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THE SPEECH ACT OF CLARIFICATION IN A DIALOGUE MODEL¹

In this paper, a set of felicity conditions for the speech act of clarifying is presented, and it is shown how clarification can be distinguished from explanation. A formal system of clarification dialogue called CD is constructed that builds the speech act of offering a clarification into the system as a distinctive kind of move made by a participant in the dialogue. One party requests clarification of the other party's previous utterance, and then the other party attempts to provide it. At the same time, the dialogue at a global level has a communal goal of solving a problem caused by ambiguity, obscurity of expression, or some other difficulty that prevents a discussion for moving forward. Locution rules, dialogue moves, clarification rules and termination rules for CD are provided.

Keywords: argumentation, dialogue models, ambiguity, explanation, misunderstanding, dialectical shifts.

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There are many theoretical questions about clarification dialogues that remain unanswered, even though they are widely used in artificial intelligence systems, for example in expert systems. What exactly does the term “clarification” mean in the context of a clarification dialogue? Is clarification a kind of speech act that might be represented as such in the typology of speech acts of (Searle 1969)? If so, what are the essential characteristics of such a speech act? What kind of dialogue does clarification dialogue represent? It is clearly not a critical discussion type of dialogue of the type analyzed by van Eemeren & Grootendorst (1984). Perhaps in the classification system of Walton (1998) it can be classified as an information-seeking type of dialogue. It is not information that is wanted, so much as clarification. So the question is whether clarification dialogue is a special type of dialogue in its own right or whether it can be fitted under the category of one of the existing types of dialogue that have already been studied. Another question concerns the close relationship between clarification and explanation. Is a clarification a type of explanation, or is it something different? The question here is how to precisely differentiate between a clarification and an explanation, given that these two speech acts seem so close.

A model of clarification dialogues, of the kind now used in artificial intelligence, if systematized as a structure, could become a vitally important kind of tool for dealing with informal fallacies, and other kinds of problems that commonly occur in argumentation. For example, it has for some time been advocated that fallacies arising from ambiguity, like equivocation and amphiboly, can best be dealt with by seeing them as procedural problems that can be resolved by dialogue exchange in which the recipient or critic of the argument engages in a dialogue with a proponent who put the argument forward (Hamblin 1970; Mackenzie 1988; Walton 1996, van Laar 2003). In such a clarification dialogue, the expression supposed by the critic to be ambiguous or problematic would be cited, the potential ambiguity identified, and the proponent would be asked to clarify what she meant in her earlier discourse in the dialogue when she put her argument forward. Clarification dialogues can also be useful for dealing with fallacies that arise from the asking of questions, like the traditional fallacy of many questions. The best approach is often to question the original asker of the question by asking her to clarify, for example,

whether some statement making an allegation is supposed to be a presupposition of the question. In some such cases, clarification of the question can lead to its reformulation, and with it the removal of the problem.

In this paper, a set of conditions defining the speech act of clarification is presented, and a formal system of clarification dialogue incorporating this speech act is constructed. In the formal model, speech acts are taken to represent kinds of moves made by the participants in a dialogue (Prakken 2005; Reed 2006). The formal model is so far only a simple and basic one that needs to be extended by further research. Its value is that it builds on existing models of dialogue to offer a new formal structure that can be used to provide a clear and precise model of clarification that can be applied to numerous cases and problems of clarification in artificial intelligence and argumentation studies.

1. Examples of Problematic Obscurity and Ambiguity

The best place to begin is with some examples. The first two examples take the form of dialogues between two parties, and in such cases it is natural to speak of a clarification dialogue taking place. We will see below, however, that not all examples of clarification explicitly take the form of a dialogue, and that some reconstruction of such cases is necessary in order to apply a dialogue model to them.

The first example concerns a sequence of e-mails between a professor who had registered to go to a conference and one of the conference organizers. The first e-mail from the conference organizer gave information to all participants in the conference on conference registration and details on paper presentations and accommodations.

Conference Organizer: If you are registering to stay in the University Hotel or Residence, you will need to check in at Alumni Hall (they will receive you any time).

Professor: In your latest e-mail, you say, "University Hotel or Residence." Are these the same or different?

Conference Organizer: The University Hotel on campus is a modern residence. They call it a hotel to set it apart from the more modest student residences.

The e-mail messages quoted above were selected to represent the parts of the dialogue having to do with clarification. There was more information in each message that was deleted. For example, the conference organizer added the following two sentences to his second e-mail: "I think you would be OK at the University Hotel. For about \$30.00 more per night you can get a hotel room downtown on the river."

In the conference organizer's first message, he used the expression "University Hotel or Residence" which seemed ambiguous, or at any rate unclear to the professor trying to plan his accommodations at the conference. In his e-mail, the professor asked for clarification of this expression. In his second message, the conference organizer explain that what is called the University Hotel is a modern residence but different from the standard student residences that are more modest. This response clarifies the previous message to the professor, because he is familiar with standard student residences of the kind he often stays in when he goes to conferences. He can understand that what is called the University Hotel would be more like a hotel, another kind of accommodation he is very familiar with from his experience of going to conferences.

The second example comes from a mediation session concerning the adoption of a baby by a husband and wife. The couple had previously engaged in discussions with the mother, and part of the agreement they had reached was that the mother could have contact with the child. During the discussion however, the mediator had to contend with the problem that the new parents and the mother had different ideas of what "contact" means. In the part of the dialogue paraphrased below,² there is discussion of this point.

Mother: We had agreed that I will have contact with my child.

Wife: My understanding was that by contact you're free to write letters and send pictures on holidays, that kind of thing. But I don't think we ever considered you're seeing the baby and spending time with him.

² I would like to thank Sara Greco for providing this example. She supplied it to me in the form of a transcript from mediation session. I have deleted some parts of the text and simplified other parts of it to produce a paraphrase that provides a relatively simple example of a clarification dialogue.

Husband: My understanding was that the contact would be up to the point where she surrendered the baby to us after signing the papers and it would be "contact" as in saying goodbye to the baby and having the last few moments alone with him. But I didn't realize that it was going to incorporate visitation every other weekend.

According to the understanding of the husband and wife, "contact" meant just having a few moments with a baby after signing the papers. According to the understanding of the mother, contact meant something much more substantial, including having visitation every other weekend. This misunderstanding is a highly problematic one, because there is disagreement between the two sides on what is meant by the term "contact." In order for the agreement to work, it is necessary that this misunderstanding be clarified by the mediator. The mediator had just made such a clarification before the dialogue above began.

This case is different from the previous one, because there was an actual misunderstanding that the mediator had to try to sort out by clarifying the meaning of the term "contact." In the previous case the professor was trying to prevent a problem that might arise on his arrival at the conference when he finds that the accommodation he has selected is not the kind he had in mind. In order to anticipate this difficulty and deal with it in advance, he asks for clarification of the conference organizer's message about the accommodations. The two cases are also different because there is a mediator present in the adoption case whose job it is to be a neutral party who, among other things, can clarify problematic misunderstandings that the two parties to the discussion have.

Looking at these two examples it can be seen that clarification often takes the form of a dialogue that is part of an ongoing dialogue between two parties. Clarification is provoked by a problem or difficulty that arises in the dialogue. It can be a practical problem that arises because one party is uncertain about what to do, or how to follow the advice or directives of the other party. In other cases, it may be that the one party simply doesn't understand something the other party has said because it is unclear or obscure. Obscurity is a relative matter, because what is obscure to one person may be clear to another, for example an expert who knows the specialized terminology an assertion or argument was expressed in.

Obscurity can be a serious problem in argumentation, because you can't argue rationally with another party in a discussion if you can't identify specifically what his or her argument is supposed to be. Obscurity in argumentation requires clarification before the argument can have any hope of being resolved. If someone's argument is obscure, the best response is to ask for clarification.

An example cited in (Walton 2006: 11), taken from Lutz (1989: 5–6) quoted the response of the associate administrator of NASA when asked, during the investigation of the Challenger space disaster in 1986 whether the performance of the space shuttle had been holding its own, or was improving with each launch (Lutz 1989: 5–6).

I think our performance in terms of lift-off performance and in terms of orbital performance, we knew more about the envelope we were operating under, and we have been pretty accurately staying in that. And so I would say that the performance has not by design drastically improved. I think we have been able to characterize the performance more as a function of our launch experience as opposed to it improving as a function of time.

This response was obscure to the interviewer and his audience, even though it may have been clear to those familiar with NASA jargon, for all we know. In this case, although a request for clarification was appropriate, it would have been difficult to know where to start. In a case like this, it would have been appropriate for the interviewer to ask for clarification, but given the density of the prose, it may have been hard to make headway in this task. It may have required an extended clarification dialogue with several moves.

Ambiguity is another problem that can, in most cases, best be solved by means of a clarification dialogue addressed to the key term or phrase that is ambiguous. To cite a simple kind of example, offering directions to a motorist in ambiguous wording could send him off in a wrong direction. In many cases, the problem is a simple one to solve by means of a clarification dialogue. The motorist can ask the speaker what she means, one thing or the other, and then she could offer clarification by stating the meaning she intended. In other cases, however, the problem can be more difficult to solve. Ambiguity can give rise to fallacies like equivocation

in which a word or phrase is used in two different meanings in the same argument, and *amphiboly*, the same kind of problem, but arising from ambiguity of sentence structure rather than from a single word or expression. *Amphiboly* can be a serious problem in law, where it can prove to be vitally important how a clause in a contract, for example, is phrased. But in such cases, merely asking for clarification may not solve the problem, for once a contract has been agreed to, it is binding on both parties, and the issue of what the terms or clauses in the contract mean may be hard fought by both sides.

In the following case (*Gorgichuk v. American Home Assurance Co.*, CCHDRS 43-004 I.L.R., Ontario S.C., April 19, 1985) the disputed issue was whether a man's accidental death was covered by his insurance policy, according to the contract. The description below is quoted from (Walton 2006: 24).

The plaintiff's husband died as a result of a motor vehicle accident which occurred in Barbados. The bus in which the man died was transporting him, the plaintiff, and others from their hotel in Barbados to the airport at the end of their 14-day vacation. The couple had purchased the vacation package through an agent. As part of the package they purchased accident insurance under a group policy. The policy provided \$45,000 in coverage for death occurring in consequence of riding in: (1) any aircraft ...; or (2) "any airport limousine or bus or surface vehicle substituted by the airline." The policy provided \$15,000 in coverage for death arising out of the use of other public conveyances. The plaintiff argued that the words "substituted by the airline" in (2) above referred only to the words "surface vehicle."

The problem arose in this case because of the ambiguity of clause (2), due to its obscure sentence structure. Two clarifications of the meaning of clause (2) are possible:

(C1) any airport limousine, or bus or service vehicle substituted for an aircraft by the airline;

(C2) any airport limousine or bus, or service vehicle substituted for an aircraft by the airline.

The insurance company argued that (C1) should be taken to be the intended meaning of clause (2). The bus was the normal mode of transport

from the hotel to the terminal, so the insurance company argued that they did not have to pay the \$45,000 death benefit. The plaintiff argued that clause (2) should be interpreted as meaning (C2). On this interpretation, the bus did not have to be “substituted” for an aircraft. On that interpretation, the insurance company would have to pay out the \$45,000 death benefit.

In this kind of case, the problem cannot be solved by a clarification dialogue of the simple kind used in the motorist example. The two clauses exist in the contract that was agreed to, and the problem can't just be solved by asking the framers of the contract what they meant to say. Instead, a third party, the judge or jury (trier of fact) has to examine the arguments on both sides, and arrive at a decision at a different level of dialogue. The judge has to look at all the evidence and decide which interpretation is the more reasonable, given the facts and legal rules relevant to the case. In this particular case, the judge ruled that (C1) was the better justified interpretation of the contract, and so the plaintiff's claim to collect the larger death benefit of \$45,000 was not upheld. What the judge does may partly be seen as a kind of clarification dialogue, but more to it is involved than that. It can be seen as a kind of meta-dialogue about a first level dialogue in which a dispute between two sides takes place.

Another legal example of a kind that may be considered fairly common is a request from a jury deliberating on a criminal case at trial, saying to the judge: “we would like clarification of the term ‘reasonable doubt.’” In this instance, the request is for the judge to clarify the legal meaning of the term “reasonable doubt” as it applies to the case.

Another example that suggests the importance of clarification dialogue in connection with fallacies is taken from recent work on the fallacy of wrenching from context (Walton & Macagno 2007). In this case, a remark made by Vice-President Al Gore led to a widely circulated story that he had claimed to have invented the Internet. This story arose from an interview of Gore by Wolf Blitzer on CNN's *Late Edition* program on March 9, 1999.³ Gore was asked to describe what distinguished him from another challenger for the presidential nomination and he replied as quoted below.

³ A transcript of the interview can be found at this site on the Internet: <http://www.cnn.com/ALLPOLITICS/stories/1999/03/09/president.2000/transcript.gore/index.html>

During my service in the United States Congress, I took the initiative in creating the Internet. I took the initiative in moving forward a whole range of initiatives that have proven to be important to our country's economic growth and environmental protection, improvements in our educational system.

If you look at the wording of what Gore actually said, there is no evidence that he claimed to have invented the Internet. To paraphrase what he said more accurately and fairly, he claimed only to be responsible for helping to create an economic and political range of initiatives that helped to move the development of the Internet forward. Unfortunately however, by saying "I took the initiative in creating the Internet," a saying that was ambiguous and vague, he left himself open to the charge that he claimed to have invented the Internet. This simplified but inaccurate and misleading version of what he said was then repeated on the media, making Gore look ridiculous. When the distorted attribution was used to attack Gore and his political views, the straw man fallacy was committed. In this case, one can see the damage caused by the straw man fallacy and by wrenching what was said from context. The damage was done before any clarification was made, but one can appreciate how a clarification dialogue might have helped untangle the matter, once the attacks on Gore were underway.

2. Explanation and Clarification

There are four particular kinds of situations in which clarification dialogues are useful. One is the kind of situation where an explanation of an anomaly is needed. Another is the kind of situation cited in section 1 where an ambiguity has proved to be an obstacle to communication, and where clarification of terminology would make the ambiguity apparent to the participants in the dialogue, thereby enabling the dialogue to move ahead more constructively. A third is the kind of situation where an explanation is required. A purpose of offering an explanation is to convey understanding to a questioner who has questioned something that is puzzling, or represents an anomaly of the kind that needs to be explained. A fourth kind of situation where a clarification dialogue is useful is the kind of case where the definition is offered to help a questioner understand the meaning of the term or expression that he or she is not familiar with.

So far, in the study of formal dialogue systems, most attention has been paid to studying types of dialogue that are frameworks for argumentation. These include persuasion dialogue, inquiry, information-seeking dialogue, negotiation, deliberation and the eristic or quarrelsome type of dialogue. Clarification dialogue seems most closely related to the information-seeking type of dialogue. However, it does not seem that these two types of dialogue are the same. The purpose of information-seeking dialogue is the transmission of information from one party to the other, but this goal seems inherently different from that of the process of clarification. Clarification is presumably informative, in some sense, but it appears to be different from the providing of information of the kind characteristically carried out in information-seeking dialogues.

The purpose of using an argument is to resolve some disagreement or doubt that has arisen about some particular proposition at issue. Argumentation presupposes an expression of doubt on the part of one party in the dialogue, while the other party has the goal of removing this doubt by providing reasons to accept or not to accept the proposition at issue. Explanation, as a type of speech act, can be contrasted with argument. What provokes explanation is not doubt whether the event to be explained actually occurred or not, but understanding of why or how the event occurred. Thus there is a fundamental distinction between the speech act of explanation and speech act of argument. Each has a different purpose.

The purpose of clarification dialogue is to help one party in a dialogue to understand an obscure or otherwise problematic utterance of the other party. To understand such a dialogue and its purpose, one has to understand that two parties are involved. One of these parties, whom we might call the respondent, needs or wants clarification of something, while the other party, whom we might call the proponent, is presumed by the respondent to be in a position to offer clarification. It is important to draw a distinction between the goal of the dialogue as a whole, and the individual goals of each of the two participants in the dialogue. The goal of the dialogue as a whole is for this process of clarification between the two parties to take place successfully. The goal of the proponent is to offer clarification to the respondent, clarification of such a kind that will remove the respondent's puzzlement or failure to understand something. The goal of the respondent is to obtain such clarification.

Not much work has been done on studying formal dialogue frameworks for the speech act of explanation, but some work has been done in this area. According to the new dialectical theory of explanation (Walton, 2004), the purpose of offering an explanation is to transfer understanding from one party who presumably has it to another party who lacks understanding about some event or phenomenon that is anomalous and appears puzzling to him or her. The new dialectical theory is different from the traditional covering law theory in that it views an explanation in the context of dialogue in which there are two parties and the explanation is based on a verbal exchange between them.

In a formal system of dialogue CE is presented in which speech acts of requesting and providing an explanation are represented as dialogue moves in the system (Walton 2007). CE has opening rules, locution rules, dialogue rules, success rules and closing rules. This dialogical theory of explanation postulates that an explanation is a dialogue between two parties, one of whom asks a question requesting understanding of something which he or she claims not to understand, while the other offers a response that claims to convey the requested understanding to the party asking the question.

To use such formal dialogue systems to model clarification dialogue, we need to draw a clear distinction between clarification requests and clarification responses. A clarification request can be considered as a special kind of speech act of request, while a clarification response can be seen as a special kind of speech act of response. The latter is more like an assertive speech act. However there are no dialogical speech acts in Searle's theory (Searle 1969), and hence for the purpose of the analysis of clarification speech acts, we need to redefine the notion of a speech act as a dialogue move.⁴ In other words, clarification must be seen as inherently dialogical. We need to see clarification as an exchange consisting of two speech acts, a request and a response.

A clarification dialogue could take place within another dialogue that is ongoing but where a problem is encountered. It could be a persuasion

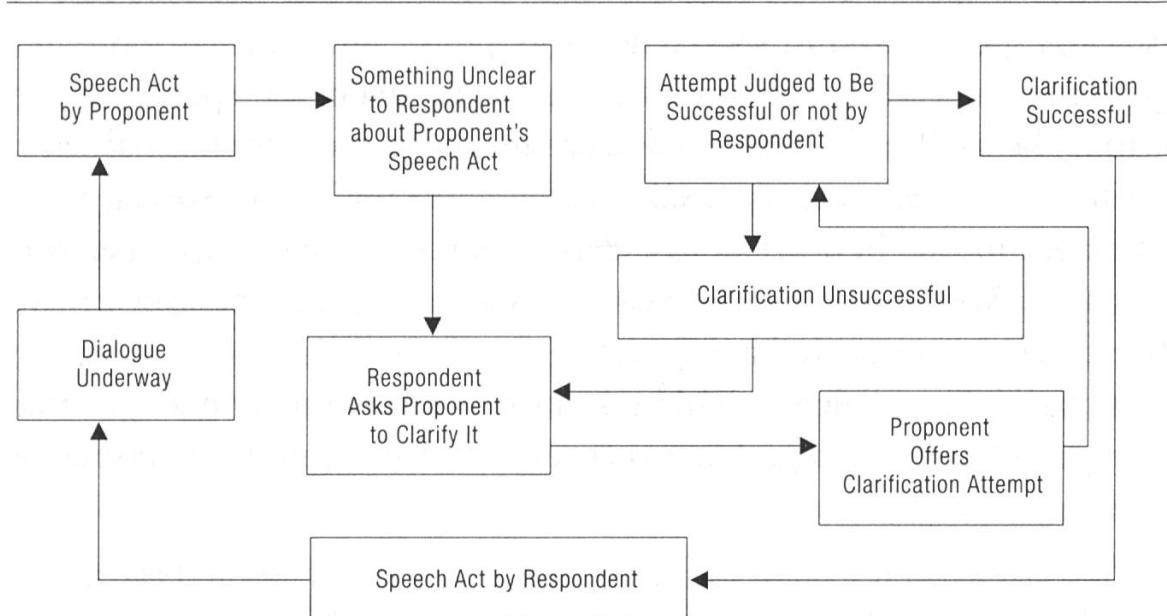
⁴ It would appear that others have taken this approach as well. Merin (1994) has advocated it, and it has also been put forward by the Geneva and Birmingham schools of discourse analysis (Stubbs 1983).

dialogue, a negotiation, a deliberation, or any other type of goal-directed dialogue. The sequence of dialogue that the speech act of clarification is characteristically part of is shown in figure 1.

As such a dialogue is underway at one particular point, a speech act is put forward by one party, and because there is something unclear about the speech act to the other party, at the next move in the dialogue, the other party asks the first party to clarify it. Let us call the party who originally put forward the speech act the proponent, and the other party who questioned this speech act the respondent. At some point in the dialogue, the respondent puts forward an argument, makes a claim, or makes some other move in the dialogue that has the form of a speech act. Because the speech act is unclear to the respondent, he questions it, and asks the proponent to clarify it. To meet this request, the proponent is supposed to offer some clarification attempt. The respondent will then normally reply by indicating whether he felt that the response was successful in answering his question for clarification or not.

Both explanation and clarification involve transfer of understanding from one party to another in a dialogue, but the difference between them can be characterized as follows. An explanation can be of an event, or of an anomaly of any sort, whereas a clarification occurs where one party

Figure 1: Sequence of Dialogue in Which Clarification Occurs



has made some move in the dialogue, a verbal move or speech act, there is something that is unclear to the second party, and the second party, at his next move, declares that he does not understand what was said and requests that the first party provide understanding. This account of the distinction is compatible with the observation of Schlangen (2004: 137) that what examples of clarification have in common is that unlike normal questions, they are “not about the state of the world in general, but about aspects of previous utterances.”

The TREC system of clarification dialogue discussed by De Boni & Manadhar (2003) was aimed at testing a system’s ability to track content through a series of questions in which the system was required to respond correctly to situations in which full understanding of a question depended on an understanding of previous questions. To accomplish this task, the system has to track context over a series of questions in a dialogue. Thus the problems of defining clarification more fully, and developing systems of clarification dialogue for use in argumentation and artificial intelligence, cannot be solved only by using the speech act definition of clarification proposed above. It needs to be solved by seeing how a speech act request for clarification can be paired in dialogue with a response at the next move by the other party that purports to offer clarification. It needs to be solved by studying criteria for success of such a response. It needs to be solved by studying the kinds of situations, like obscurity and ambiguity, that give rise to requests for clarification. And finally, it needs to be solved by studying how clarification dialogue systems track context over a series of questions in a dialogue.

In order for a dialogue of this kind to be successful, each party has to understand the moves made by the other party, and even to understand the needs of the other party, in order to help the dialogue move forward constructively. But what exactly is understanding of this sort? In the past, this question would have been considered impossible to answer by analytical philosophers, because of its subjective nature. But recent developments in artificial intelligence have now begun to develop an analysis of the concept of understanding that is useful for computing.

In a way, the early analytical philosophers were right to assume that understanding is subjective. An agent, whether it is a computer or a human, understands its incoming experiences and messages from other

agents in terms of its own frame of reference, including its goals, commitments, expectations, perceptions of what is normal, values, and customary and routine ways of doing things. Thus in order to grasp understanding, we have to frame it in a dialogue context in which one agent understands, or fails to understand, a message sent to it by another agent. In the same kind of relational context, an agent can understand, or fail to understand, an incoming message in the form of a perception from its environment. In order to have enough mutual understanding to engage in activities like asking a question, putting forward an argument, or attempting an explanation, agents have to share common starting points and common knowledge. Much of this common knowledge is linguistic. In order to communicate, agents need to share a language, with its conventions and rules.

According to the original theory of Schank & Abelson (1977), now widely accepted in artificial intelligence and cognitive science studies (Schank & Riesbeck 1994), communicating engines share common knowledge in the form of what are called scripts. Scripts are concisely described by Schank, Kass & Riesbeck (1994: 77) as “frozen inference chains stored in memory.” Typical scripts represent knowledge people can generally be presumed to have about common situations, and knowledge they have about routine ways of doing things. The usual example is called the restaurant script (Schank, Kass & Riesbeck 1994: 7). A person knows when he or she goes to a restaurant that there is a set of routine actions and common expectations about what is or is not done in that setting. Generally you expect to enter the restaurant, to be seated, to get a menu, to read it, to have a conversation with the server, to order some food, to be served or collect the food, to eat, to pay, and then to leave the restaurant. Restaurants and actual practices vary, but there is a general routine and the steps or actions in that routine are generally performed in a certain order. If you’re not familiar with the restaurant script, you might learn it by going to one restaurant, and then apply that knowledge of the restaurant script when you go to another restaurant that is similar, but not exactly the same in every respect.

According to this theory, we understand new things that we partly fail to understand by relating them to old things we already understand. Thus when there is a failure of understanding, it is because there is a gap

in something that generally makes sense to us, but there is one particular respect or point in which it fails to make sense. For example, if there seems to be an anomaly, an inconsistency or some respect in which an event appears strange or unusual, it may provoke an agent to seek an explanation or to ask for clarification of the thing that does not make sense to him or her. In order to offer clarification or explanation of the kind that would lead the questioning agent to come to understand what he or she presently fails to understand, the answering agent needs to assume that the questioning agent already understands quite a bit about the event in question, to focus on the particular part that doesn't make sense. In other words responding to a request for clarification is best seen as a kind of repair process.

3. The Speech Act of Clarification in a Dialogue Setting

The felicity conditions for the speech act of clarifying can be formulated after the manner of Searle (1969) by contrasting clarifying with the speech acts of requesting and promising. Table 1, set up after the fashion of the table used by Aakhus (2006) to define the speech act of making a proposal for action, presents the felicity conditions for the speech act of clarifying in the middle column.

To show the reader how other speech acts are typically defined, the felicity conditions for the speech of requesting are given in the left column, while the felicity conditions for the speech act of promising are given in the right column.

The analysis of the speech act of clarifying in table 1 is an important step towards the goal of providing a model to study clarification, but it is only a first step. The speech act analysis has to be set in a context in which requests for clarification are made and are responded to appropriately, inappropriately, and when appropriately, with greater and lesser degrees of success. We need a dialogue model, for this purpose, in which the distinction needs to be drawn between the speech act of requesting a clarification and the speech act of responding to such a request by supplying a clarification, or at least making a clarification attempt.

Four principal formal systems of dialogue were constructed in (Walton 1984) as structures to model the kinds of argumentation used in connection with informal fallacies. There was no thought given at this time to

Table 1: Felicity Conditions for the Speech Act of Clarifying

<i>Act</i>	<i>Request (Searle 1969)</i>	<i>Clarify</i>	<i>Promise (Searle 1969)</i>
<i>Propositional Content</i>	Future act A of H.	Past speech act A of S.	Future act A of S.
<i>Preparatory Condition</i>	H is able to do A. S believes H is able to do A. It is not obvious to both S and H that H will do A in the normal course of events of his own accord.	H is unable to understand A. H believes that S can do something to lead H to come to understand A. It is not obvious to both S and H that H can continue the dialogue successfully if he does not understand A.	S is able to do A. S believes S is able to do A. It is not obvious to both S and H that S will do A in the normal course of events of his own accord.
<i>Sincerity Condition</i>	S wants H to do A	S believes H understanding A will mutually benefit H and S.	S intends that in uttering to do A he is under the obligation to do A.
<i>Essential</i>	Counts as an attempt to get H to do A.	Counts as an attempt to lead H to understand A.	Counts as an attempt to commit S to do A.

applying these models to studying explanation or clarification. However one of these systems, called CB, similar to previous systems devised by Hamblin (1970, 1971) and Mackenzie (1981), because it is simple and basic, provides a nice platform that can be extended to modeling other kinds of dialogue. In this type of dialogue, each of the two parties, the proponent and the respondent, has a thesis to be proved as its ultimate conclusion, and it tries to devise strategies to prove this conclusion based on the explicit commitments of the other party. In recent terminology, CB would be classified as a type of persuasion dialogue. In one of the other dialogue system CBV, implicit commitments as well as explicit commitments are used. Each party has a set of implicit commitments that may not be known to either party, as well as a set of explicit commitments that are on public view and known to both parties. In this system, implicit commitments of a party are revealed if he tries to avoid commitment. For example, suppose the party denies he is committed to a particular propo-

sition, but it is revealed that it is among his implicit commitments. Now he has to resolve the apparent inconsistency.

The rules of CB are presented below. They are taken verbatim from (Walton 1984: 133–135) except that the labels of the rules (CBLR1, etc.) have been changed.

– *Locution Rules*

CBLR1. Statements: Statement letters, S, T, U, ..., are permissible locutions, and truth-functional compounds of statement-letters.

CBLR2. Withdrawals: “No commitment S” is the locution for withdrawal (retraction) of a statement.

CBLR3. Questions: The question “S?” asks “Is it the case that S is true?”

CBLR4. Challenges: The challenge “Why S?” requests some statement that can serve as a basis in (a possibly defeasible) proof for S.

– *Commitment Rules*

CBCR1. After a player makes a statement, S, it is included in his commitment-store.

CBCR2. After the withdrawal of S, the statement S is deleted from the speaker’s commitment store.

CBCR3. “Why S?” places S in the hearer’s commitment-store unless it is already there or unless the hearer immediately retracts his commitment to S.

CBCR4. Every statement that is shown by the speaker to be an immediate consequence of statements that are commitments of the hearer then becomes a commitment of the hearer’s and is included in his commitment store.

CBCR5. No commitment may be withdrawn by the hearer that is shown by the speaker to be an immediate consequence of statements that are previous commitments of the hearer.

– *Dialogue Rules*

CBDR1. Each speaker takes his turn to move by advancing one locution at each turn. A no-commitment locution, however, may accompany a why-locution as one turn.

CBDR2. A question “S?” must be followed by (i) a statement “S,” (ii) a statement “Not-S,” or (iii) “No commitment S.”

CBDR3. “Why S?” must be followed by (i) “No commitment S” or (ii) some statement “T,” where S is a consequence of T.

The problem is to devise a system that can be used to supplement CB, and many other kinds of dialogue systems as well, that will allow for clarifi-

cation moves to be made. The first locution rules needed are those that allow for clarification requests to be made. Using the clarification request rule, a speaker may ask the hearer to clarify a statement the hearer previously made. Clarification moves could apply to questions as well as to statements, so a speaker could also ask the hearer to clarify a question he had asked. Thus two kinds of clarification requests are involved, depending on whether the hearer's previous move in the dialogue was the putting forward of a statement or the asking of a question. "Clarify S" requests clarification of a statement S that was put forward by the hearer at his previous move. "Clarify Q" requests clarification of a question Q that was asked by the hearer at his previous move. The making of a clarification request of this sort signals the opening of a clarification dialogue.

Dialogue rules are needed to govern how clarification requests are made and responded to. The first part of the rule says that whenever a statement is made or a question is asked by a speaker, the hearer may put forward a clarification request at his next move. The second part of the rule says that the speaker should attempt to fulfill the clarification request at his next move after the hearer asked for it. This rule requires that the speaker should offer an attempt at clarification. Such a rule can be formulated as follows: "Clarify S" or "Clarify Q" (depending on whether the previous move was the making of a statement or the asking of a question) should either be followed by a statement T that attempts to clarify S or Q, or by a reply admitting that the speaker can't do it. The speaker indicates this by saying, "I can't clarify it." A clarification attempt is defined as any set of statements made by the other party in response to a clarification request other than a statement of the form, "I can't clarify it."

This last dialogue rule does not require that the clarification attempt has to be successful. A successful clarification attempt is one that leads the hearer to come to understand the statement or question that the hearer asked about. These considerations lead us to a discussion of clarification rules. The first is the rule that after any clarification attempt by the speaker, the hearer should indicate whether the speaker's clarification attempt was successful or not. This response could be indicated by the hearer's saying, "I understand," or "I still don't understand."

Now more dialogue rules are needed. They could be called termination rules, because they state the condition under which a clarification is

ended. If the hearer makes the former reply, "I understand," the clarification dialogue ends. If the hearer makes the latter reply, "I still don't understand," the dialogue needs to continue, and further clarification attempts need to be made. Such a series of exchanges needs to continue until the hearer either says "I understand" or the speaker says "I can't clarify it." In either event, the clarification dialogue ends.

4. A System for Clarification Dialogue

To solve the problem of building the speech act of clarification into an appropriate dialogue setting, a dialogue system called CD is presented. Like CB, it has locution rules and dialogue rules. In the basic system of clarification dialogue CD outlined below, there are four kinds of rules. There are seven kinds of locutions allowed: statements, questions, clarification requests for statements, clarification requests for questions, clarification responses, "inability to clarify" responses, and successful clarification responses. There are seven locution rules, five dialogue rules, two clarification rules, and two termination rules. The locution rules indicate the kinds of moves allowed. Rules for the CD System of Clarification Dialogue:

– Locution Rules

CDLR1. Statements: Statement letters, S, T, U, ..., are permissible locutions, and truth-functional compounds of statement-letters.

CDLR2. Questions: The question "S?" asks "Is it the case that S is true?"

CDLR3. Clarification Requests for Statements: "Clarify S" requests clarification of a statement S that was put forward by the hearer at his previous move.

CDLR4. Clarification Requests for Questions: "Clarify Q" requests clarification of a question Q that was asked by the hearer at his previous move.

CDLR5. Clarification Responses: a response (move at the next move by the other party) to a clarification request.

CDLR6. Inability to Clarify Responses: "I can't clarify it," concedes that the speaker has no clarification attempt to offer of his statement made or question asked.

CDLR7. Successful Clarification Responses: a response that leads the other party at his next move to say, "I understand it."

- *Dialogue Rules*

CDDR1. Each speaker takes his turn to move by advancing one locution at each turn.

CDDR2. Whenever a statement is made by a speaker, the hearer may put forward a clarification request for the speaker to clarify the statement at his next move.

CDDR3. Whenever a question is asked by a speaker, the hearer may put forward a clarification request for the speaker to clarify the statement at his next move

CDDR4. A request for clarification must be followed by (i) a clarification attempt, or (ii) a statement “I can’t clarify it.”

CDDR5. “Why S?” must be followed by (i) “No commitment S” or (ii) some statement “T,” where S is a consequence of T.

- *Clarification Rules*

CDCR1. If after any clarification attempt made by a speaker, the hearer replies by saying, “I understand,” the speaker’s clarification attempt is judged to be successful.

CDCR1. If after any clarification attempt made by a speaker, the hearer replies by saying “I don’t understand,” the speaker’s clarification attempt is judged to be unsuccessful.

- *Termination Rules*

CDTR1. If the hearer makes the reply “I don’t understand” in response to a clarification request, the speaker can make an additional clarification request.

CDTR2. If the hearer makes the reply “I understand” in response to a clarification request, the clarification dialogue ends.

Just as CB is a minimal system of persuasion dialogue, CD also represents a basic or minimal system of clarification dialogue that provides a beginning framework that is very simple, but can be extended. Because there are different kinds of situations in which the need for clarification arises, the basic system needs to be extended in different ways, depending on the type of dialogue and the problem.

A typical profile of dialogue that follows the rules of CD is represented in table 2. The two parties in the dialogue are W (White) and B (Black). By convention, White always moves first.

Table 2: Typical Profile of Clarification Dialogue

Locution	Speaker	Content	Commits W	Commits B
Statement S	W	S	S	
ClarRequest (S)	B	S		Comm(Clar)
ClarResponse (T)	W	T	T	
Understand S	B		Closure	Closure

At her first move, White asserts the statement S. By the normal commitment rules one has in a type of dialogue like CB, White becomes committed to S, as shown in the first row, fourth column of the table. As shown in the second row, Black makes a clarification request regarding statement S. According to a new commitment rule that we now add to CD, White becomes committed to clarifying S as soon as Black requests clarification of S. The set of statements made by White when she clarifies S are designated as T. At his last move, Black says that he understands S. According to rule CDTR2 of CD, this means that the clarification dialogue ends, and has been successful.

This simple example of clarification dialogue is not so interesting in itself, but it shows how the rules can be used to run dialogues, leaving open the possibility that additional rules can be added to cope with different problem situations. Thus it has enough basic structure to add onto, in order to tackle problems of the kind represented by the examples we began with. It is now time to return to these examples and see how the CD type of dialogue framework could potentially be applied to them.

5. Examples Reconsidered

Now it might seem like our job is done. We have provided an analysis of the speech act of clarifying, and we have shown how clarification dialogues can be constructed in which this speech act is used. In such a dialogue, one party can ask for clarification of some remark made by another party in the dialogue, and the second party can attempt to provide such a clarification. But is that all there is to it? We don't have the space here to test the new model fully, but at least we can apply it to the examples.

In the conference example, the exchange took place as a sequence of e-mails, and therefore it is very clear that the clarification has a dialogue structure. The expression “University Hotel or Residence” was perceived as potentially ambiguous by the professor, or at least unclear and potentially problematic in relation to his task of arranging for accommodations at the conference. He therefore requested clarification of the conference organizer, who successfully offered it in terms familiar to the professor. Because the professor and the conference organizer both clearly understand what a normal hotel or student residence is like, the conference organizer’s clarification, based on this distinction, was helpful to the professor. Because it enabled him to come to understand something he previously failed to understand, the conference organizer’s clarification was successful in the dialogue. If he still failed to understand something, the professor could have sent another e-mail. But since he didn’t, it can be assumed that the conference organizer’s clarification did the job.

In the adoption example, the dialogue is more complex. There are the two sides in the dialogue, that of the mother and that of the husband and wife. They are trying to reach an agreement about conditions for the adoption of the mother’s baby. In general, the exchange could be seen as a negotiation type of dialogue, but as this dialogue proceeds the mediator, the third party in the dialogue, detects an ambiguity. It could be described as an ambiguity if the two parties disagree about the meaning of the term “contact” in their agreement. It could perhaps also be said that even though they both understand the meaning of the term “contact” in general, there is an implicit disagreement or misunderstanding about the criteria for contact, or about the degree of contact each has in mind for the purposes of the agreement. Because a contract is involved, and also because a third party has the role of guiding the discussion between the other two parties, this example is similar to the insurance policy case, discussed below.

In the Challenger space disaster example, the response of the associate administrator of NASA was unclear to the interviewer who asked the question, and his audience, and so the interviewer should have asked for clarification. We don’t know whether in fact he did or not. But still, all of us can see that for anyone not familiar with NASA jargon, the reply was unclear. In this case, there is not much to be said from the viewpoint of

our model, except that it would have been appropriate for the interviewer to press for clarification, and it should have been obligatory for the administrator to supply such clarification when asked for it. The dialogue might have continued in this way as a clarification dialogue, but so far as we know, it did not.

The next kind of case we considered was that of the person who offered directions to a motorist, but because of the ambiguous wording of the message, there was a danger that the motorist could have been sent off in the wrong direction. In this very common kind of case, it is up to the motorist to first of all detect the ambiguity, and then to ask for clarification of a kind that will remove it. There is a question here of the responsibility of the two parties in the dialogue. First of all, a person offering directions should try to avoid ambiguity if possible, or at least ambiguity of the kind that might have unfortunate consequences in relation to the task at hand. But second, it is up to the party receiving the advice to try to detect such a potentially troublesome ambiguity, and to ask the speaker to offer clarification of a kind that would indicate which meaning was meant. These observations suggest that the formal model of clarification dialogue CD above is incomplete. It only tells us that the party offering the advice has the option of supplying clarification of what was meant by the advice when asked for clarification on the other party. This model leaves the problem of responsibility for clarification open. It does not tell us when an ambiguity with this kind of obscurity poses a potentially dangerous problem for the dialogue. Nor does it tell us which party is obliged to recognize the problem, or to address it by asking for or providing clarification.

The next example was the legal case where the disputed issue concerned whether the man's accidental death was covered by his insurance policy. The problem arose because of the ambiguity of the clause in the insurance policy. As pointed out in the discussion of this case above, an ambiguity problem of this kind cannot be solved by a simple clarification dialogue. This ambiguity was a highly problematic one, and it was very difficult to clarify the wording in the contract to tell which interpretation was meant. As a result, the case had to go to trial, and a third party, a judge or jury, had to examine both interpretations and try to determine which one is the more plausible. As observed in the discussion

above, this case is more complex than the previous ones, because it can be seen as involving a meta-dialogue about the first level dialogue where the ambiguity occurred. This case is an interesting one, because it involves a shift from one dialogue to another. First of all, at the basic level there was a dialogue between the two parties who agreed on the contract. The terms of their agreement in this dialogue are recorded in the insurance policy. But because of the ambiguity involving, as it does, considerable financial implications, there was a shift to a different kind of dialogue in which three parties were involved – the original two parties and a third party arbitrator or decision maker. Typical examples of argumentation in trials are of this kind, where clarification of terms like “reasonable doubt” takes place at a secondary level, after there has been a shift to a different kind of dialogue about the first dialogue moves that originally took place.

The example of the widely circulated story that Al Gore had claimed to have invented the Internet involves both kinds of complications. First, there is the problem of who should have had the responsibility of clarifying what Gore meant. When he originally interviewed Gore in 1999, should Wolf Blitzer have asked for clarification of what Gore said? We don't know in fact whether he did ask for such clarification or not. Perhaps, as an interviewer who had an obligation to provide clear information to the public, he should have asked for clarification of the problematic quotation. However, perhaps it should have been up to Gore himself to provide such a clarification. What he said was not only ambiguous and vague. It was misleading, and left him open to the charge that he claimed to have invented the Internet, a claim that appeared ridiculous when it was repeated later on the media. Perhaps, Gore, a professional communicator, should have been aware of the problems his utterance would have been likely to cause. From this point of view, it seems reasonable to require that he himself should have provided clarification of what he said.

To sum up, even the simple examples suggest that there are two major problems not adequately solved by the speech act analysis of clarifying and the formal model of clarification dialogue presented above. One problem is the need for further dialogue rules that tell us which party in the dialogue should have the obligation of either making a request for clarification or providing such a clarification when some message in the dialogue

is unclear. The rules presented so far in the CD system did not rule on this issue. The second problem is represented by the kind of case in which there is a shift from one type of dialogue to another. This kind of case is especially problematic because the clarification is provided in an entirely different type of dialogue. Thus the problem cannot be solved by adding to the rules of CD. It can only be solved by devising transitions from one type of dialogue to another. For example, the argumentation in a given case may start out as a persuasion dialogue where two parties have a conflict of opinions and each is trying to persuade the other to accept some thesis. But then, because of an ambiguity, or perhaps because of some other problematic message in the dialogue that was unclear to one or both parties, there needs to be a shift to a clarification dialogue in which the two parties try to work together to agree on a clarification of the original utterance so that both can understand it. Once mutual understanding has been achieved, the parties can revert to the original persuasion dialogue, and it can continue unobstructed by the problem created by the obscurity and consequent misunderstanding.

The first two examples in this paper are especially interesting in relation to studying success criteria for the speech act of clarification in a clarification dialogue. In the conference case, the expression “University Hotel or Residence” was unclear to the professor because the expression “University Hotel” itself is not very familiar to many people. We all know what a university residence is, but a university hotel sounds like some kind of new entity that maybe like an ordinary hotel, but might not be. It may be just a different kind of university residence. Presumably the professor was uncertain about this terminology, and that was the reason he asked for clarification. The clarification offered by the conference organizer was a good one, and may be judged to be successful, was because it responded in the right way in relation to this common knowledge about hotels and university residences. The conference organizer clarified the expression by saying that a university hotel is called a “hotel” to set it apart from the more modest student residences. The reaction of the professor to the conference organizer’s final e-mail in the dialogue is not recorded. Perhaps there was none. But even in light of this failure of any further move, we can say that the clarification attempt may be judged to be successful. The reason is that it addresses the request for clarification in light of what one

would reasonably take to be common knowledge (Walton & Macagno, 2006) about hotels and university residences that provoked the professor's request for clarification.

So far then, we can say that the conference organizer's speech act of providing clarification was successful, in that it can be reasonably judged that it made clear to the professor what he had found unclear in the conference organizer's previous message. But what can be said about the success of the dialogue as a whole? To judge its success we need to take into account not only these factors, but also the goal of the dialogue as a whole. Presumably the professor was engaged in deliberations since he was registering for the conference and now had to find accommodations for the time he would be at the conference venue. The goal of the deliberation dialogue is to make a decision for action, typically to make a choice between two or more possible courses of action. In this case, it looked to the professor like there may be a choice between staying in the University Hotel or the Residence, as mentioned in the conference organizer's description. But it was not clear to him whether this was in fact the choice he needed to make. Because of his unfamiliarity with his terminology, "residence" might just be another word for university hotel. In fact it could be that the professor had already filled out the university accommodation form, and it did not clearly indicate anywhere on the form whether the building was called the University Hotel or the University Residence. In short, because of the unclear message, there was a problem, a difficulty for the professor in going ahead with making intelligent deliberations on how to proceed. Once the conference organizer had clarified the situation, the professor could then go ahead and make a decision on which form of accommodation he should reserve.

So the case as a whole does involve a dialectical shift from a deliberation dialogue to a clarification dialogue that was embedded within the deliberation dialogue. If the clarification dialogue was successful in making clear to the professor what he had previously found unclear, that is one mark of its success. But another mark of its success is whether it overcame the problem of the lack of clarity that the professor confronted within his deliberations and thereby enabled the deliberation dialogue go ahead in an intelligent and constructive manner towards its goal. Thus the general point should be made that the success of the clarification needs to be seen

not just at the local level as a speech act that transferred understanding, but at the global level as a dialogue that was an interval embedded in a wider framework of ongoing dialogue.

The second case is also very interesting to study from the viewpoint of success criteria for clarification dialogue. In this case the clarification attempt made by the mediator had already been carried out, and we see no record of that part in the dialogue presented. What we do see is the reaction of the participants to the clarification that was made. The wife stated that, according to her previous understanding, "contact" only involves writing letters or sending pictures on holidays, and kind of thing. But she said that she didn't think that she or her husband had considered contact as involving seeing the baby and spending time with him. This remark suggests that the mediator's clarification had been successful in correcting the previous understanding of the husband and wife concerning what was meant by "contact," shown to be quite different from what the mother had in mind. In the next move in the dialogue, the husband confirmed his wife's comments by saying that what he took contact to mean would refer to things like saying goodbye to the baby. He said that he didn't realize that it was going to incorporate visitation every other weekend. Hence both the responses of the husband and wife indicated that they now grasped what they previously had misunderstood about how the term "contact" was being taken. The lack of clarity in this case was posed by the misunderstanding.

This example is a very interesting one, because it is clear from the responses of the wife and the husband in the dialogue that the two of them, representing one side of the dialogue, had a very different idea of what was meant by "contact" from the one held by the mother. The mother was the party on the other side of the dialogue. Thus in this case we have a failure of mutual understanding of a key term between the two primary parties in the dialogue. This misunderstanding is clearly a serious problem that, if it were to persist, would almost certainly mean the failure of the negotiation dialogue as a whole to reach an agreement that both can live with. By clarifying the misunderstanding, therefore, the mediator's intervention should be judged to have been highly successful.

Hence this particular example can teach us quite a lot about what the proper success conditions for clarification dialogue should be. It is an

excellent example of successful clarification and shows how the reactions of the husband and wife in the dialogue provide excellent evidence that the clarification was successful.

6. Problems for Additional Research

The first problem we encountered was that of defining a speech act of clarification precisely so that it could be distinguished from similar verbal activities like putting forward an explanation. The clarification dialogue was classified as a species of information-seeking dialogue, and we provided a dialectical theory of explanation that sets dialogue conditions, understanding conditions and success conditions for the speech act of putting forward an explanation. The key difference between clarification and explanation, as shown in figure 1, is that clarification always occurs in response to a speaker's previous question in a dialogue and asks for clarification in relation to that question. However, in analyzing specific examples in order to determine whether a given text of discourse contains an explanation or clarification, it will be necessary to develop additional criteria that can apply to the actual evidence given in the discourse, to help us determine, in that given case, whether the speech act is best classified as an explanation or a clarification. This empirical work remains to be done, and there are already many examples of clarification dialogue that have been collected (Schlangen 2004), but some remarks of a theoretical nature can be given to guide this research.

The following general remarks are meant be helpful to providing a framework for future work of distinguishing between clarifications and explanations in specific examples. The purpose of each speech act is to be sought in the goal of the speaker. In both instances the speaker has the goal of helping the hearer to understand something that he has indicated that he does not understand. But in addition to analyzing clarifying and explaining as speech acts, we also need to analyze them in relation to the purpose they have in the dialogue as a whole that both speaker and hearer are participating in. It is in relation to this overarching dialogue framework that the distinction needs to be made. The purpose of a clarification dialogue is to achieve clarity about something that is unclear

(obscure) to the one party. Removing obscurity is one kind of transfer of understanding, but there are many other kinds as well. Explanations can be of many kinds, and are not only restricted to the kind of transfer of understanding that is meant to make something more clear to a party in a dialogue. Scientific explanations, for example, are often put forward not just to clarify something that was previously unclear, but to help advance scientific understanding generally in relation to a scientific problem. Thus the difference between explanation and clarification is to be sought not just in the effect of the speech act on the hearer in a dialogue, but on the nature of the problem that the explanation or clarification was meant to solve. The problem to which a clarification dialogue is addressed is one where a participant finds something unclear, or obscure, and where the other party tries to make it clear by relating it to something that he already understands or is familiar with. Problems to which an explanation is addressed are much more varied. They include not only situations where something is unclear, but typically involve a situation where there is an anomaly that provokes puzzlement because it represents something unusual, or even something that appears somehow inconsistent in relation to facts currently known. For example in the case of the Challenger space disaster, the explosion was not something we would describe as unclear. But once it was observed, the event called out for explanation because we do not expect such a carefully engineered scientific effort to blow up in the course of its mission. Such an event is clearly a drastic failure, an anomaly of the kind that immediately presents us with a need for understanding the reason why it happened.

The dialogue rules of CD were meant only to be simple and basic dialogue rules of the kind that need to be extended in order to deal with real cases of clarification dialogue. In such a simple case, the dialogue starts out as a persuasion dialogue and then shifts to the clarification dialogue. If the clarification dialogue was successful, then the participants can resume their original persuasion dialogue, and the clarification interval will help them to better understand the nature of their disagreement. The biggest problem for providing formal models of clarification dialogue that can be useful for analyzing real cases of clarification attempts is to extend the simple systems by adding new rules that are especially applicable to the kind of clarification that is taking place in that particular

case.⁵ As we noticed in the examples examined, depending on context, there can be considerable variation in the kinds of rules and requirements that are appropriate for a particular case. For example, it was observed that clarification dialogue in the legal context may be different in certain respects from clarification dialogue of a kind that typically occurs in ordinary conversational argumentation. Such examples show that the communication contexts can vary, and that an interdisciplinary approach to construct a specific rules for particular communicative context is the best way to move this line of research forward (Rigotti & Rocci 2006). For example, to analyze legal argumentation, the central notion required to capture the institutionalized dimension of this discourse is that of the activity type, a concept developed by Levinson (1979) and van Eemeren & Houtlosser (2002).

In tandem with these developments, what is needed is the extension of the formal dialogue system CD by means of adding new rules that are appropriate to model different kinds of clarification attempts in different contexts of dialogue. Finally, research is needed on dialectical shifts to better explain how the shift can be made from a persuasion dialogue, or any other type of dialogue, to a clarification interval representing different type of dialogue, namely clarification dialogue.

7. Conclusions

The conclusion arrived at in this paper is that it is possible to define clarification dialogue as a special type of systematic goal-directed dialogue in its own right that has its own distinctive rules and characteristics. Although there is a very close relationship between clarification and explanation, and clarification can be seen as a special type of explanation, it has been shown that clarification and explanation are, in principle, distinct as separate types of speech acts. Felicity conditions for the speech act of clarifying were formulated after the fashion of Searle (1969) and Aakhus (2006). However it was also shown that this speech act analysis was not,

⁵ More powerful systems of this sort, especially designed for computational domains, that model locutions as speech acts used in dialogic sequences (Prakken 2005; Reed 2006) can be used to solve this problem.

on its own, sufficient to enable us to analyze the dialogue structure of clarification. In order to grasp the structure of clarification dialogue, two formal dialogue systems were presented. CB is an already existing system (Walton 1984) representing persuasion dialogue. CD is a new system constructed in this paper to represent clarification dialogue. Although CD is a minimal system, it was shown how it can be used to represent the typical example of a clarification dialogue by formally modeling its basic elements and showing how these elements are combined together to compose clarification dialogue. A dialogue model showing how these elements are combined was presented in the typical profile of a clarification dialogue in table 1.

So far, the system for clarification dialogue devised to this point is merely a simple, basic model. But the examples discussed show how it can be extended to take special contexts into account. It is highly typical of clarification that it takes place as an interval in some other type of dialogue where an attempt is made to solve some problem that has occurred in the other dialogue, specifically a problem where one party in the dialogue fails to understand some previous contribution of the other party that is necessary for the dialogue to continue in a successful manner. To make a repair, the participants shift to a clarification dialogue. In some cases, the shift to clarification dialogue is even required by a third party, such as a mediator or judge. The outline of a typical dialectical shift of this sort was presented in figure 2. It is also fairly typical of such cases that the clarification dialogue occurs in a meta-dialogue interval (Krabbe, 2003), where the clarification dialogue that takes place in the interval is a separate embedded dialogue about the original persuasion dialogue that was taking place previously.

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