a sequence of two speech acts. The first conjunct constitutes the answer to the question asked; the second provides additional, relevant information.

15. An anonymous reviewer objects to this claim, pointing out that if the addressee of (24)A knows that George *doesn't* drive a Toyota, he learns from the disjunction that Jane drives a Subaru station wagon. Hence, it is suggested, the disjunction is a more informative answer to the question than its second disjunct, or the assertion that Jane drives a Subaru, would be. This point brings out a certain problematicity in my treatment of informativity. I have assumed that informativity is determined relative to a hearer's information set. But speakers do not have perfect information about their hearers' information sets, so utterances may turn out to be more or less informative for the hearer than the

True "entailing disjunctions" do not seem to be usable in any context. In contrast, for cases like (24)A, it is generally possible to construct an appropriate context. Consider the slightly different example in (26):

(26)   Either Jane has a big truck, or she has a truck and George has a station wagon.

As an answer to the question, *What kind of vehicle does Jane have?* the disjunction would involve the same kind of complex violation of Non-Vacuity as does (24)A. But if we furnish a context in which there is under discussion a question to which each disjunct would provide a possible and distinct answer, utterance of the disjunction appears appropriate. Suppose, then, that Jane and George are house mates, and that they are moving house together. I am wondering about the mechanics of their move:

(27)   Q: How are they going to move all their stuff?
        A: Well, either Jane has a big truck, or she has a truck and George has a
            station wagon. Either way, they can get everything into their own cars.

In response to this question, the disjunction is perfectly acceptable.

3.1.   A tangent: Apparent exceptions to the Distinctness Condition

I would like to discuss briefly two apparent exceptions to the distinctness condition. The first type involves intentional violation of the condition for rhetorical effect. Asked what kind of weather you expect for your upcoming vacation, you might reply gloomily:

(28)   Either it'll rain or it'll pour.

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speaker anticipates. However, it seems that we do not judge informativity in terms of the informativity an utterance *happens* to have for a hearer. As an example, consider the question/answer pair in (i):

(i) Q: Did Jane win the contest?
     A: Either she won, or she didn't win and now she's weeping in the bathroom.

The disjunctive answer certainly conveys the information that if Jane didn't win, she will now be weeping in the bathroom. And if the hearer happens to know that Jane is not weeping in the bathroom, she will learn from the answer that Jane won. But I don't think that this consideration makes the response an informative answer to the question. Its use seems precisely to indicate that the speaker doesn't know the answer to the question.

Like the "monkey's uncle" disjunctions discussed above, this sort of disjunction involves an intentional and blatant violation of the felicity condition, and has a similar effect, conveying the speaker's certainty about the proposition expressed. Utterance of the disjunction as a whole thus has a different conversational effect than utterance of either disjunct alone would have, and it is this difference which licenses utterance of the disjunction.

A second and very different class of cases involve what, following Horn (1985), I call *metalinguistic disjunction*, illustrated in (29) and (30).

(29)   George lives in London, or at least he lives somewhere in England.
(30)   George has bought a car, or rather he's bought a brand new Ferrari.

In both of these cases, one disjunct entails the other, but these are perfectly acceptable and do not have the "flouting" flavor of (28). In fact, there is reason to believe that these examples do not involve true disjunction at all, for they differ from ordinary clausal disjunctions in a number of respects. First, they are rendered infelicitous by the addition of *either* at the beginning of the first disjunct:

(31)   #Either George lives in London, or at least he lives somewhere in England.

Second, and crucially, the *or* can be eliminated without any real change in the sense of the string, suggesting that *or* is not making a truth-conditional contribution here:

(32)   George lives in London. At least, he lives somewhere in England.

Third, these *or* sentences, unlike ordinary disjunctions, are asymmetric. To the extent that it is at all possible to change the order of the disjuncts, this change has a significant effect upon the meaning conveyed. Finally, the *or* in these cases is usually accompanied by some qualifying expression: *at least, rather, even, I should say,* and *should I say?* are common.

The function of *or* in these sentences is not to express disjunction of propositions, but to indicate a particular relation between speech acts. *Or* indicates that the act performed by utterance of the second "disjunct" is to fill the same "discourse slot" as the first, and thus in some sense replaces that act. The speaker of (29), like the speaker of (32), is committed only to the claim that George lives somewhere in England. Metalinguistic disjunctions, of course, have something in common with true disjunctions. In both cases, each disjunct is construed as offering an answer to the same question. But in the case of metalinguistic disjunction, the second answer wholly or partially replaces the first, and hence there is no constraint on entailment between the disjuncts.

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4.   RELATING THE TWO ACCOUNTS

I turn now to the relation between the evidence-based and information-based accounts of the relatedness condition. Each account invokes a different interaction between general conversational principles: the evidence-based account attributes the condition to the interacting demands of Quality and Quantity; the information-based account attributes it to the demands of Quantity interacting with Relation. It would be satisfying if one of these sets of conversational demands could be reduced to the other; but this does not seem to be possible. However, in certain cases, satisfaction of one set of requirements guarantees satisfaction of the other. Let's begin by examining such a case.

Consider the disjunction disjunction in (33), first discussed in section 1:

(33)   Either Jane is talking to her mother or she is surfing the web.

This disjunction satisfies the requirements of evidence by virtue of the fact that both disjuncts constitute reasonable possibilistic conclusions from a single set of premises, such as the following:

(34)   i.   Jane's telephone has been busy for an hour.
        ii. The only person she talks to for a long time on the phone is her mother, but occasionally she spends time surfing the web.

These premises form the basis of an argument to the disjunctive conclusion (33), and thus constitute the right kind of evidence for the cooperative utterance of that sentence.

The disjunction satisfies informativity requirements by virtue of the fact that both disjuncts of (33) could be answers to some one question, such as:

(35)   Why has Jane's phone been busy for so long?

This ensures that the disjunction has an identifiable discourse topic.

However, it is not incidental that the disjunction is *both* a consequence of the premises in (34) *and* an answer to the question in (35). We recognize the argument based on (34) as being reasonable because we recognize that, by virtue of the background information in (ii), each disjunct of (33) constitutes a possible explanation for the observation (i). Being possible explanations for (i), they are also possible answers to the question *Why is it the case that (i)?* Indeed, Van Fraassen (1980) argues that explanations simply *are* answers to *why* questions. Thus, in this

case, to recognize that there is an argument of the kind required by the evidence-based account is to recognize that there is a question of the kind required by the information-based account. Thus, it appears that where the question which a disjunction would answer is a request for an explanation, the requirements of informativity will be satisfied if and only if the requirements of evidence are.

But the two sets of requirements come apart in the case of disjunctions which would answer a straightforward information question. Consider:

(36)   Either Jane quit her job or Frankie did.

This disjunction is a possible answer to the question "Who quit their job?" and there is no need for a hearer to be able to reconstruct an underlying argument in order to recognize this. In such cases, the informativity requirements could be satisfied even if the evidence requirements were not. This does not mean, though, that a hearer will not expect the speaker to *have* the relevant kind of evidence.

It is thus not the case in general that the requirements of the information-based account reduce to those of the evidence-based account. It is the case, though, that both sets of requirements are in force. There is nothing surprising in this, for we know that hearers expect speakers to have appropriate evidence for their assertions and to make informative contributions. What is interesting is that in the case of disjunctions, these requirements both have the same effect. Satisfaction of either set of conditions requires the disjuncts to be relevant and distinct alternatives. This pragmatic constraint is thus doubly enforced by general principles of conversation.

But one question remains. I have explained why disjunctions, if used, must express relevant alternatives. But it also seems that where relevant alternatives are to be presented, disjunctions are often preferred over other truth conditionally equivalent forms. Is there then something about the disjunctive form which renders it particularly suitable for this task?

This question about disjunctions is raised by Grice in "Indicative Conditionals," and there he is principally concerned with explaining why disjunctions differ from conditionals in their discourse behavior. This is of particular concern to him because he takes natural language conditionals to have the truth conditions of material implication, and thus assumes a truth conditional equivalence between, e.g.:

(37)   Either the butler did it, or the gardener did.
(38)   If the butler didn't do it, the gardener did.

Unlike Grice, I assume that natural language conditionals have modal truth conditions of the sort posited by Stalnaker (1968), Lewis (1973) and Kratzer (1979), and consequently expect to find certain differences in the discourse behavior of

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conditionals and disjunctions. Nonetheless, the two forms often are inter-substitutable in discourse, an observation which can perhaps be explained by the fact that the assertibility conditions for these forms are similar. Assertion of a conditional is licensed under normal circumstances only if the speaker does not know the truth value of either the antecedent or the consequent, but has evidence for the conditional as a whole. In general, the kind of evidence which supports assertion of a disjunction will also support assertion of a conditional. What would be of most interest would be an investigation of just those cases in which conditionals and disjunctions are not inter-substitutable; but this would take me too far afield.

Let me return, then, to the basic question: is there something special about the disjunctive form which renders it particularly suitable for the presentation of alternatives? The answer, I think, is that this form is peculiarly suited for giving lists. Conjunctions, of course, can also be used to give lists, but all of the members of a conjunctive list are asserted (with the appropriate modification of terminology where the conjuncts are not propositions). Disjunction, however, allows a speaker to list possibilities without committing to the truth of any one member of the list. There is no limit on the number of items listed, and the list can be continued by a different speaker, as in:

(39)   Ann: Either Jane isn't at home or she can't hear the phone.
        Bud: Or she's ignoring it.

Continuation by another speaker is ruled out where the alternatives are listed using the truth-conditionally equivalent form of a conjunction embedded under negation:

(40)   Ann: It's not the case (both) that Jane is at home and that she can hear the phone.
        Bud: #And that she's not ignoring it.

The difference between unembedded conjunctions or disjunctions on the one hand, and conditionals or conjunctions embedded under negation on the other, lies in the complexity of the information update procedure required by each. In context change frameworks (see, among others, Heim (1983), Beaver (1995)), information update is taken to be procedural. I have argued elsewhere (Simons 2000) that the update procedure for a disjunction is as follows: Given a disjunction with disjuncts S_1 to S_n, update i independently with each disjunct, and then calculate the union of the results, i.e.:

(UPD) $i + [\![S_1 \text{ or } S_2 \text{ or } ... \text{ or } S_n]\!] = [i \cap [\![S_1]\!]] \cup [i \cap [\![S_2]\!]] \cup ... \cup [i \cap [\![S_n]\!]]$

Again, this is a procedure which can be iterated indefinitely, with no backtracking and no need for forward "planning"[16].

But consider now the update procedure required by a conjunction embedded under negation:

(UPCN) $i + [\![NOT\ [A\ and\ B]]\!] = i\ /\ [\![A]\!] \cap [\![B]\!]$

This requires, first, the calculation of the intersection of the conjuncts; then, calculation of the complement of this set; finally, this complement must be intersected with the starting set. To add to the embedded conjuncts after the second stage has been completed, it would be necessary to go back and undo the calculation of the complement. The hearer cannot begin the update procedure until the entire propositional content has been presented, and no additions can later be made to this content. This form, then, is far less suited to the function of giving lists than the truth conditionally equivalent disjunctions.

The disjunctive form is thus particularly suited to listing relevant alternatives because it is particularly suited to listing without asserting.

The position I have adopted in this paper is perhaps the most conservative view one could take of *or* within the truth-conditional semantic tradition: *or* has the truth-conditions of inclusive disjunction; the requirement that its disjuncts constitute distinct and relevant alternatives is not a part of its meaning, but a condition on its felicitous use, and this condition is a consequence of general conversational principles. To uphold this view, however, one must be explicit about how the specific conditions which constrain the use of disjunctions arise from the conditions constraining discourse contributions generally. This means giving precise formulations of the conditions and principles involved, and articulating the steps which lead from the general to the specific conditions. The conservative view is plausible only to the extent to which this can be done.

My goal in this paper has been to provide the conservative view with this necessary support. More broadly, the goal is to add to the evidence that conversational principles have a significant explanatory force, and that the explanations these principles provide can be rigorous, precise and satisfying.

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16. The same holds on the assumption that the proposition expressed by the disjunction is calculated first, and the result then intersected with the information set. I have not introduced this procedure in the main discussion as it does not play any essential role in deriving the felicity conditions, and I wished to keep the assumptions introduced to a minimum. Assuming this update procedure does allow for a more elegant formulation of the Non-Vacuity Principle. On this, see fn.13.

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