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ANTICIPATING OBJECTIONS IN ARGUMENTATION

It has rightly been emphasized in the literature on argumentation that a well developed capacity to recognize and counter argumentative objections is an important rhetorical skill. Leff (1999, 510). He remarked that the eloquence of the most eminent orators, such as Demosthenes, Cicero, Burke and Lincoln, is based on a dialectical sensibility marked by a well-developed capacity to recognize and counter argumentative objections. We now have fairly well developed tools for the identification, analysis and evaluation of arguments, we appear to have no tools specifically shown to be useful for recognizing and countering argumentative objections during the process of constructing an argument. Techniques for anticipating and to responding to objections that might possibly be made against an argument do not appear to have been studied very much at all in the current literature on argumentation.[1] It is a neglected topic in current research efforts.

The word 'prolepsis', which comes from the Greek word *prolambanein*, to anticipate, can have a variety of meanings. One is a figure of speech in which a future event is referred to before it happens. For example, "If you tell the cops, you're a dead man". Another species of this meaning is the use of a word in anticipation of the circumstances that would make it applicable. For example, in the sentence, 'They drained the lake dry', the term 'dry' only applies after the lake has been drained. A third meaning is a philosophical concept used in ancient epistemology by Epicurus and the Stoics to indicate a preconception, a pre-theoretical notion that can lead to true knowledge of the world. A fourth meaning is the anticipation and answering of an objection or argument before one's opponent has put it forward. A fifth meaning is to refer to any figure of speech or text of discourse that anticipates some response, and that incorporates some attempt to reply to the response in advance of its being explicitly made. For example, it might refer to a statement made in a narrative that refers to some part of the story told later. A sixth meaning is a special instance of the fifth called proleptic argumentation in this paper. It refers to an argument (or some other type of move in argumentation, like asking a question), that contains a reply to some potential objection to the argument that might undermine or attack it, or at least raise doubts about the acceptability of the argument.

The art of anticipating objections is fundamentally important for improving critical skills of the kind needed in writing a position paper. But it would seem impossible to anticipate all the kinds of objections that might be made to a given argument. How could students of critical thinking be taught to develop this skill, or at least be offered some useful resources? Two methods are proposed in this paper.

1. A Simple Example

At first sight, it looks like it might be fairly easy to analyze proleptic argumentation using the existing resources of argumentation theory. The device of using proleptic argumentation is to anticipate a counter-argument by making an objection or rebuttal, a counter-counter-argument against the existing counterargument. It looks like this sort of structure can be easily modeled by an ordinary argument diagram, using the following method. First we diagram the original argument, then we add to the diagram by showing how the counter-argument can be used to attack the original argument. Then we

[1] Some have tried to convince me that ancient *stasis* theory is such a tool, but I remain unconvinced.

anticipate the counter-argument by building a counter-argument to that counter-argument, and display the structure of all three arguments on an argument diagram. This methodology seems pretty straightforward, and in certain respects it is useful up to a point in helping to display the structure of proleptic argumentation in any given case.

Let us consider a simple example to show how this analysis works.

The Global Warming Example

Climate scientist Bruce, whose research is not funded by industries that have financial interests at stake, says that it is doubtful that climate change is caused by carbon emissions.

The argument in the global warming example can be classified as proleptic because it anticipates the objection that Bruce's research is biased, because it is funded by industries that have financial interests at stake. This counter-argument is quite a common kind of objection in debates on global warming.

The argument in the global warming example can be classified as an argument from expert opinion, and an analyzed as having the following form, with three premises.

The Global Warming Example as an Argument from Expert Opinion

Bruce is an expert on climate science.

Climate change is in the domain of climate science.

Bruce says that it is doubtful that climate change is caused by carbon emissions.

Therefore it is doubtful that climate change is caused by carbon emissions.

The global warming argument also contains a statement that anticipates a potential objection. The objection could be analyzed as comprised of the following two statements.

Objection

Bruce's research is funded by industries that have financial interests at stake.

Bruce is biased.

The first statement gives a reason to support the second one. The second one is serious objection, because it would undercut the original argument from opinion. The opinion of a biased expert is not trustworthy or credible. The allegation that the expert is biased, especially if a reason can be given to back it up, tends to make the expert's opinion less plausible than it might be otherwise.

Based on this kind of analysis of the global warming argument as proleptic, some fairly standard sort of analyses of the structure of the argument can be given that helps us to understand how proleptic argumentation works. One way of doing this is to represent

the proleptic part of the argument as giving additional support to the conclusion. This suggestion can be represented visually by analyzing the structure of the argument using an argument diagram. One way is to show the structure as a linked argument in which the proleptic premise goes along with the other premises in the argument from expert opinion to support the conclusion.

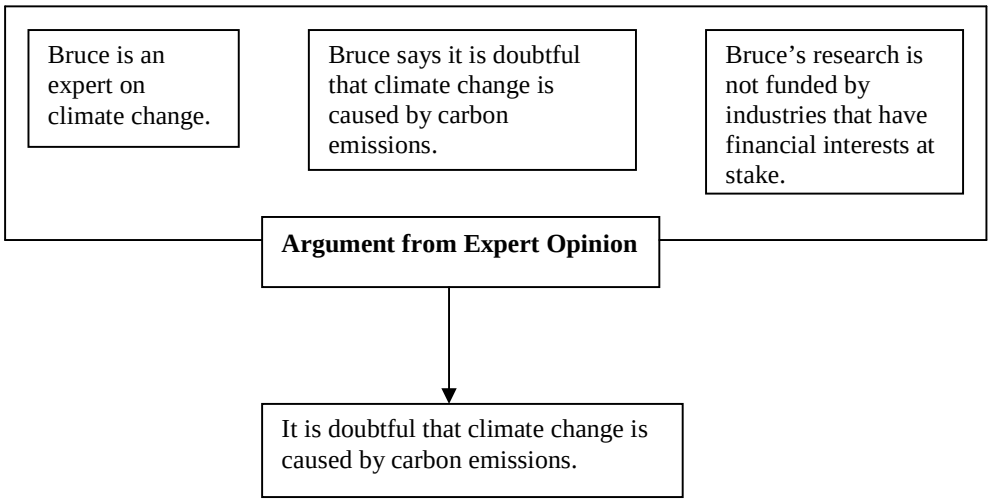

Figure 1: Proleptic Argumentation as Linked

According to this way of representing the argument, the premise that Bruce has nothing financially to gain is part of the argument from expert opinion that functions as additional assumption helping to support it. But is this additional premise really part of the argument from expert opinion? That depends on what we take to be the premises in the argumentation scheme for argument from expert opinion. Argumentation schemes are stereotypical patterns of reasoning used in everyday conversational argumentation, and in other contexts as well, like legal and scientific argumentation. They represent patterns of non-deductive reasoning that have long been studied in argumentation theory.[2] In section 3 we will examine the argumentation scheme for argument from expert opinion and ask the question of which premises should be specified as part of the scheme itself, as opposed to being external considerations outside the scheme. Before examining this question, we also need to consider the possibility that the premise that Bruce has nothing to gain should be seen as falling outside the scheme.

According to another way of viewing proleptic argumentation, the proleptic premise is seen as an additional argument that is separate from the argument from expert opinion,

[2] The study of argumentation schemes, or forms of argument that capture stereotypical patterns of human reasoning, is at the core of argumentation research. Recent work (Walton, Reed and Macagno, 2008) provides a systematic analysis of many common schemes, and a compendium of 68 schemes. This work surveys not only the history of argumentation schemes, but also covers the latest state of the art results of research efforts in artificial intelligence to systematically classify and codify the schemes. Historically, schemes are the descendants of Aristotle's topics, long thought to be useful for inventing and evaluating arguments. Schemes have been studied by Hastings (1963), Perelman and Olbrechts-Tyteca (1969), Kienpointner (1992), Pollock (1995), Walton (1997), and Grennan (1997).

one that provides independent evidence supporting the conclusion. This way of viewing the argument is visualized in figure 2.

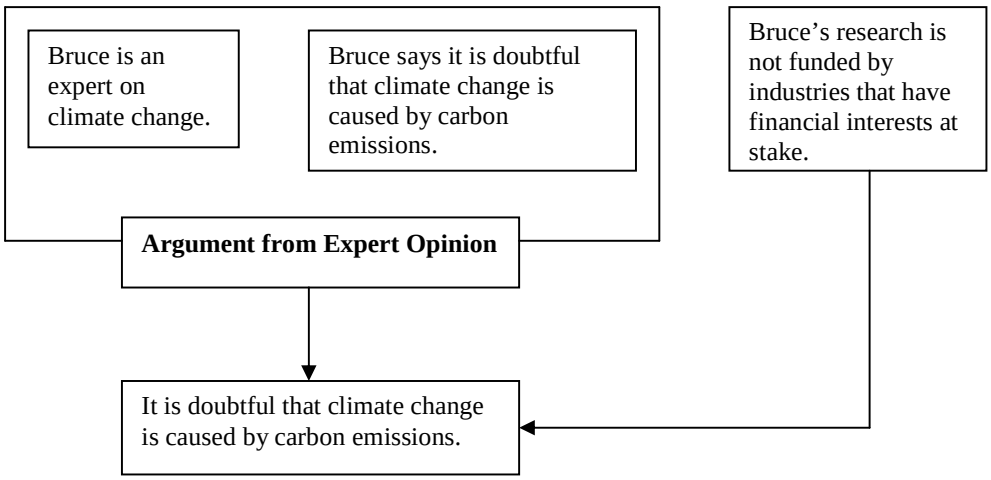

Figure 2: Proleptic Argumentation as Convergent

According to this way of representing the argument, the premise that Bruce has nothing financially to gain is not part of the argument from expert opinion that functions as additional assumption of presumption helping to support it. It is an independent reason supporting the conclusion. This way of viewing proleptic argumentation seems better, in that it sees the premise that Bruce's research is not funded by industries that have financial interests at stake as a separate from the scheme for argument from expert opinion. It is an additional supportive argument that boosts up the argument from expert opinion, but it is not a premise within this form of argument itself.

These first two ways of modeling proleptic argumentation represent the proleptic premise as anticipating and reacting in advance to possible ways that the conclusion might be attacked. But the structure of proleptic argumentation can also be viewed by an analysis that goes deeper into its structure. According to a third analysis, the real thrust or function of the assertion that Bruce has nothing financially to gain is to anticipate and rebut the potential objection that Bruce is biased. It is this objection of bias that is really harmful to the argument. The assertion that Bruce has nothing financially to gain anticipates the bias objection and gives a reason to think that it is not true.

The structure of the proleptic argumentation according to this third analysis can be shown very well by an Araucaria argument diagram. Araucaria is an automated argument diagramming system developed by Glenn Rowe and Chris Reed at the University of Dundee.[3] It can represent the distinction between linked and convergent arguments, and also has a repository for sets of argumentation schemes, like the scheme for argument

[3] Araucaria is a software tool for analysing arguments. It aids a user in reconstructing and diagramming an argument using a simple point-and-click interface. The software also supports argumentation schemes. Version 3_1 is available (free) at: http://araucaria.computing.dundee.ac.uk/

from expert opinion, that can be applied to individual arguments (Reed and Rowe, 2004). Figure 3 shows how Araucaria represents the proleptic argumentation in the Bruce example. Figure 3 shows the argument from expert opinion in the Bruce example on the right. It has three premises joined together in a linked argument supporting the conclusion that global warming is real. Around these three premises and the conclusion is a shaded border showing how the premises are connected to the conclusion, and the name of the argumentation scheme for argument from expert opinion is displayed just above the conclusion. This display shows how the parts of the argument are connected together and how parts of them are based on the argumentation scheme for argument from expert opinion. On the left, the statement Bruce is biased is shown in a shaded box joined by a double arrow to the conclusion of the argument from expert opinion. The double arrow represents what is called refutation in Araucaria. Refutation is like negation. Refutation occurs where one statement is put forward as an attack on another statement, presenting a reason why this other statement should not be accepted.

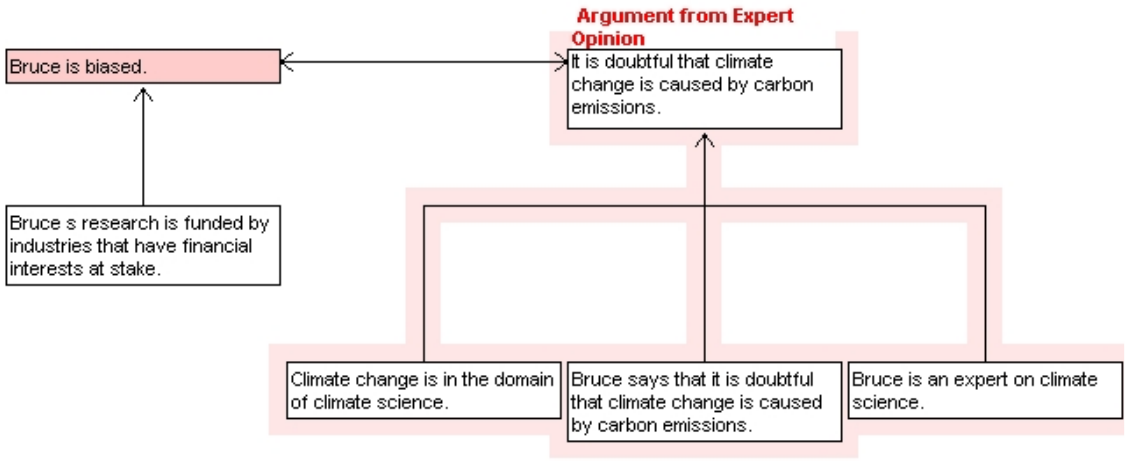

Figure 3: *Araucaria* Diagram for Proleptic Argument in the Global Warming Example

Underneath that statement that Bruce is biased, as shown in figure 3, there is an argument that supports this claim. Thus we can see in figure 3 the structure of the potential objection from bias to the argument from expert opinion in the global warming example. Visualizing the structure in this way, it is possible to see how the original argument in the global warming example functions as a proleptic argument designed to anticipate the potential refutation based on a claim of bias.

An even deeper analysis of the proleptic argumentation in the global warming example can be offered once we realize that it is common knowledge in the debate on global warming climate change skeptics are often funded by corporations who have something to gain by promoting the skeptical viewpoint. Waste produced by corporations is an important factor in carbon emissions that are supposedly a significant cause of climate change. Any audience of the climate change debate would presumably know these facts. These generally accepted opinions could be seen as the basis of the bias objection that could be potentially directed against the argument from expert opinion in

the global warming example. This way of representing the proleptic argumentation in the global warming example, by basing it on common knowledge[4], is shown in figure 4.

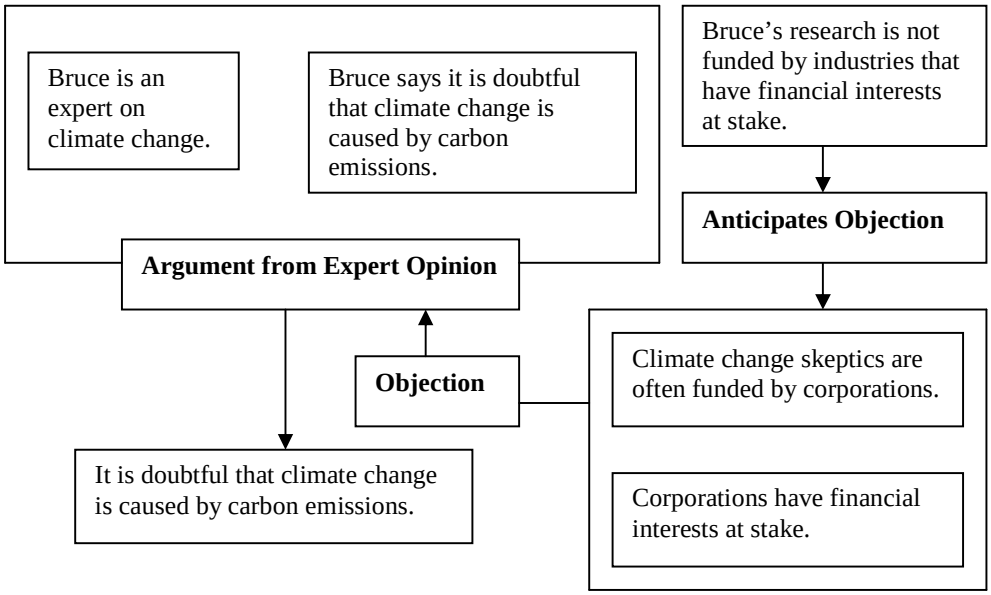

Figure 4: Argument in the Global Warming Example Based on Common Knowledge

This analysis is comparable to the one shown in figure 3 in that the objection anticipated in the analysis shown in figure 4 could also be viewed as one of bias. In the structure visualized in figure 4, the two assertions that climate change skeptics are often funded by corporations and corporations have financial interests at stake can be seen as premises in a linked argument supporting the objection that the expert on climate change cited in the argument from expert opinion could be biased. The allegation that the expert is biased is a powerful form of attack that could rebut the argument from expert opinion. This analysis shows how proleptic argumentation works and what its basic structure is. A proleptic argument is similar to any ordinary argument except that it builds in a potential objection to the given argument in advance of that objection being made.

The analysis given so far is not only theoretically useful, but could be of practical use in the identification, analysis and evaluation of proleptic arguments. However, as a theoretical analysis of the structure of such arguments, it is incomplete. The other component required to analyze this kind of argumentation is the notion of argumentation as an orderly sequence of dialog moves in which participants take turns putting forward arguments and responding with moves like making objections. The normal sequence of events in such a dialog is that the proponent puts forward an argument at one move, and then at the next move the respondent poses an objection to that argument. Then in a third move, the proponent can reply to the objection. Three moves are involved. However, in proleptic argumentation the order of the dialog sequence of moves is different. In this

[4] Govier (1992, p. 120), categorized a proposition as common knowledge if it states something known by virtually everyone, for example, 'Human beings have hearts'. Freeman (1995, p. 269) called a proposition common knowledge if many, most or all people accept it. Common knowledge has also now become an important concept in artificial intelligence.

kind of argumentation, we only have the proponent's argument, and the respondent has not yet made the objection. In advance of the respondent having made the objection, the proponent puts forward the argument already containing a response to that objection. In proleptic argumentation, there is only one actual move in the dialog, and the sequence of three moves is encapsulated in the one move.

This sort of analysis shows much more promise of probing more deeply into the structure of proleptic argumentation in order to provide a theory of that structure. We need two components. First, we need an argument diagram, or some comparable structure that shows how the objection is made as a counter-argument or refutation attacking the original argument. Second, we need an analysis of how argumentation is normally composed of a sequence of moves in which the two participants take turns, and where typically one party puts forward and argument and the other party in the next move makes an objection to that argument. To analyze this component we need the notion of the dialog structure. Since both argument diagrams and dialog structures are fairly well developed tools of argumentation analysis, it would seem that analyzing proleptic argumentation is a task that should be within our grasp. However, there is a problem.

2. Argumentation Schemes and Critical Questions

The argument diagram in figure 1 offers a further clue as to how proleptic argumentation might be analyzed. Shown on the right side of figure 1 is the argumentation scheme for argument from expert opinion. In a case where the scheme of an argument is known, this knowledge could be extremely helpful for us in trying to anticipate what kinds of objections might be made to that argument.

The scheme representing argument from expert opinion was formulated in (Walton, 1997, p. 210), with some minor notational changes[5], as follows. *E* is an autonomous agent of a kind that can possess knowledge in some subject domain. The domain of knowledge, or subject domain, is represented by the variable *D* for a domain of knowledge. It is assumed that the domain of knowledge contains a set of propositions.

Argument from Expert Opinion (Version 1)

Major Premise: Source *E* is an expert in domain *D* containing proposition *A*.

Minor Premise: *E* asserts that proposition *A* (in domain *D*) is true (false).

Conclusion: *A* may plausibly be taken to be true (false).

As shown in (Walton, 1997) any given instance of an argument from expert opinion needs to be evaluated in a dialog where an opponent (respondent) can ask critical questions. The six basic critical questions matching the appeal to expert opinion (Walton, 1997, p. 223) are the following.

[5] Earlier versions used the variable *F* to represent the field of knowledge, while the version above uses the domain *D* of knowledge. It is assumed in some cases that different fields can be identified that represent identifiable domains of knowledge.

1. *Expertise Question*: How knowledgeable is *E* as an expert source?
2. *Field Question*: Is *E* an expert in the field *D* that *A* is in?
3. *Opinion Question*: What did *E* assert that implies *A*?
4. *Trustworthiness Question*: Is *E* personally reliable as a source?
5. *Consistency Question*: Is *A* consistent with what other experts assert?
6. *Backup Evidence Question*: Is *E*'s assertion based on evidence?

If a respondent asks one of the six critical questions, a burden of proof is shifted back to the proponent's side to reply appropriately. The asking of a critical question from the above list defeats the argument from expert opinion temporarily until the critical question has been answered successfully.

In Araucaria, critical questions matching an argument that has a particular scheme can be displayed on a menu when the scheme is applied to the argument in a diagram structure. For example, in figure 2, the global warming example is displayed in the two boxes in the pane on the right, and its argumentation scheme is displayed in the two boxes in the pane on the left. Some critical questions corresponding to the argument are listed in the box at the bottom. This kind of information could be very useful to someone who wants to put forward the argument in the global warming example by making it into a proleptic argument. The arguer could look through the list of critical questions and ask herself which of these might be a particularly serious objection to the argument she is putting forward.

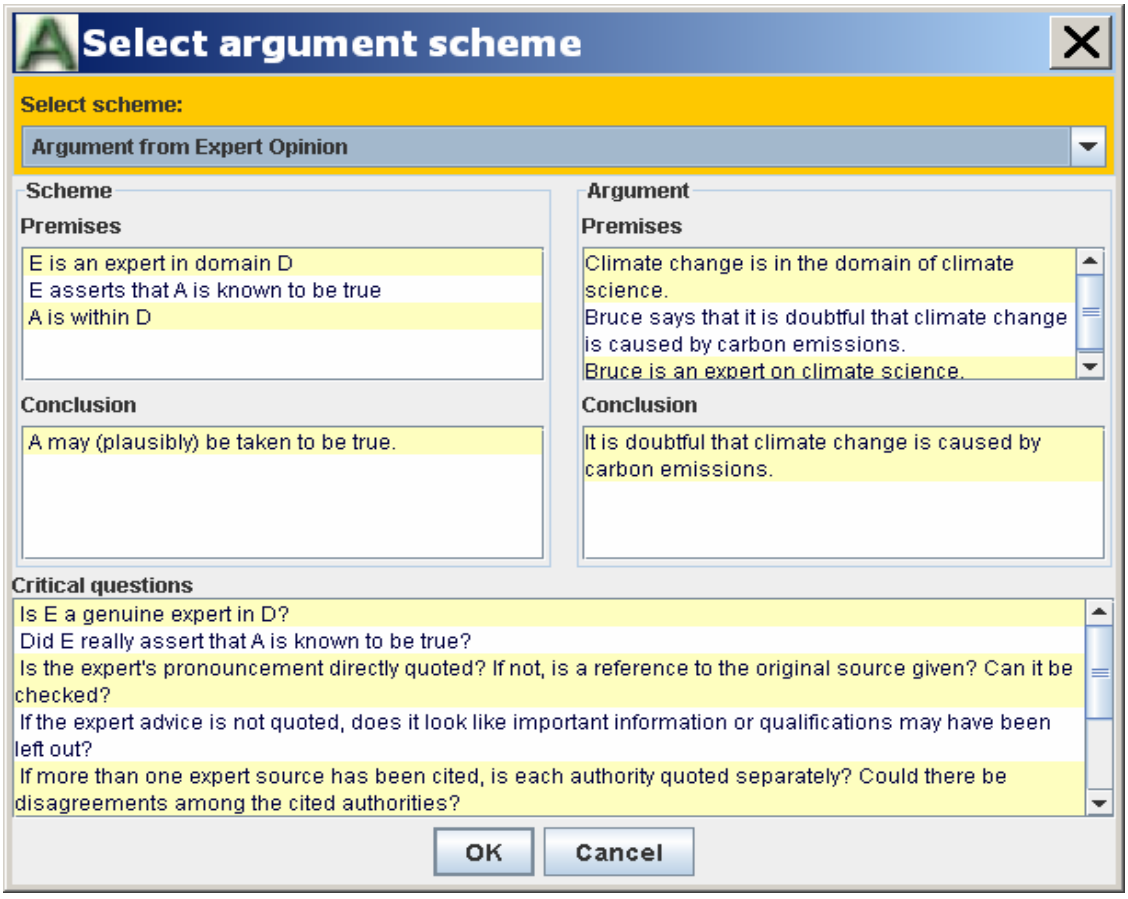

Figure 5: Araucaria Scheme Menu for Argument from Expert Opinion

That tool of using critical questions as a device for anticipating objections to an argument could become even more powerful as critical subquestions under each of the leading critical questions are formulated. The arguer could not only anticipate an objection at one level by finding a critical question that applies to the argument, but could even probe more deeply into a possible objections by looking at specific critical subquestions under a given critical question.

The six main critical questions for argument from expert opinion were presented above. However, under each of these main critical questions a set of subquestions has been recognized through studies of many examples of argument from expert opinion in conversational argumentation. The list below is taken from the summary in (Godden and Walton 2006, pp. 278-279).

1. *Expertise Question*: How credible is *E* as an expert source?
    - 1.1 What is *E*'s name, job or official capacity, location, and employer?
    - 1.2 What degrees, professional qualifications or certification by licensing agencies does *E* hold?
    - 1.3 Can testimony of peer experts in the same field be given to support *E*'s competence?
    - 1.4 What is *E*'s record of experience, or other indications of practiced skill in *D*?
    - 1.5 What is *E*'s record of peer-reviewed publications or contributions to knowledge in *D*?
2. *Field Question*: Is *E* an expert in the field that *A* is in?
    - 2.1 Is the field of expertise cited in the appeal a genuine area of knowledge, or area of technical skill that supports a claim to knowledge?
    - 2.2 If *E* is an expert in a field closely related to the field cited in the appeal, how close is the relationship between the expertise in the two fields?
    - 2.3 Is the issue one where expert knowledge in *any* field is directly relevant to deciding the issue?
    - 2.4 Is the field of expertise cited an area where there are changes in techniques or rapid developments in new knowledge, and if so, is the expert up-to-date in these developments?
3. *Opinion Question*: What did *E* assert that implies *A*?
    - 3.1 Was *E* quoted in asserting *A*? Was a reference to the source of the quote given, and can it be verified that *E* actually said *A*?
    - 3.2 If *E* did not say *A* exactly, then what did *E* assert, and how was *A* inferred?
    - 3.3 If the inference to A was based on more than one premise, could one premise have come from *E* and the other from a different expert? If so, is there evidence of disagreement between what the two experts (separately) asserted?
    - 3.4 Is what *E* asserted clear? If not, was the process of interpretation of what *E* said by the respondent who used *E*'s opinion justified? Are other interpretations plausible? Could important qualifications be left out?
4. *Trustworthiness Question*: Is *E* personally reliable as a source?
    - 4.1 Is *E* biased?
    - 4.2 Is *E* honest?
    - 4.3 Is *E* conscientious?
5. *Consistency Question*: Is *A* consistent with what other experts assert?
    - 5.1 Does *A* have general acceptance in *D*?
    - 5.2 If not, can *E* explain why not, and give reasons why there is good evidence for *A*?
6. *Backup Evidence Question*: Is *E*'s assertion based on evidence?
    - 6.1 What is the internal evidence the expert used herself to arrive at this opinion as her conclusion?
    - 6.2 If there is external evidence, e.g. physical evidence reported independently of the expert, can the expert deal with this adequately?

6.3 Can it be shown that the opinion given is not one that is scientifically unverifiable?

Having a list of critical subquestions of this sort that fit in a tree-like structure under the original set of critical questions could be very useful in helping us to analyze the logical structure of proleptive argumentation, and even for seeing how an automated system to assist with proleptive argumentation could be built. Consider once again the original Bruce example: climate scientist Bruce, whose research is not funded by industries that have financial interests at stake, says that global warming is real. The problems are to see why the expression, 'whose research is not funded by industries that have financial interests at stake', is there in the argument, what role it plays, and how it could be predicted that such an expression appears in the argument. There is also the practical question of seeing if there is any way a technology for proleptive argumentation could be built that could advise an arguer to build in such expressions that would have an effective proleptive function in anticipation objections that might be made to the argument. This practical question is more of a question for argumentation technology, but if we could understand how the structure of proleptive argumentation works, it could be very helpful for building such a technology.

Once it is recognized that the global warming argument fits the argumentation scheme for argument from expert opinion, we already know in advance what the standard critical questions are corresponding to this scheme. What we have to do is connect up the expression, 'whose research is not funded by industries that have financial interests at stake' with one or more of these critical questions or subquestions. We also know that the trustworthiness question is one of these questions, and we even know from the more detailed list above, that the bias question is a subquestion of the trustworthiness question. What is missing is the link between bias and having a financial interest at stake in something being discussed. This link may not be hard to establish. One way we could establish that link would be to have a further list of critical subquestions under the bias critical subquestion that asks whether and arguer has a financial interest at stake. In the tree structure of critical questions and subquestions, and subquestions of the subquestions, there would be a path between the original trustworthiness question and the question about having a financial interest at stake. This tree structure would give us a way of analyzing the Bruce argument to show what the function of the expression 'whose research is not funded by industries that have financial interests at stake' is in the argument. In other words, the device of critical questions would give us a way of analyzing the logical structure of proleptic argumentation. It might even give us a beginning step in the project of devising an argumentation technology based on argumentation schemes and critical questions that would enable an arguer to search for objections that could be anticipated.

This solution would appear to work in cases like the global warming example where the given argument fits a known argumentation scheme like an argument from expert opinion, and where the objection corresponds to some known critical question or subquestion matching the scheme. But there are other more complex cases where these conditions are not met. In some cases of proleptic argumentation, the potential refutation forming the objection to the arguer needs to confront is not a critical question, but a counter-argument. There can be all kinds of possible counter-arguments to a given argument, and they can take many forms. To anticipate a counter-argument that one's opponent may be likely to use in any given discussion would seem to be a much harder

task. The counterargument could be an argument with any sort of argumentation scheme, possibly one quite different from the argumentation scheme matching the original argument. How to predict the second argument from only knowing the first one would seem to be quite difficult task. It would seem to require much knowledge of the context of the discussion and the common strategies of one's opponent in that discussion. The next step is to examine an example of this sort.

It needs to be mentioned here that there are some fundamental questions about argumentation schemes and proleptic arguments that need to be asked. In its simplest form, the scheme for argument from expert opinion can be expressed as follows: *E* is an expert; *E* says that *A*; therefore *A* is true. In outline, this abbreviated form of the scheme expresses the basic thrust of an argument from expert opinion. Hence this basic form has explanatory power, for example, in teaching critical thinking skills. But what about the other premises in the standard version of the scheme? What about the premise that *E* is an expert in an identifiable domain of knowledge *D*, and the premise that the propositions asserted by *E* falls into domain *D*? Are these premises to be classified as proleptic, or do they represent premises that are essential to the argumentation scheme?

3. A More Complex Example

The more complex example treated in this section also involves the global warming debate. To treat the example we need to begin by sketching out the context of this debate. The conflict of opinions in the global warming debate is a little difficult to pin down, because several propositions appear to be at issue, but the basic contention on each side in the current debate could be specified as follows. According to the currently dominant view, there is a warming of the climate system caused by the release of greenhouse gases from the burning of fossil fuels that is causing bad consequences, like longer droughts, worse heat waves, and more flood-causing rains. According to the contrary view, measurements indicating that there is a global warming are flawed, and if there is any warming, it is not caused by human activities. Proponents of the contrary view are sometimes called greenhouse doubters. They disliked being called deniers, but their opponents often call them naysayers. They could be called skeptics, to use a more neutral term. Given this brief outline of the context of the debate, we also need to make a few remarks about how it fits into the classification of types of dialogues standardly used in argumentation theory. To begin with, it fits into the model called the persuasion dialogue or critical discussion in which there is an initial conflict of opinions, and the purpose of the dialog is to resolve this conflict of opinions by means of rational argumentation.

The type of persuasion dialogue or critical discussion could be classified as being of the dissent rather than the dispute type. In the dispute type of persuasion dialog each participant has a proposition to be proved called his or her thesis, and the thesis of the proponent is the opposite (negation) of the thesis of the respondent. The dispute type of dialog is symmetrical while the dissent type of dialog is asymmetrical in the following sense. In the dissent type of persuasion dialog only the one proponent has a proposition to be proved, and the role of the respondent is to cast doubt on the attempts of the proponent to prove her thesis by rational argumentation. In the dispute type of dialog each participant has a positive burden of proof, well in the dissent type of dialog, only the one side has a positive burden of proof.

With this account of the context of dialog in mind, we can now proceed to an examination of the example. The following argument was found in a *Newsweek* article on controversies about global warming.[6] The argument cited was put forward by advocates of global warming, in response to arguments of their critics portraying scientific opinion as divided. The critics cited a petition signed by over 100 scientists and others, including TV weathermen, who had said that they cannot subscribe to the view of global warming that claims it causes climate catastrophes. The Inter-governmental Panel on Climate Change (IPCC) is an international body that periodically assesses climate research.

The Scientific Truth Example

Scientific truth is not decided by majority vote, of course (ask Galileo), but the number of researchers whose empirical studies find that the world is warming and that human activity is partly responsible numbered in the thousands even then. The IPCC report issued this year, for instance, was written by more than 800 climate researchers and vetted by 2,500 scientists from 130 nations.

In this case, both sides in the controversy are trying to use argument from expert opinion to support their views. The majority of climate scientists now side with the advocates of global warming, and the use of argument from expert opinion citing this majority seems to be their strongest argument. The leading argument of the skeptics is that there is uncertainty on any matter as complex as global warming. The skeptics are using their petition to try to portray science as hopelessly divided on the matter of global warming.

One can see that the argumentation in the scientific truth example is proleptic. It is an argument from expert opinion of a particular sort that seems susceptible to a particular kind of objection. Part of the argument presents a counter-argument to this objection. An analysis of the argumentation in the example is presented below in a series of stages. In this series, the original argument is formulated, then the potential objection to it is formulated, finally, and the objection to this objection is formulated.

Argument from Expert Opinion

The IPCC report supports the hypothesis of global warming.

The IPCC report was written by scientists who are experts.

Therefore the hypothesis of global warming is plausible.

Objection

The global warming skeptics say that scientific opinion on global warming is divided.

If other experts disagree, that finding casts the hypothesis of global warming into doubt.

[6] Sharon Begley, 'The Truth about Denial', *Newsweek*, August 13, 2007, 20-29.

There was a petition signed by over 100 scientists and others, including TV weathermen who said they do not accept the hypothesis of global warming.

Therefore there is reasonable doubt concerning the hypothesis of global warming.

Reply to Objection

The IPCC report endorsing the hypothesis of global warming was written by more than 800 climate researchers and vetted by 2,500 scientists from 130 nations.

Acceptance by a majority of scientists supports the hypothesis of global warming even if some scientists do not accept it.

Therefore the hypothesis of global warming is plausible even though there may be some grounds for doubt about it.

Objection to Reply to Objection

Scientific truth is not decided by majority vote.

In the case of Galileo, the majority was against scientific truth.

The argument in the part quoted above reduces to a numbers game. Over 100 scientists signed the petition supporting the view of the skeptics. Response, the argument quoted from *Newsweek* cites a report written by more than 800 climate researchers and vetted by 2,500 scientists. According to the numbers, this argument appears to overwhelm the argument from expert opinion previously put forward by the skeptics, whose petition only contained signatures of just over 100 scientists. But this argument appears, in one respect, to be a bit ridiculous, for appeal to expert scientific opinion as a form of argument should not merely be a numbers game. That would make the argument risk being open to the objection that it has now become an appeal to popular opinion, a form of argument recognized generally as being fallacious. As the argument put it, “scientific truth is not decided by majority vote”. The argument even cites the case of Galileo, who was forced to recant his scientifically based opinion that the earth orbits around the sun because it conflicted with the majority view of the time that the sun orbited around the earth. What is suggested is that just because a proposition is accepted by a broad majority at the time, including even a majority of the scientists or experts, it does not necessarily follow that this proposition is true. Indeed scientific research has shown us time and time again that widely accepted popular opinions have been proven to be false.

In this case, the argument is proleptic because it puts forward the argument that global warming is supported by a majority of scientists, especially climate researchers who are specialists on matters of global warming, but included within this argument is a reply to a potential rebuttal. The rebuttal is the argument that scientific truth is not decided by majority vote, and therefore this argument putting forth numbers indicating that the majority of scientists support the view of global warming is fallacious. The objection is

that it makes the argument a mere appeal to popular opinion, a type of argument shown to be fallacious by the famous case of Galileo.

The argument is proleptic because it anticipates a possible objection in response to that objection by trying to rebut it in advance of the objection being made. This argument is a particularly interesting one to examine, because it involves two argumentation schemes, argument from expert opinion and argument from popular opinion. The argument initially put forward takes the form of an argument from expert opinion, as shown in figure 6.

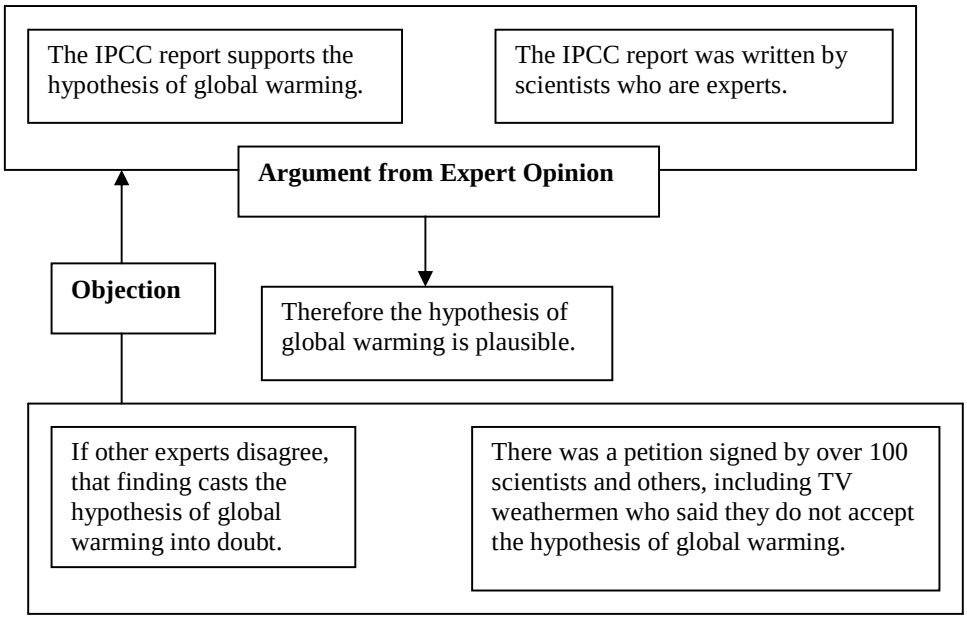

Figure 6: Objection to the Argument in the Scientific Truth Example

This objection carries weight because it casts the original argument from expert opinion into doubt by giving a reason to think that other experts do not agree with the original claim made. It follows up the opening made by the consistency critical question matching the scheme for argument from expert opinion.

In the second part of the analysis of the scientific truth example above, an objection to this objection is put forward, relating to the fallacy called argument from popular opinion. Although traditionally regarded as a fallacy, this form of argument is not always fallacious. Arguments from general acceptance tend to be weak, and in many instances they only carry much weight by being back up or "bolstered" by other arguments they are combined with (Walton, 1997). In such cases, an argument of this sort can be reasonable as a means of shifting a burden of proof to the other side in a dialogue. However, in some cases they do not apply. For example in a scientific inquiry, an argument based on general acceptance could be inappropriate, and could rightly be seen as a fallacious argument from popular opinion. The objection to the objection in the scientific truth example is based on these factors.

To respond in advance to the potential rebuttal to the argument represented in figure 6, a clause is put in claiming that scientific truth should not be decided by majority opinion. The form of the rebuttal to the argument shown in figure 6, based on this objection, is shown in figure 7.

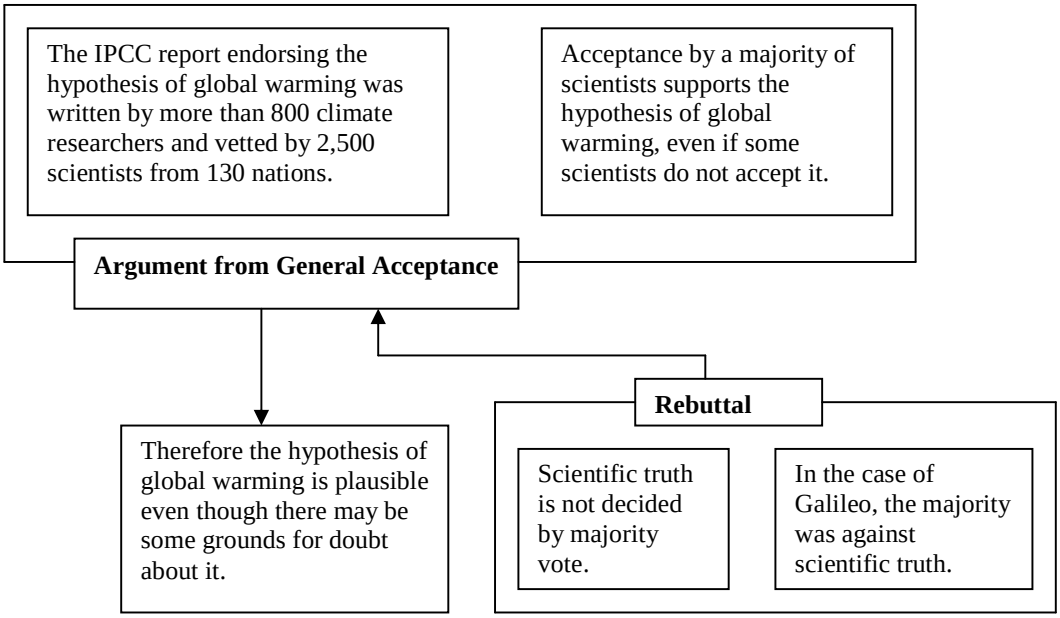

Figure 7: Rebuttal to the Initial Argument in the Scientific Truth Example

In figure 7, the argument supporting the initial argument in the scientific truth example is shown in the two text boxes at the top. However, this argument is labeled in figure 7 as an argument from general acceptance, a form of argument that is sometimes fallacious. The rebuttal shown in figure 7 attacks the application of the argumentation scheme for the argument from general acceptance, also known as the argument from popular opinion, to the argument previously put forward. The rebuttal argues that this form of argument does not properly apply in this case because scientific truth is not decided by a majority vote, as in the Galileo case.

The objection to the reply to the objection is especially interesting, because it pits one argumentation scheme against another. First, the advocates of the global warming hypothesis use argument from expert opinion to support their view. Anticipating the objection from the skeptics that there are experts who dissent from this view, they add that a large number of scientists, perhaps even a majority, support this view. However, they also appear to be aware of another kind of objection that the skeptics might put forward: to argue that acceptance by a majority of scientists is a reason for accepting a hypothesis is a mere argument from popular opinion, a type of argument known to be fallacious. To counter this objection they state that scientific truth is not decided by majority vote, and cite the case of Galileo. Of course, this is the very case that might be used against their argument.

The proleptic argumentation in this example is of a different kind than that represented in the global warming example. In the scientific truth example, the arguer basically uses

the argument that she has more experts on her side than the climate skeptics do. This could be seen as a kind of argument from expert opinion but a rather unusual one that appeals to the number of experts. This argument in itself responds to the consistency critical question of whether the opinion of this expert is consistent with what other experts assert. But over and above that, there is an even more interesting kind of proleptic argumentation involved. The arguer is responding to the potential objection by citing the sheer number of experts on her side, she is using a potentially fallacious argument from popular opinion. The objection is that scientific truth should not be decided merely by the number of scientists who accept a particular opinion. This objection is a tricky one, and not too easy to deal with, the point to be made here is that the arguer in the scientific truth example is trying to anticipate this objection and to respond to it with the counterargument in advance of its being made by the opposition in the debate.

It helps us to know the context of the global warming debate as outlined above, because we know that the global warming skeptics are in a vulnerable position, since only a minority of experts on climate science supports their view. Knowing this context, we can see why the proponents of global warming want to stress that the majority of experts agree with their view, and that the view advocated by the other side is a minority view. If they can further argue that this minority view is somehow biased, for example through having something to gain by advocating their opposed the viewpoint, these facts can be the basis for a powerful attack against the view of the skeptics.

Given the context of the global warming debate, we can easily see why proponents of global warming use the proleptic argumentation in the scientific truth example to get the skeptics. We can analyze the argumentation, as above, and see how it works, but it is much harder to try to figure out how such a proleptic argument could be constructed in advance from the data we have. We know that the argument is based on the scheme for argument from expert opinion. And we know something about the context of dialog concerning the global warming debate. What we don't know is how these two pieces of data can be put together to anticipate the objection, and to encapsulate it into the argument from expert opinion so that it is in response to a kind of objection that could plausibly be made against it.

4. Dialog Systems

A formal dialog system for argumentation has three stages – an opening stage, an argumentation stage and a closing stage. There are two participants, called the proponent and the respondent, who take turns making moves in form of speech acts, like asking a question, asserting a statement, putting forward an argument, or retracting a commitment. The participants cooperate by taking turns making these moves, and a formal dialog system has rules that define the permitted types of moves, and whether a move is an appropriate response to a prior move made by the other party. Each type of dialog has a communal goal, closure rules determine when a completed sequence of moves has achieved the goal, or whether the dialog has run to its limit of moves and is closed. In the formal dialog theory of Hamblin (1970; 1971), a move is defined (Hamblin, 1971, p. 130) as a triple $\langle n, p, l \rangle$. n is the length of the dialog, defined as the number of moves made, p is a participant, and l is what Hamblin calls a locution, comparable to what is now called a speech act. A dialog is an ordered sequence of such moves in which the participants

take turns making the moves. Such a dialog can be illustrated, Hamblin's notation, by a small example dialogue with three moves: $\langle 0, P_0, L_2 \rangle, \langle 1, P_1, L_3, \rangle, \langle 2, P_0, L_1 \rangle$. Each move contains a locution of a certain type (like the asking of a question or the putting forward of an argument). In the example above, at the first move, move zero, participant P_0 puts forward a locution of type 2. At the second move, move 1, participant P_1 replies by putting forward a locution of type 3. At the third move, move 2, P_0 replies with a move of type 1. Such a dialog sequence always begins at move zero, continues as an alternating sequence of moves of the kind specified above, and ends at a last move where it is terminated when it meets the conditions for closure, as stated by the closure rules. Although Hamblin clearly recognized that there could be different types of dialogs, he did not attempt to classify them in any general way. Later work, based on Hamblin's approach, like (Walton and Krabbe, 1995), classified different types of dialog, including persuasion dialog, negotiation, deliberation, inquiry, information-seeking dialog and eristic (quarrelsome) dialog. The formal systems of dialog Hamblin constructed appear to fit the model of what is now called persuasion dialog. Following Hamblin's approach, four formal systems of persuasion dialog were constructed in (Walton, 1984) to model argumentation where each party has a designated thesis to be proved by using arguments based only on premises that represent commitments of the other party. One of these systems, called CB, is comparable as a persuasion dialog to some previous systems of Hamblin (1970; 1971) and Mackenzie (1981). However CB is even simpler. CB was designed to be a basic system, a minimal platform of dialog rules that can be extended to modeling various other more complex kinds of dialog by new adding rules as needed.

The problem posed here is how proleptic argumentation could be represented in a Hamblin-style dialog system like CB. Stating this problem and taking some steps toward a solution paves the way for further research on how to model proleptic argumentation in any formal dialog system. The place to begin is to put forward a precise definition of a proleptic argument in a Hamblin-style dialog system. Let's call the two participants White and Black. We assume that the speech act of putting forward an argument for acceptance by the other party has been precisely defined in a Hamblin-style system. With the structure of the example dialog above in mind, let's say that White has put forward a locution of this type at move *m*, and the type of this locution fits the structure of the speech act for putting forward an argument. If this argument is proleptic, it is put forward in such a way that it attempts to anticipate an objection that might be made by Black at some future move, perhaps even at the next move in the dialog. White might do this, for example, by adding an additional premise to the argument that responds to some possible objection that Black might plausibly make at move $n > m$. A proleptic argument is one that has this form as a type of move in a formal dialog system.

How could participant in a dialog anticipate what sort of objection the other participant might plausibly make to her argument at move *m* at some future move *n* in the dialogue? As shown above, we can partly solve this problem if we go beyond the basic Hamblin-style dialog system and put in argumentation schemes. Indeed, such a system, called ASD (Argumentation Scheme Dialog) has already been constructed (Reed and Walton, 2007). ASD allows for a kind of move called a critical attack, which has two distinct effects in a dialogue, depending on whether the critical question posed is an assumption or an exception. In such an enriched dialogue system, if the locution is that of

putting forward an argument, this argument may fit an argumentation scheme, and as shown above in this paper, the premise added to proleptic argument may anticipate such a critical attack.

The problem has already been solved (above) for the kind of case in which the proponent puts forward an argument that fits an argumentation scheme and the type of proleptic argument she wants to use is one that anticipates a critical question matching the scheme that might be asked by the respondent at his next move. To get a more general solution, we have to deal with the following kind of case. Suppose the proponent has put forward an argument that fits an argumentation scheme like the scheme for argument from analogy. Now it might be known in advance that this particular type of argument is susceptible to certain kinds of counter-arguments. For example when you put forward an argument based on an analogy, a common type of objection is for the respondent to produce a counter-analogy. But how would a participant in Hamblin-style dialog system that has argumentation schemes anticipate in objection of this kind at a point in the dialog sequence before the respondent has even made it? The answer to this question, suggested already above, is that some study of types of counter-arguments commonly used against a given type of argument needs to be undertaken. On the basis of this study, common types of counter-arguments matching a given scheme need to be listed in catalogued in a repository or database that can be used by participants in a dialog system. Such research has not been carried out yet, but in the literature on argumentation and fallacies, there are already many remarks that have been made about commonly used counter-arguments matching a given scheme. For example, one common type of response to an *ad hominem* argument is to cast doubt on the arguer's ethical character by arguing that she's just as bad, as shown by her using such a negative argument, or is shown by some comparable incident in which she has shown a bad ethical character. A useful research project for studying proleptic argumentation would be easy to go through the various types of argument that have been studied and catalog the common responses to them that have already been identified.

5. Conclusions

We have seen that argumentation schemes and formal dialog systems have provided a methodology for constructing proleptic arguments. When an arguer has put forward an argument in a dialog that fits an argumentation scheme, she can construct a proleptic argument by building in an additional premise that anticipates the asking of a critical question matching the scheme at some future move. Thus a dialog system containing a list of argumentation schemes with matching critical questions is a primary method for building proleptic arguments. Still, the investigation of the scientific truth example in this paper has shown that this methodology has limitations. We need to go on to ask what kind of methodology needs to be developed in order to assist with the construction and analysis of proleptic arguments of other sorts. So far, there would appear to be no way to anticipate all the objections that might be made to a given argument, or even all the most powerful ones. To have a secondary method for this task, as our discussion of the scientific truth example showed, one has to take into account factors in the context of dialogue in the specific case. In the case of the scientific truth example, it was important to know some basic facts about the global warming debate, and in particular to know of

some facts about how the advocates of global warming argue against global warming skeptics and vice versa. It was also necessary to see how the argument from expert opinion, because it was based on number of experts cited, was open to a certain kind of objection based on argument from popular opinion, another type of argument associated with an argumentation scheme.

A direction for further research on proleptic argumentation is to study how certain kinds of arguments are often objected to by other kinds of arguments that are commonly used to attack them. There is no space for such a project here, as noted above, current work on schemes and fallacies, such common forms of counter-attack to certain types of arguments have been recognized. In (Walton, 1999) and (Walton, Reed and Macagno, 2008), it is shown how the *ad hominem* argument is commonly used to attack arguments fitting the scheme of argument from expert opinion. In (Walton, 1995, 147) it is shown how the scheme for argument from an exceptional case is a refutational scheme opposed to the scheme for argument from an established rule.

The primary method for constructing propleptic argumentation set out in this paper can be summarized as follows. First, take the given example of an argument and see if a known argumentation scheme can be applied to it. If so, carry out the following steps.

The Primary Method

1. Fill in any ordinary premises that might not be explicitly stated in the given argument.
2. Scan over the standard critical questions matching that scheme, and judge which one is most powerful as a potential objection, from what is known of the context of the dialog.
3. Judge whether merely asking the question is enough to defeat the argument, or whether the question needs to be backed up by additional evidence in order to defeat the argument.
4. In the former case, classify the additional premise needed as an assumption.
5. In the latter case, classify the additional premise needed as an exception.
6. If the additional premise needed is an assumption, build in an additional premise to the argument that anticipates this objection and denies it.
7. If the additional premise needed is an exception, build in an additional premise to the argument that anticipates this objection, and provide a new argument to support the premise.

This method will not work if the given argument in the examples selected does not match a known argumentation scheme. Also, it will not work in cases like the scientific truth example, where the counter-argument required is a special one that fits particular features of the example.

Where the primary method will not work, we need a secondary method to be developed. To search for potential objections that are not brought up by the first method, we would need to apply this secondary method by carrying out the following steps.

The Secondary Method

1. Go through the list of common counter-arguments used to attack this particular type of argument.

2. Examine each of these counter-arguments in light of the context of the debate to see if one might fit.
3. If you find one that fits, anticipate the objection by building in a premise stating that this particular type of counter-argument does not apply.
4. Give an argument supporting the premise, for instance by citing an example that shows why this particular type of counter- argument does not apply.

In the scientific truth case this additional argument was the argument that the case of Galileo shows that scientific truth is not decided by majority vote. The secondary method has not been fully developed yet, and will require two kinds of research and collection of data. One, as indicated above, is a survey of the literature on argumentation and fallacies to find common types of counter-arguments that have already been recognized as matching a particular type of argument. The other kind of research required is to study specific debates and controversies, like the global warming debate for example, to fit together the main types of arguments used in that debate, like argument from expert opinion, and the main types of counter-arguments used to attack the type of argument, like argument from bias. These two bodies of data then need to be combined to build up repositories of known counter-arguments to a given type of argument.

We began by defining proleptic argumentation in a way narrower than including any attempt to reply to any kind of speech act in discourse by anticipating an objection to the making of that speech act in the speech act itself. We narrowed the focus to argumentation by defining proleptic argumentation as referring to an argument that contains within itself a reply to some potential objection, attack or rebuttal that could be made against it. We included under this heading not only counter-arguments but also the asking of critical questions that could raise doubts about the argument. We saw throughout the paper that these two kinds of cases had to be handled differently. We first of all showed how a system like Araucaria can be used to visualize the argument structure of some kinds of refutations. We also showed how the system, supplemented with argumentation schemes, provides a way of anticipating typical critical questions that match an argument fitting one of these argumentation schemes.

We used the global warming example to show how this technology can be used to anticipate objections to common types of arguments, suggesting that it could provide a useful tool for assisting a critical arguer to build proleptic arguments. We showed how this technology could be an extremely powerful tool, once critical questions under each of the main critical questions matching an argumentation scheme have been settled in a systematic way. Such a nested list of critical questions produces a tree of basic objections and more specific objections that can be used against an argument a given type.

We then went on to examine the problem of extending this framework to dealing with more complex kinds of cases in which the task is to anticipate a counter argument that could be of a more variable kind. To illustrate this problem we used the scientific truth example, a real example of an argument on a controversial debate found in a news magazine. In this kind of case the counter-argument contained within the proleptic example would not have been possible to anticipate going by a standard list of critical questions. In this case a completely different type of argument was a potential attack against a given argument in a more subtle way that would have been difficult to identify without knowing in advance what the response was.

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Abstract

Anticipating objections, and even responding to a potential objection in advance as part of your argument, is a common move in argumentation. It is an important argumentation skill for teaching critical thinking skills and for rhetoric. Such a strategy is often called *prolepsis*, although the term has other meanings as well. Although prolepsis in argumentation is a legitimate kind of strategic maneuvering, it can be associated with problems, and even fallacies in some instances. This paper uses argumentation schemes and dialog models to study proleptic argumentation.