DIAGRAMMING, ARGUMENTATION SCHEMES AND CRITICAL QUESTIONS

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Abstract

Argumentation schemes are forms of argument that model stereotypical patterns of reasoning. This paper is part of a project on the formalization of argumentation schemes. The paper shows how argumentation schemes and critical questions should be fitted into the technique of argument diagramming using the Araucaria software system. This XML system provides an interface through which the user can mark up a text of discourse to produce an argument diagram. We discuss several problems arising from the need to deal with enthymemes.

The formulation of the set of presumptive schemes in (Walton, 1996) was rough and ready. The variables and constants used in the schemes are quite a varied bunch, and have not been all incorporated into any single over-arching formal structure. Only the most rudimentary attempt was made to classify the schemes by a tree-structure exhibiting how some fall under others. In many cases, the organization of the premises of the scheme and the matching critical questions was obviously clumsy. For example, in some instances, it seemed that the critical question merely asked whether one of the premises was true or acceptable. Thus it looked like either the premise or the critical question was redundant. These same problems were perhaps even more evident in Hastings' (1963) initial attempt to introduce a comprehensive set of schemes with matching critical questions.

Now that we have a new software system for argumentation diagramming that can accommodate argumentation schemes, many of these technical issues of how to clean up the schemes appear more pressing. Before this point they may have seemed relatively minor matters of detail to the working argumentation theorist or teacher of critical thinking. But now they demand our attention. In this presentation, some of the very most elementary of these technical questions of formalization of schemes are raised.[1] As a means of arranging this questions, let us lay out our aims as desiderata for a theory of argumentation schemes. Such a theory should be

- **rich** and sufficiently exhaustive to cover a large proportion of naturally occurring argument
- **simple**, so that it can be taught in the classroom, and applied by students
- **fine-grained**, so that it can be useful employed both as a normative and evaluative system
- **rigorous**, and fully specified, so that it might be represented in a computational language such as AML
- **clear**, so that it can be integrated into traditional diagramming technique.

This is a challenging list to tackle, not least because some of these are at odds with one another: the more fine-grained our theory is, for example, the less likely it is to be at all exhaustive. Similarly, rigorous specification is crucial for computational representation, but a siginificant barrier for application to the real world. Happily, some of the aims do hang together: simplicity, for example, works to support not only computer representation, but also diagramming and classroom teaching. This then is where we are headed. Here, we briefly describe the Araucaria computer system that supports analysis of argument (and subsequent retrieval and manipulation of argument analyses), and how that software has provided a basis for formulating further developments in a theory of argumentation schemes.

[1] Chris Reed would like to thank the Leverhulme Trust and Douglas Walton would like to thank the Social Sciences and Humanities Research Council of Canada for research grants to support a joint research project, Argumentation Schemes in Natural and Artificial Communication. The proposed research includes developing a classification of schemes and building a corpus of natural language examples.

1. Introducing Araucaria

Araucaria is a is a software tool for supporting the process of constructing an argument diagram (Reed and Rowe, 2002). It is available for free on the web at

www.computing.dundee.ac.uk/staff/creed/araucaria

It supports argumentation schemes, and it has an online repository of analyzed arguments you can access. Once an argument has been analyzed it can be saved in a format called AML (Argument Markup Language) that can then used for many purposes, for example in a data base or on a web page. Work is currently under way to provide web access to the online database of argument analyses independently of the Araucaria application. Araucaria has been designed for use by teachers and students in critical thinking courses, or courses with a critical thinking aspect. But because it is a powerful tool in certain respects, possibly its most important application will be to research problems in the field of argumentation.

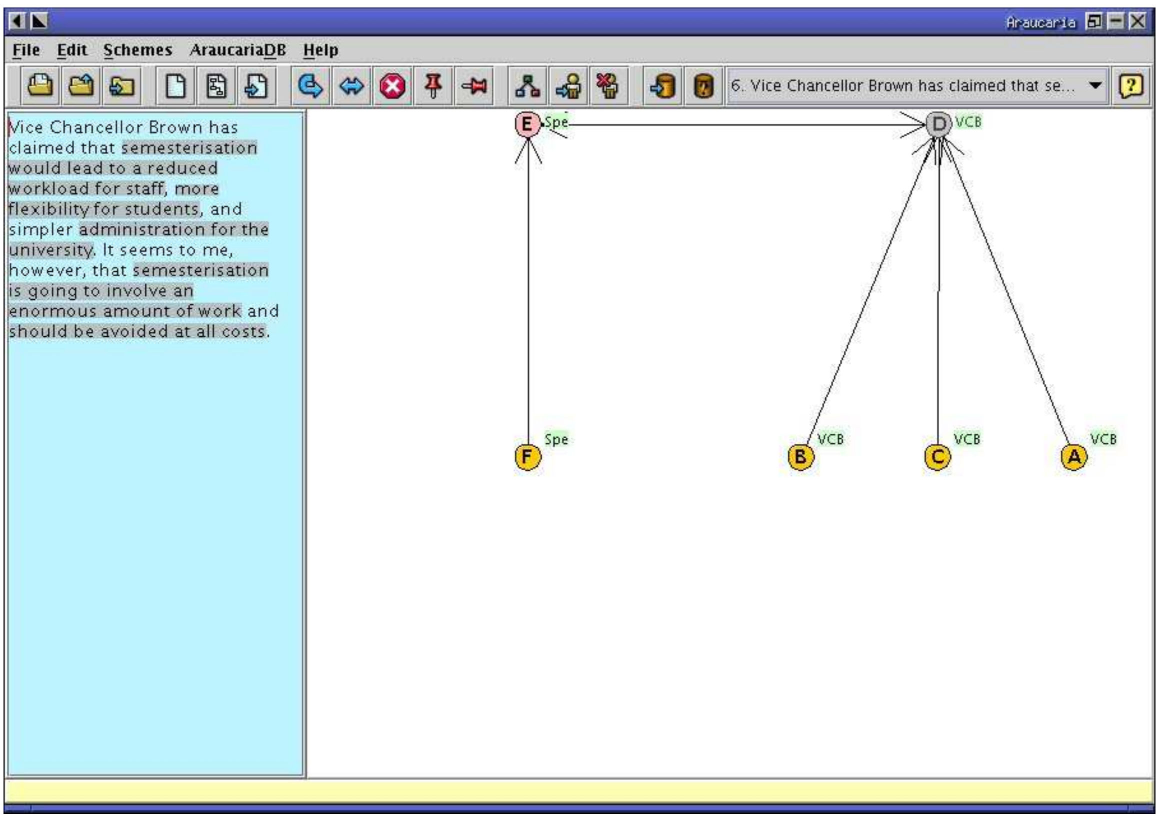

Figure 1. Araucaria main window

Araucaria is similar to a software tool called Reason!Able devised by Tim van Gelder of the Department of Philosophy of the University of Melbourne, which has been well tested, and is very simple and easy to use. Where Araucaria is aimed at argument analysis, for researchers and undergraduate teaching, Reason!Able is aimed at argument construction, for more introductory teaching earlier in the curriculum. The two thus complement each other.

Applying Araucaria to many basic problems of argumentation and informal logic has just begun, and below we will use some simple examples to discuss some of the more basic points. In this discussion, we concentrate on our current joint research project that has the aim of developing a more sophisticated analysis, classification and formalization of argumentation schemes. To begin, some introduction to schemes is presented. But to confine the discussion to reasonable limits, the scheme for appeal to expert opinion is taken as a case in point.

2. Introducing Argumentation Schemes and Enthymemes

Most in this audience are familiar with argumentation schemes, but for those who may not be, it is best to begin with a brief explanation of what they are. Argumentation schemes are forms of argument (structures of inference) representing common types of argumentation. They represent structures of arguments used in everyday discourse, as well as in special contexts like legal argumentation or scientific argumentation. They represent the deductive and inductive forms of argument that we are so highly familiar with in logic. But they can also represent forms of argument that are neither deductive nor inductive, but that fall into a third category, sometimes called abductive or presumptive. This third type of argument is defeasible, and carries weight on a balance of considerations in a dialogue. Perelman and Olbrechts-Tyteca, in *The New Rhetoric* (1969) identified many of these defeasible types of arguments used to carry evidential weight in a dialogue. Arthur Hastings' Ph.D. thesis (1963) carried out a systematic analysis of many of the most common of these presumptive schemes. The scheme itself specified the form of premises and conclusion of the argument. Hastings expressed one special premise in each scheme as a Toulmin warrant linking the other premises to the conclusion. Such a warrant is typically a defeasible generalization. Along with each scheme, he attached a corresponding set of critical questions. These features set the basic pattern for argumentation schemes in the literature that followed.

Many of these argumentation schemes were described and analyzed by van Eemeren and Grootendorst (1984; 1992). Kienpointner (1992) developed a comprehensive listing of argumentation schemes that includes deductive and inductive forms in addition to presumptive ones. In (Walton, 1996), twenty-five argumentation schemes for common types of presumptive reasoning were identified. Following Hastings' format, a set of critical questions is attached to each scheme. If an argument put forward by a proponent meets the requirements of a scheme, and the premises are acceptable to the respondent, then the respondent is obliged to accept the conclusion. But this acceptance, or commitment as it is often called, is provisional in the dialogue. If the respondent asks one of the critical questions matching the scheme, the argument defaults and the burden shifts back to the proponent. The weight of the argument is only restored when the proponent gives a successful answer to the question.

An argumentation scheme that can be used as an example is the one for argument from sign. An example would be a case in which Helen and Bob are hiking along a trail in Banff, and Bob points out some tracks along the path, saying, “These look like bear tracks, so a bear must have passed along this trail.” In the argumentation scheme below, one premise is seen to function as a Toulmin warrant.

Argument from Sign (Walton, 1996, p. 49).

Minor Premise: Given data represented as statement *A* is true in this situation.

Major (Toulmin Warrant) Premise: Statement *B* is generally indicated as true when its sign, *A*, is true, in this kind of situation.

Conclusion: Therefore, *B* is true in this situation.

The major premise is a presumptive conditional stating that if *A* is true, then generally, but subject to exceptions, *B* is also true. In the case cited, the tracks could have been "planted" on the trail by tricksters. But in the absence of evidence of such trickery, it is reasonable to provisionally draw the conclusion that a bear passed along the trail. Argument from sign is closely related to abductive inference, or inference to the best explanation. The best explanation of the existence of the observed tracks is the hypothesis that a bear walked along the trail producing the tracks. Of course, there could be other explanations. But in the absence of additional evidence, the bear hypothesis could be plausible as a basis for proceeding carefully.

Everyone in this audience will likely know what an enthymeme is, but a brief explanation may be helpful to some. The term 'enthymeme' is standardly used in logic to refer to an argument in which one or more statements that are part of the argument are not explicitly stated. Enthymemes are sometimes loosely referred to as arguments with "missing premises", but sometimes the missing statement is the conclusion. There are many problems with enthymemes that make the notion a difficult one to capture by means of some mechanical process. Attributing unstated assumptions to an arguer is a perilous kind of inference to draw, for it depends on interpreting what the arguer presumably meant to say. Any argument expressed in a natural language text of discourse is notoriously difficult to interpret. First of all, vagueness and ambiguity are common. But even worse, arguers sometimes achieve plausible deniability by exploiting innuendo and concealed meaning. When a meaning is attributed to him, the arguer may deny it, even alleging the other party has committed the straw man fallacy. This fallacy is the tactic of exaggerating or distorting an interpretation of an opponent's argument to make it more vulnerable to refutation (Scriven, 1976, pp. 85-86). One might think that the problem of enthymemes could be solved by only attributing arguments to someone else if the argument comes out as deductively valid. But here an even worse problem lurks (Burke, 1985; Gough and Tindale, 1985; Hitchcock, 1985). Making the argument valid may not represent what the arguer really meant to say. Maybe the argument he intended to put forward is invalid. At any rate, it is not too hard to appreciate that the problem of enthymemes is far from trivial, and that it would be extremely difficult to find some algorithm that could mechanically plug in the right missing statements.

Parenthetically, it might be noted that even the term 'enthymeme' itself seems to be a historical misnomer. (Burnyeat, 1994) has examined the textual evidence of Aristotle's manuscripts and by early commentators on them. In the *Prior Analytics* (70a10), Aristotle wrote that an enthymeme is an incomplete (*ateles*) *sullogismos* from plausibilities or signs. But Burnyeat has cast doubt on whether Aristotle wrote the word *ateles* in the original manuscript. It seems more likely that it was inserted by one of the earliest commentators and then kept in. According to Burnyeat's analysis, what Aristotle really meant by ‘enthymeme’ is a plausibilistic argument of the kind he treated in the *Topics* and *Rhetoric*. Such an argument is syllogistic-like in appearance, but based on a warrant that is defeasible, or only true “for the most part” (to use Burnyeat’s translation of Aristotle’s phrase). If Burnyeat’s interpretation is right, the outcome is significant for argumentation theory. It means that ‘enthymeme’, in the original Aristotelian meaning, refers to presumptive argumentation schemes, not to incomplete arguments.

A problem we now turn to exploring is the relationship of critical questions to missing premises that might be implicit in an argument. The critical questions can be seen as representing additional relevant factors that might cause an argument to default. So then a question arises. Could the critical questions be reformulated as additional premises in the argumentation scheme itself? To approach this question, it is best to start with a discussion of a specific example. Let’s consider the appeal to expert opinion.

3. Appeal to Expert Opinion as a Case in Point

Appeal to expert opinion is a type of argument used in an information-seeking dialogue. The special kind of information-seeking in appeal to expert opinion arises from a situation where one party to the dialogue has information that the other lacks. The one party is an expert. The other is not. The expert has knowledge that the non-expert wants to use in order to get advice on how to proceed with a problem or choice of actions. The scheme representing appeal to expert opinion as a form of argument was formulated in (Walton, 1997, p. 210) as follows.

Appeal to Expert Opinion (Version I)

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

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

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

It was made clear in (Walton, 1997) that appeal to expert opinion should, in most typical cases at any rate, be seen as a defeasible form of argument. It is rarely wise to treat an expert as omniscient. However, there is quite a natural tendency to respect experts and to defer to them. Thus, for most of us, it is not easy to question the opinion of an expert. It verges on the impolite, and is best done in a careful way. But experts are often wrong, for many reasons. As a practical matter, for example in matters of health and finance, you can do much better if you are prepared to critically question the advice of an expert in the right way. Thus, in principle, appeal to expert opinion as a from of argument is best seen as defeasible and as open to critical questioning.

The six basic critical questions matching the appeal to expert opinion, as indicated in (Walton, 1997, p. 223), are listed below.

1. *Expertise Question*: How credible is *E* as an expert source?
2. *Field Question*: Is *E* an expert in the field 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?

The idea behind using critical questions to evaluate appeals to expert opinion is dialectical. The assumption is that the issue to be settled by argumentation in a dialogue hangs on a balance of considerations. Appeal to expert opinion can carry a small weight of presumption in the dialogue, even if, by itself it is only a weak argument. If the given argument meets the requirements of the argumentation scheme, and the premises are plausible (carry some weight as presumptions), that can throw some weight on the conclusion as a plausible assumption to go ahead with. But suppose the respondent asks one of the appropriate critical questions indicated above. The burden of proof shifts back to the proponent's side, defeating the argument temporarily until the critical question has been answered successfully.

Now let's go on to discuss the general question of how the critical questions are related to missing premises. To pose this question more effectively, we need to consider a reformulation of appeal to expert opinion as an argumentation scheme. In this newer version, a conditional premise that links the major to the minor premise has been added.

Appeal to Expert Opinion (Version II)

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

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

Conditional Premise: If source *E* is an expert in a subject domain *S* containing proposition *A*, and *E* asserts that proposition *A* is true (false), then *A* may plausibly be taken to be true (false).

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

Version II has taken the old argumentation scheme and added a premise that expresses the Toulmin warrant that gives the argument its backing. What version II reveals is that the argument has a *modus ponens* structure as an inference. But it is not a deductively valid *modus ponens* argument. It has the form we could call defeasible *modus ponens*. For example, in a given case, an argument having the form of version II could throw weight on the conclusion that a proposition *A* is plausible. But then it might be pointed out that *E* is not a credible expert, for some reason. This information would defeat the appeal to expert opinion, undermining the previous grounds for accepting *A*.

Now the question arises whether version II could be made even more explicit. Could it be done by building the critical questions into the argumentation scheme? According to this proposal, the new scheme would have the following form.

Appeal to Expert Opinion (Version III)

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

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

Conditional Premise: If source *E* is an expert in a subject domain *S* containing proposition *A*, and *E* asserts that proposition *A* is true (false), and *E* is credible as an expert source, and *E* is an expert in the field *A* is in, and *E* asserted *A*, or a statement that implies *A*, and *E* is personally reliable as a source, and *A* is consistent with what other experts assert, and *E*'s assertion is based on evidence, then *A* may plausibly be taken to be true (false).

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

Version III makes the conditional premise seem cumbersome and hard to remember. Another way to accomplish the same result would be to add the content of each of the critical questions as a separate premise. This yields version IV.

Appeal to Expert Opinion (Version IV)

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

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

Conditional Premise: If source *E* is an expert in a subject domain *S* containing proposition *A*, and *E* asserts that proposition *A* is true (false), then *A* may plausibly be taken to be true (false).

Expertise Premise: *E* is credible as an expert source.

Field Premise: *E* is an expert in the field that *A* is in.

Opinion Premise: *E* did assert *A*, or made a statement that implies *A*.

Trustworthiness Premise: *E* is personally reliable as a source.

Consistency Premise: *A* is consistent with what other experts assert.

Backup Evidence Premise: *E*'s assertion is based on evidence.

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

In version IV, all the critical questions have been built in as premises. Now the argumentation scheme is complete by itself, and we don't need the device of critical questions any longer, or so it would seem.

Technically speaking either of version III or version IV would work as well as version II, with accompanying critical questions, as a format for analyzing and evaluating appeals to expert opinion as arguments. It doesn't really matter that much which version you use. The advantage of version II is that it strikes a nice balance. It shows you what you basically need as the core of the appeal to expert opinion. It indicates to a user what essential elements give this form of argument the weight that it can carry to command rational assent in a case by shifting a presumption from one side of a dialogue to the other. But then the critical questions offer the user (interlocutor, analyst, evaluator, student) a choice among strategies for probing into the weak points in such an argument. They function like a traditional topic as a memory device. We tend to defer to an expert, and may be hard pressed to think of the right question to ask. To open the discussion up, a user can cast around among the list of standard critical questions and find one that best expresses his doubts or his failure to make sense of what the expert has said. Thus version II is a good choice in which to express the form of appeal to expert opinion.

Version II is also the most attractive option for diagramming; having to include in a diagram all the implicit premises of version IV introduces unnecessary complexity, whilst diagramming the extra, convoluted warrant of version III fails to elucidate the structure of the argument at all. Instead, marking the general, typical, structure with a scheme, and then allowing access to that scheme's critical questions during the analysis process, allows the analyst the flexibility to include the critical question premises where they are included in the original text, but to leave them out of the diagram where they are not required. The full set of critical questions is retained in the definition of the scheme to remind the analyst of the assumptions that are being made, and to aid in the process of evaluation. This is the approach adopted in Araucaria.

4. The Completeness Problem

A general problem is how an argumentation scheme can have normative bite in a dialogue if the respondent can continue the dialogue by asking critical questions or by otherwise challenging the argument. If these arguments are defeasible, how can they ever be used to pin down a respondent’s commitments? One tool that can be applied to deal with this problem is the profile of dialogue (Krabbe, 1999). A profile of dialogue is a sequence of moves that represent only a small part of a longer sequence of dialogue. For example, it might represent a question, a reply to that question, and then a next move or two. Profiles are not just descriptive tools for identifying common patterns of moves in examples of argumentation. They can also be used in a normative way to represent how an ideal sequence of dialogue should go, or to diagnose faults, errors or fallacies. The argumentation scheme for appeal to expert opinion, along with the set of matching critical questions, can easily be used to set up a normative profile for the typical kind of case in which appeal to expert opinion is used to support a claim. The first point in the profile will be an argument or question put forward by the respondent. The next point will be the appeal to expert opinion put forward by the proponent to reply to this move. At the next point, the respondent’s set of allowed options can be represented by eight branches in a tree diagram. The respondent can (a) ask a critical question, (b) challenge one of the premises of the appeal to expert opinion, or (c) accept the conclusion of the argument as a commitment. Thus the profile of dialogue shows how the argument has normative bite when used in a dialogue.

Another problem concerns enthymemes. Can the critical questions be used, in addition to the argumentation scheme, to specify additional missing premises that can be added in to a given argument? Because the critical questions are already formulated in advance, it seems possible that they could be used as part of an automated device to pick out missing premises in enthymemes. But this problem leads back to the one above. It could be called the completeness problem for critical questions. Once the respondent has run through the list of critical questions matching a scheme, can he go on to ask even more specific critical questions raised by the previous answers? The problem is one of how argumentation schemes are binding on a respondent. Presumptive schemes are defeasible. They are not deductively valid. The question then is how long the process of critical question can continue before the argument must finally be accepted as binding the respondent to accepting the conclusion, if he has accepted the premises.

As an example, let's go back to appeal to expert opinion, where the basic critical questions are known to have subquestions coming under each of them. For example, three critical subquestions have been cited (Walton, 1997, p. 217) as coming under the trustworthiness critical question.

Subquestions for the Trustworthiness Question

Subquestion 1: Is *E* biased?
Subquestion 2: Is *E* honest?
Subquestion 3: Is *E* conscientious?

Bias means failure to represent both sides of an issue in a balanced way. Bias is not always bad, because advocacy is sometimes quite appropriate in argumentation. Still, bias can be important is judging the worth of an argument based on appeal to expert opinion. Honesty means telling the truth, or whatever is perceived as being the truth of a matter. Conscientiousness means care in collecting sufficient information. Thus the subquestions above represent more specific ways the trustworthinesss of an expert can be questioned.

Using this scheme, the completeness problem can be posed. Suppose the proponent has answered all of the six basic critical questions posed by the respondent in prior dialogue exchanges? Is the respondent obliged at that point to accept the appeal to expert opinion reasonable? If he accepts the premises, is he now obliged to accept the conclusion as a commitment in the dialogue? Or can he carry on asking more specific critical subquestions? The danger is that the dialogue could go on and on indefinitely. What burden of proof is appropriate for the proponent? When can he stop the process and say that his appeal to expert opinion should now carry weight?

5. Two Examples for Analysis

As a basis for discussion we select two cases for analysis. Both are from the leading logic textbook (Hurley, 2000). Both are presented by Hurley (p. 139) as examples of the fallacy of "appeal to unqualified authority" or *argumentum ad verecundiam*.

The Bradshaw Example

Dr. Bradshaw, our family physician, has stated that the creation of muonic atoms of deuterium and tritium hold the key to producing a sustained nuclear fusion reaction at room temperature. In view of Dr. Bradshaw's expertise as a physician, we must conclude that this is indeed true.

The basic problem of fallaciousness in the Bradshaw example arises from the field critical question. As Hurley puts it, “The conclusion deals with nuclear physics, and the authority is a family physician” (p. 139).

The Tobacco Example

James W. Johnston, Chairman of R. J. Reynolds Tobacco Company, testified before Congress that tobacco is not an addictive substance and that smoking cigarettes does not produce any addiction. Therefore, we should believe him and conclude that smoking does not in fact lead to any addiction.

The basic problem of fallaciousness in the Tobacco example arises from subquestion 1 of the trustworthiness critical question. If one should take him to be authority, Johnson may be presumed to biased. As Hurley puts it (p. 139), Johnston had a “clear motive to lie”, for if he had admitted that tobacco is addictive, government regulations could put his company out of business.

6. Applying Araucaria to These and Similar Cases

Let’s consider how these two examples would be processed by Araucaria, or indeed any comparable system for argument analysis and diagramming. The two premises and the conclusion in the Bradshaw example can be highlighted, and the linked argument diagram can be constructed. If the argument were cleaned up a little before being inserted into Araucaria as text, it might come out something like this.

Cleaned Up Version of the Bradshaw Example

(A) Dr. Bradshaw says blah.

(B) Dr. Bradshaw is an expert in the field of medicine.

Therefore (C) blah may plausibly be taken to be true.

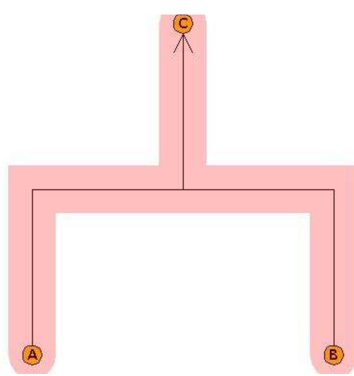

Figure 2. Diagram of the *Bradshaw* example (shaded area showing putative scheme)

The problem is that the subject domain containing blah is not medicine, but physics. Therefore, this argument doesn't even get off the ground. The *S* variable in the major premise stands for medicine while the *S* variable in the minor premise stands for physics. The problem seems like one of equivocation, or perhaps one of the argument not fitting the argumentation scheme at all (although it may superficially appear to, in the view of the uncritical thinker).

And yet there is another way of diagnosing the problem or fallacy in the argument in the Bradshaw example. If the field critical question is asked, the answer is "No; *E* is not an expert in the field that *A* is in". So here we seem to have a kind of duplication. The fault is diagnosed twice. Is this really necessary or desirable? Should the scheme and critical questions for Appeal to Expert Opinion be reformulated to eliminate this redundancy? That is the problem, anyhow.

Now consider the tobacco example. Like the previous one, this argument could perhaps be cleaned up a little to more visibly match the scheme.

Cleaned Up Version of the Tobacco Example

(A) Johnston is chairman of R. J. Reynolds.

(B) Anyone who is chairman of R. J. Reynolds is an expert on tobacco.

(C) Johnston is an expert on tobacco.

(D) Johnston says that tobacco is not addictive (etc.)

Therefore (E) 'Tobacco is not addictive' may plausibly be taken to be true.

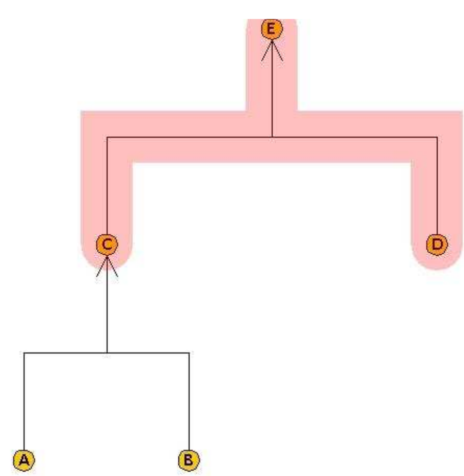

Figure 3. Diagram of the *Tobacco* example (shaded area showing putative scheme)

One problem here is the slight dubiousness of the second premise (B) as a generalization. This premise is true is certain respects, meaning that such a person is an expert on certain aspects of tobacco, like its manufacturing. But is false in other respects, because such a person is not necessarily, or as far as we know, a medical or scientific expert on addiction and on the properties of addictive substances. But this is not the major problem with the argument as an *ad verecundiam*, judging by Hurley's diagnosis. The main problem is that the example triggers the bias subquestion of the trustworthiness critical question (to put it in our terms).

It should be mentioned that both these cases are relatively simple examples of the *ad verecundiam* fallacy taken from a logic textbook. In the textbook, they are used pedagogically to introduce students to the most simple or obvious kind of case that the students will agree to as fallacious right away. In more complex examples, the mistake or blunder is not so obvious. And indeed, the kind of case emphasized in (Walton, 1997), the proponent adopts a strategy of blocking progress in a dialogue by trying to prevent the respondent (in advance) from raising the appropriate critical questions. One leading example in the book is a case where the parents of a sick child are prevented from asking questions on how to help their child by physicians who dismiss their claims as "anecdotal", suggesting that the parents do not really have a right to discuss questions of medical treatment with them. But this kind of case raises a problem identified by Jovicic (2002, p. 29). In the case she postulates, a proponent advances an argument from expert opinion using the appropriate argumentation scheme, and the premises are presumptively strong. But he is an arrogant person who blocks off the attempts of the non-specialized audience to ask appropriate critical questions. Thus, by the Walton criterion, his argument commits the *ad verecundiam* fallacy. And yet suppose that the argument, when presented to an audience of specialists, who do not even need to ask these critical questions, is based on evidence in the field, making it presumptively strong. It may too early to tell what the best solution to this problem is. But it does suggest that the argumentation scheme for Appeal to Expert Opinion, even with the matching critical questions, may be only part of the answer of dealing with the *ad verecundiam* fallacy. Somehow the argumentation scheme, the critical questions, and the profile of dialogue (Krabbe, 1999) may all need to be taken into account in the big picture. The problems with the tobacco case and the Bradshaw case are just the beginning.

In the tobacco case then, the argument has some problems fitting the form of the Appeal to Expert Opinion. But once it gets past this snag, its underlying problem is deeper. So in the tobacco case, as contrasted with the Bradshaw case, the deeper problem that is the basis for judging the argument to be an *ad verecundiam* fallacy only comes out when the right critical question is asked. And even then, the precise diagnosis of the fault is only pinpointed exactly when the level of the critical subquestions is reached.

The problem then is one of finding a uniform method of balancing off the format of the argumentation scheme in relation to the critical questions so that the processes of argument analysis and evaluation are most user-friendly. Maybe a little bit of redundancy is OK, as long as all the bases are touched at least once.

This pragmatism is the key to tackling the project's desiderata. By striking a balance between, on the one hand, the explicit deductivist approach of listing of all the implicit premises generated by critical questions, and on the other, the minimalist approach of suggesting a scheme may have been applied, the work comes a step closer to being both theoretically sound and pedagogically friendly; and both computationally formal and realistically applicable.

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