

J. Anthony Blair

University of Windsor

INFORMAL LOGIC AND LOGIC

Abstract: This article examines the relation between informal logic and logic. Informal logic originated with the rejection of formal logic in the analysis and evaluation of natural language discursive arguments. Various alternatives are mentioned: fallacy theory; acceptability, relevance and sufficiency; and argument scheme theory. The last is described at some length as involving warrants, schemes, and critical questions. Argument scheme analysis and critique, while informal, has been used in AI to develop computer programs to analyze, assess and even construct arguments in natural language. Thus informal and formal logic have come together.

Keywords: informal logic, formal logic, fallacy theory, relevance and sufficiency, argument schemes, argumentation schemes, warrants, critical questions, argument schemes in computer systems

1. Introduction

This article examines, in an unsystematic way, some of the features of the relation between informal logic and logic. Informal logic originated with the rejection of the use of formal logic for the purpose of the analysis and the evaluation of natural language discursive arguments. While not at all a rejection of formal logic, this declaration of independence required those who identified theoretically with the informal logic critique of formal logic's usefulness for this purpose to look elsewhere for analytic and normative tools. One of these was the theory of the informal fallacies. While the development of theory for informal fallacies has occupied considerable intellectual energy of the past three decades, it is merely mentioned here. Another approach, one that has been adopted in a number of textbooks, is to regard the acceptability of premises and the relevance and sufficiency of the premise-conclusion link as the informal criteria of a logically good argument. A third approach, and the one developed at some length in this article, is the use of argument scheme theory. An argument scheme is an abstract pattern that an argument exemplifies. A large number of such patterns that

have been found to be used again and again in the arguments occurring in natural language discourse have been described and named. These schemes rely on the presumption that reasoning from the kinds of grounds and via the kinds of inferences that are identified by such a scheme is justified. They presume that such inferences are warranted, to use the concept introduced by Toulmin (1958). The premises, warrant, and other assumptions of any instance of a scheme may be tested by a set of what are termed the “critical questions” that pertain to that scheme. Argument scheme analysis and critique, while informal, has been used in Artificial Intelligence to develop computer programs to analyze, assess and even construct arguments in natural language. Since computer programs require necessary relations between premises and conclusions, that is, the deductive validity that characterizes formal logic, we find that at present informal and formal logic have come together.

2. The origins of informal logic

So-called “informal logic” began in the late 1960s and early 1970s in Canada and the United States in university philosophy classrooms in which students had signed up for a “logic” course that they expected to improve their reasoning and their ability to understand and criticize the public policy arguments of the day, particularly those published in the media, which at that time consisted of newspapers and magazines (see Kahane 1971, p. vii). The people teaching those courses were junior philosophy faculty members who had some training in formal logic.

Often the course was an elementary formal logic course and the logic was *not* applied by the instructor to the arguments the students were interested in analyzing. In such cases, the students became frustrated. The rationale sometimes given for studying formal logic without any application to the kinds of texts and arguments the students wanted to be better at critiquing was that training in formal logic improves one’s reasoning ability, and thus indirectly helps one better to analyze and evaluate arguments. But the transfer of knowledge and skill alleged in this claim was never empirically demonstrated (nor has it yet been, to my knowledge), and anecdotally seemed minimal.

However, in other cases the instructors *did* try to teach the students to analyze and evaluate examples of such arguments using the tools of elementary formal logic. In those cases, both students and instructors became frustrated. There were several difficulties.

First, the text of discourse had to be translated into standard form so that its formal structure could be extracted. That turned out to be a nightmare, since often the text included other kinds of sentences besides present tense declarative sentences (such as interrogatives, imperatives, and others not readily classified), they were in past or future tenses of various kinds, or in the subjunctive mood, the expressions were vague, and so on. Efforts to force the text to fit the standard form required for formal appraisal tended to result in oversimplification or other distortion of the original meaning. None of the logic textbooks that were available at the time provided help, because their examples were designed to illustrate the logical principles, not the other way around, and so they were (quite appropriately) simplified and tailored to suit that purpose. As a consequence, they were highly oversimplified as compared to the language of public discourse.

Second, the logical structure of the texts was more complicated than the textbook material was able to handle. For instance, the arguments included – besides straightforward arguments directly supporting a thesis – anticipations of objections and replies to those objections, consideration of arguments against the thesis as well as those in its favour, several arguments for the same thesis, sometimes combined with contrary considerations, and so on.

Third, almost always the arguments seemed to rely on unstated assumptions. To render those assumptions explicit by turning the resultant translation into a valid argument seemed to beg the question, since the point of the reconstruction was to decide the validity of the argument, not prejudge it. But then the decision as to how to formulate the assumptions could not be determined using logic.

Fourth, even in cases in which some sort of translation of the argument into standard form that would permit it to be assessed was achieved, that assessment ran into a couple of further difficulties. For one thing, if the problematic feature was not the validity of the argument, then the truth of the premises was the issue. The standard line of the day was that the determination of premise truth lies outside the province of logic, and in epistemology or in science. But then the logic course had nothing to say about a key component of argument evaluation. For another thing, when the argument as reformulated proved deductively invalid, in many cases it remained a cogent argument: its premises supplied obviously good reasons for accepting its conclusion. But if that was so, then deductive validity was not the only criterion of argument merit, and the logic course had nothing to say about any other criterion to be used in argument evaluation. Finally, an argument with a premise that was equivalent to the conclusion would be

deductively valid, since any proposition implies itself, but it would be question-begging as an argument. These last two points showed that deductive validity is neither a necessary nor a sufficient criterion of a logically good argument.

As a result of these experiences, many of these philosophy instructors concluded that formal logic is not well-suited as the model for the analysis and interpretation of such argumentation, and that it does not provide an adequate basis for the evaluation of such argumentation. New tools for the analysis of arguments were needed, and new criteria for the assessment of arguments were needed. Since it was assumed that logic is the study of the norms distinguishing good from bad arguments, it was assumed that these new tools and criteria belong within logic, and since the term “informal logic” had been used in some quarters, it was adopted as the label for these departures from formal logic. (See Scriven 1976 and 1980, and Blair and Johnson 1980 for formulations of these points.)

In my view it is significant that “informal logic” was adopted as the name of a *critique* of certain applications of formal logic. It was *not* the name of a new theory or approach to the analysis and assessment of arguments except insofar as it identified such a theory or approach negatively – in terms of what it was not. As a result, a variety of tools and criteria have clustered under the rubric of “informal logic” that are not necessarily consistent and are often redundant (that is, they performed the same role in different ways).

It perhaps remains necessary to emphasize that in rejecting formal logic as the tool to be used for the analysis and the basis for the evaluation of natural language discursive argumentation, informal logicians did not and do not reject formal logic.

3. Is “informal logic” logic?

Meanwhile, critics of the attempts to develop non-formal analytic tools and criteria of evaluation raised a variety of objections. One line of attack (Hintikka 1985, Woods 2000) holds that logic is by definition a formal enterprise, and so the idea of an informal logic is a contradiction in terms. Something that complicates this line of objection is that ‘formal’ can be understood in a variety of senses, and in at least one sense of ‘formal,’ namely “involving reference to abstract patterns,” informal logic is in some of its manifestations and in spite of the name, a formal enterprise, since most theorists focus on patterns of argument or argumentation schemes as tools to be used in the analysis and evaluation of arguments.

It remains true, however, that there is envisaged no calculus for the informal analysis and evaluation of arguments, and so in this respect informal logic is not formal. Is it therefore not logic? There is some precedent for calling the norms that warrant the inferences of arguments their “logic.” Here is Daniel Bonevac in the article on the philosophy of logic in the *Cambridge Dictionary of Philosophy* (1995, p. 592): “Logic judges inferences good or bad and tries to justify those that are good.” And here is Wilfred Hodges in the article on modern logic in the *Oxford Companion to Philosophy* (1995, p. 500): “Logic, whether modern or traditional, is about sound reasoning and the rules which govern it.” If these very general formulations are accepted, then the identification of logic with deductive logic is best regarded not as a matter of definition, but rather as a contingent assertion. And it is an assertion that requires support in the face of the now widely held view that there can be arguments with sound reasoning or good inferences that are not deductively valid. It should be added that this view is shared by argumentation theorists, including, besides those in the speech communication community, informal logicians, and for several decades now, also scholars working in Artificial Intelligence modeling reasoning and argument, and many epistemologists among philosophers. Even so, here we enter the fray of *der Streit der Fakultäten*. Who owns the word ‘logic’? Different camps can claim different historical precedents for their preferred terminology, but this is an un-illuminating controversy. What is of possible interest is the question whether there is any possible connection or overlap between formal logic in the narrow sense and informal logic in any of its manifestations.

For each smallest unit of argument – at a minimum one proposition supporting another or alleged to support another – at least two distinct features are open to evaluation from the point of view of whether the premises justify the conclusion: the supporting proposition, and the relationship of support.

The adequacy of the supporting proposition for the purpose of the argument seems appropriately to be determined according to the use to which the argument is being put, and as a result, in different ways. For instance, if the argument is supposed to establish the truth of the supported proposition, then the truth of the supporting proposition(s) would be the issue. However, if it is supposed to establish that an interlocutor is obliged to accept the supported proposition(s), then the interlocutor’s acceptance of (or commitment to) the supporting proposition(s) would be the issue. And if it is supposed to establish that it would be reasonable for interlocutor to accept the supported proposition(s), then the acceptability to the interlocu-

tor of the supporting proposition(s) (its or their worthiness to be accepted by the interlocutor) would be the issue. These all seem to be either epistemological or else dialectical matters, and whether they belong to logic in a broad sense, they do not evidently belong to formal logic in the narrow sense.

What about the adequacy of the relationship of support between the supporting proposition(s) (the premise[s]) and the supported proposition (the conclusion) in an argument when the former does [or do] not deductively imply the latter? To those for whom logic is concerned only with “what follows *necessarily* from what” (see Harman and Kulkarni 2006) this question is by definition ruled to be outside the domain of logic. To the extent that anyone bothers to classify it, this is counted as an epistemological issue (see, e.g., Goldman 1999, Ch. 5). To those for whom logic is concerned with the norms of good reasoning or (what is not the same thing) of good arguments, this question belongs to logic, although to informal rather than to formal logic (see, e.g., Johnson 2000).

4. Defeasible arguments as the subject matter of informal logic

Whether or not they are entitled to use the term ‘logic’ to name their enterprise, it is with supporting relationships that are deductively invalid that informal logicians have been chiefly concerned. Moreover, they have focused on a sub-set of such relationships, setting aside those that can be quantified, that is, assigned a numerical statistical probability.

Such arguments are now recognized and classed as “defeasible” arguments. That is, their premises supply good reasons for accepting their conclusions if they constitute the only salient information or grounds available on which to decide the conclusion. However, challenges from critics or simply the discovery of additional information can “defeat” such arguments – that is, can reduce or removed the force of any justification that the original premises supplied for their conclusions.

Here are some examples of such defeasible arguments. The arguments outside the parenthesis in each case have grounds that supply good reasons for accepting their conclusions in ordinary circumstances, other things being equal. However, if such further information as that supplied or alluded to in the parenthesis were to obtain, the arguments would be weakened or lose any probative force completely. (In each case the reader is asked to imagine a situation in which such an argument might be made.)

1. Presumably she is a Canadian citizen, for she was born in Ottawa, Canada's capital city. (But she is Princess Margriet of the Netherlands, and when she was born, during WWII, while the Dutch royal family was living in exile in Ottawa, the hospital room in which she was born was temporarily declared Dutch territory so that she would have Dutch citizenship. [This circumstance happens to be true; the author was born in the same hospital a couple of years earlier.]
2. You ought to take your daughter to the circus because you promised her you would. (But the circus has been cancelled due to a fire; or, your daughter has influenza; or,)
3. My physician has just advised me that I should lose weight and take up some sort of exercise régime, so I'd better change my diet and exercise habits. (But my weight is in the normal range for my height and age, and I walk two kilometers to and from work every day; also my physician is a self-admitted health extremist.)
4. Given that you want to buy a kitchen knife with about a 7"-long single-edge blade about an inch wide and about 1/8" thick at the back tapering convexly to the cutting edge, you should ask at the store for a "chef's" knife. (But that store has its knives classified in an idiosyncratic way: they call a chef's knife an "all-purpose kitchen knife" and what *they* call a "chef's knife" is quite different.)
5. A good explanation of the kitten's death is that a dog mauled it, so probably the kitten was killed by a dog. (But the injuries are consistent also with an attack by a large cat, and there are no dogs living in the neighbourhood, only several cats.)
6. The witness has a track record of lying and deception, so his testimony should be taken with a grain of salt. (But since his incarceration the witness has converted to Islam and is a conscientious believer.)

The informal logicians' question has been, What norms are appropriate for assessing such inferences?

5. The theory of informal fallacies as a normative theory for informal logic

One normative basis for "informal" argument evaluation that was suggested early on was the use of the informal fallacies, which have a tradition tracing back to *Sophistical Refutations*. For many who identify with informal logic, the informal fallacies are a prominent tool for the analysis and assessment of discursive argumentation. Accordingly, a logically good

argument would be a non-fallacious argument. However, it soon emerged that what constitutes an informal fallacy was far from theoretically clear (see Hamblin 1970), so while fallacy theory might in principle supply the norms sought by an informal logic, that prospect remained a promise rather than delivered goods. Great strides have been made since that time in developing clear and consistent theories of the informal fallacies (see, for instance, the work of Walton 1995, or of van Eemeren & Grootendorst 1992a), however the emphasis must be placed on the plural – theories – for there is no consensus in the literature supporting just one conception of fallacy (see Hansen and Pinto 1995).

Moreover, there are a couple of reasons to leave the informal fallacies out of the present picture. One is that the informal fallacies must not be identified with informal logic; they do not constitute its defining subject matter. Such prominent informal logicians as Scriven (1976) and Hitchcock (1995) regard fallacy analysis as problematic, and certainly not central to the informal logic enterprise. Furthermore, the most fully developed analysis by an informal logician is due to Walton, and on his analysis argument scheme theory is essential to an understanding of the informal fallacies. Below, I will outline argument scheme theory in some detail.

6. Relevance and sufficiency as criteria of inference cogency in arguments

In the 1970s, Johnson and Blair (1977) introduced what seem to be generic norms that apply to the support relationship. In any logically good argument the premises would have to be *acceptable*, *relevant* and *sufficient*. That is, they would have to be worthy of belief or acceptance for the purpose of the argument, and they would have to have probative bearing on the truth of the conclusion (thus, by the way, ruling out question-begging premises), and the evidence or other kinds of grounds they supplied would have to include enough information of the appropriate kind(s) to justify accepting the conclusion on that basis. These are generic norms, since any cogent argument must and would satisfy them. Deductively valid arguments that are not question-begging will have both relevant and sufficient premises. And arguments whose premises supply a high numerical degree of probability to their conclusions will satisfy these conditions too. Moreover, arguments whose premises supply good reasons for accepting their conclusions (albeit with qualifications) – even though such arguments are deductively invalid and their evidence assigns no quantitative probability to their conclusions – also satisfy these norms.

It has been argued against these criteria (Biro and Siegel 1992, pp. 97–98), that the criterion of relevance is redundant, given the criterion of sufficiency, since sufficiency presupposes relevance: premises cannot supply sufficient evidence for a conclusion if they are irrelevant. The premise of this objection is true, but it is not so clear that the conclusion follows from it. It is possible for an argument that someone has advanced to contain (some) premises that supply sufficient support to the conclusion and also (other) premises that are irrelevant to that conclusion. Without the criterion of relevance, such an argument would have to be judged logically good when in fact its logical merit is mixed. As we might say, the arguer should have stopped when he was ahead with just the sufficient – and therefore relevant – premises; but he didn't, and went on to include some irrelevant premises. (To be sure, the irrelevant premises might have been offered first, or mixed among the relevant ones, and not just added at the end.) In order to identify such irrelevant offerings as “premises” it must be clear that the arguer intended them to serve as support for his conclusion. He (mistakenly) thought they were relevant. Otherwise, in interpreting his discourse, the listener or reader would be justified in discarding them as not belonging to the argument, on the ground that they are irrelevant to the conclusion. Thus we see that relevance also functions as a criterion of argument identification. In identifying arguments in texts of discourse in the absence of clues as to the intentions of the speaker or writer, we set aside assertions that have no probative bearing on a conclusion as not part of any argument, and assign to them some other function in the discourse. The parts of the text that we identify as belonging to an argument will then consist of one assertion whose contents function as a conclusion and other assertions whose contents all function as relevant premises adduced in support of that conclusion. For an argument so identified, the assessment of the cogency of the support the premises provide for the conclusion will thus focus exclusively on whether they supply sufficient support, given that they have already been judged relevant by virtue of their inclusion in the argument. So it seems that the critics who would exclude relevance as a criterion of argument evaluation are right for texts from which information or other speech act contents with no probative bearing on a conclusion have already been weeded out, whereas those who regard relevance as a needed criterion of argument evaluation are right for texts of what a speaker or writer intended to constitute an argument.

Although the *acceptability*, *relevance* and *sufficiency* criteria are intuitively plausible, the theoretical difficulty lies in specifying how to identify when they have been satisfied, and as a result, in operationalizing them

so as to be able to use them to judge in particular cases whether grounds adduced as probative really are relevant and whether grounds admitted as relevant really do suffice to justify accepting the conclusion. Attempts have been made to characterize relevance and sufficiency (e.g., Blair 1989, 1991; van Eemeren & Grootendorst 1992b), but no results have found widespread endorsement.

7. Argument (or argumentation) schemes as criteria for argument cogency

An alternative approach has been to use argument schemes as the basis for assessing defeasible arguments. It is an approach whose provenance is murky and probably mixed. One can find elements in it of Toulmin's model of an argument found in *The Uses of Argument* (1958) and in theories of argument schemes found in Perelman and Olbrechts-Tyteca's *Traité sur L'Argumentation* (1958) and especially in Hastings's dissertation, *A Reformulation of the Modes of Reasoning in Argumentation* (1962). It contains elements that seem clearly to have been influenced by the modeling of argumentation as a dialogue, popularized in van Eemeren and Grootendorst's "Pragma-Dialectical" theory (1984, 1992, 2004). Its fullest expression is found in the combination of a dialogue-modeling approach to argument scheme theory developed by Walton in, for example, *Argumentation Schemes for Presumptive Reasoning* (1996) and *Argumentation Schemes* (with Reed & Macagno, 2008).

Many arguments provide *prima facie* support for their conclusions. Toulmin (1958) notes both that the grounds adduced in such arguments provide qualified, but not unconditional, support, and also that the support will dissolve if unexpected but possible conditions of rebuttal turn out to obtain. Such arguments are thus defeasible (although Toulmin did not use that term). According to Perelman and Olbrechts-Tyteca (1958), it is possible to identify in texts of all sorts arguments that exhibit recognizable patterns or schemata (here called "schemes"). For Perelman and Olbrechts-Tyteca arguments – unlike demonstrations (such as the proofs of mathematics or logic) – are always in principle open to challenge or reconsideration. In fact this seems to be a definitional property of their concept of argument. Consequently, they took instances of the argument schemes they identified to be in principle open to question (and thus, again, defeasible). Hastings (1962) added the idea that to each argument scheme there can be associated a set of "critical question," which are questions that are a means of testing any

particular argument that is an instantiation of a scheme in order to decide whether in that case it establishes its conclusion or instead should be considered to be defeated.

To illustrate these ideas, I will use the example of the argument scheme for “Argument from Expert Opinion” quoted from Walton, Reed and Macagno (2008, p. 310):

Argument from Expert Opinion

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

Minor Premise: E asserts that proposition A is true (or false).

Conclusion: A is true (or false).

Following Toulmin (1958), any argument relies on a “warrant” or inference license. That is, the inference from the grounds offered in support of the conclusion to the conclusion presupposes that inferences from *such* grounds to *such* conclusions are legitimate or justified (thus: warranted, or licensed). Hitchcock (1995, 2002) has convincingly argued that Toulmin’s concept of a warrant should be understood as a generalization of the associated conditional of the argument. The “associated conditional” of an argument is defined as the conditional proposition consisting of the conjunction of the premises of the argument as its antecedent and the conclusion of the argument as its consequent. The associated conditional of an argument cannot be a premise, for to so designate it entails a vicious regress. By the same reasoning, a generalization of an argument’s associated conditional cannot be a premise either. So an argument’s warrant is not a premise, but instead is an assumption of the argument. Whether or not it is expressed is immaterial; in some cases it is, but frequently it is not.

Arguments fitting the scheme Argument from Expert Opinion seem to rely on some such warrant or inference license as:

Argument from Expert Opinion Warrant: If a proposition is asserted to be true (or false) by someone who is an expert in the domain to which it belongs, one may [i.e., one is justified or entitled to] presume that it is true (or false), other things being equal.

For some theorists, an argument (or argumentation) scheme is very like a warrant. For instance van Eemeren and Grootendorst write that in arguing, a person “relies on a ready-made *argumentation scheme*: a more or less conventionalized way of representing the relation between what is stated in

the argument [= the grounds or, roughly, the premises] and what is stated in the standpoint [= the opinion argued for or, roughly, the conclusion]" (1992, p. 96; my emphasis). To rely on such a relation in arguing is precisely to rely on a warrant; it is to assume that inferences from arguments or grounds of such a kind to standpoints or opinions of such a kind are licensed or justified. Similarly, van Eemeren and Grootendorst identify *modus ponens* as an example of a justificatory argumentation schema ("scheme" in my terminology) (1984, p. 66). *Modus ponens* can be expressed as follows (where p and q are variables ranging over propositions):

Modus ponens: If p , and p implies q , then q .

But such a proposition may also be expressed as a warrant – in the case of *modus ponens*, as follows:

Modus Ponens as a warrant: If a proposition is true and it logically implies a proposition, then one is entitled to infer that the latter is true.

Setting aside the problem that *modus ponens* is problematic as a warrant in some cases since it can warrant question-begging arguments (i.e., when $p = q$), it is easy to see why warrants and schemes can be identified. Unpack the antecedent of a warrant expressed as a conditional as the group of schemata representing premises and its consequent as the schema for a conclusion and, presto, there is an argument scheme.

Besides presuming that the argument's warrant is justified, an argument's proponent typically makes certain other assumptions. For instance, an Argument from Expert Opinion, it is assumed that S is a domain of *factual knowledge*. If A were the proposition, "Beer tastes better than bourbon," or the proposition, "Abortion is *prima facie* immoral," no appeal to expert opinion would be appropriate because these claims are not factual claims, but rather, respectively, an expression of personal preference and a moral value judgement, neither of which is the kind of claim that can be settled by appeal to expert opinion. One way to explain why not is to point out that the appeal to expert opinion, as Walton notes, is a special case of a more general argument scheme, namely, the Argument from Position to Know. Here is Walton *et al.*'s depiction of that scheme (2008, p. 309):

Argument from Position to Know

Major Premise: Source a is in a position to know about things in a certain subject domain S containing proposition A .

Minor Premise: *a* asserts that *A* is true (or false).

Conclusion: *A* is true (or false).

What justifies our reliance on experts, when it is justified, is, among other things, that their claims have the status of knowledge and the subject domains to which the claims belong and to which their expertise pertains are fields of knowledge. Thus experts can be in a position to know what they are talking about and so can, in principle, convey that knowledge to others. Judgements of taste and of moral value do not belong to fields of knowledge (or so I contend), so appeals to expert opinion about matters of taste or moral value are inappropriate because such judgements lie outside the scope of *anyone's* epistemic authority. The use of the Argument from Expert Opinion scheme relies on the assumption that the scheme is applicable to the question at issue in the argument. In general, then, it is assumed that the use of an argument instantiating a given scheme is an appropriate use of that scheme.

Often, when arguments are made that employ such schemes, not only will such assumptions be left unexpressed, but also parts of the argument itself will be left unexpressed. When someone argues, “I should be cutting down on the salt in my diet, because my doctor said I’m getting too much,” he (or she) leaves unexpressed the premise that the doctor has knowledge of the domain of what constitutes a healthy diet, to which belongs the amount of salt a person should ingest. For when we accept what someone said merely on the ground that he (or she) said so, it is because we believe or assume or presuppose that he is in a position to know about what he is talking about.

To be sure, a scheme can be any pattern whatsoever, since there is no requirement that argument schemes exhibit established logical principles. However, many schemes are used over and over, and their patterns are identified and named. Walton *et al.* (2008) describe and name sixty schemes, as well as one or more subtypes for several of them. These names and patterns of argument are familiar. Besides argument from authority, among others they include, for example: *ad populum*, argument from example, argument from analogy, composition, division, argument from waste, argument from cause to effect, argument from correlation to cause, argument from sign, *ad hominem*, slippery slope, argument from precedent.

What makes these schemes well known and often instantiated? I suggest it is that they are schemes with a *prima facie* plausibility. Arguments instantiating these schemes are, on the face of it, plausible arguments. What this amounts to is that their warrants – the generalizations of their associated conditionals that license the inference from their premises to their

conclusions – are defensible. That is, it can be shown that when these warrants are relied on in arguments, under appropriate conditions, the premises of the arguments serve to justify the conclusions.

Walton, following van Eemeren and Grootendorst (1992), following Hastings (1962), associate with each argumentation scheme a set of critical questions. The function of such questions is to test whether a particular instance of a scheme is actually a plausible argument. Here are the critical questions that Walton *et al.* (2008, p. 310) list for the Argument from Expert Opinion.

Critical Questions for Argument from Expert Opinion

- CQ1: *Expertise Question:*
How credible is *E* as an expert source?
- CQ2: *Field Question:*
Is *E* an expert in the field [S] that *A* is in?
- CQ3: *Opinion Question:*
What did *E* assert that implies *A*?
- CQ4: *Trustworthiness Question:*
Is *E* personally reliable as a source?
- CQ5: *Consistency Question:*
Is *A* consistent with what other experts say?
- CQ6: *Backup Evidence Question:*
Is *E*'s assertion based on evidence?

The critical questions function to test whether other things are in fact equal in the case of the argument in question. Some of them (namely, CQ1, CQ4, CQ5 and CQ6) ask whether there exist in the case at hand any factors that *undercut* the inference from the premises to the conclusion, and thus block the justificatory force of the warrant (see Pollock 2008, p. 453, for his most recent account of his concept of defeaters: "... rebutting defeaters attack the conclusion of a defeasible inference, while undercutting defeaters attack the defeasible inference itself, without doing so by giving us a reason for thinking it has a false conclusion."). If the alleged expert's qualifications are weak, or the expert might be strongly motivated to lie or exaggerate, or if the expert is relying on someone else's say so and not on acquaintance with the evidence for the claim, then the inference is undercut and the argument is defeated.

One of the critical questions on the list (CQ5) tests whether there is an independent reason to question the conclusion. If other experts, especially

if they are equally or better qualified, disagree with *E* about *A*, then there exists a *rebutting* defeater of the argument. That is, there is a reason for thinking that it has a false conclusion.

The remaining critical questions on the list test whether the premises are true in the particular case (namely CQ2 and CQ3). If the person relied upon as an expert is not an expert, or if what the person actually said is different from, and does not imply, the claim he or she is cited as attesting to, then those premises are false and the argument has nothing to go on.

Although Walton *et al.*'s (2008) list of critical questions for Argument from Expert Opinion do not include one, it seems advisable to add a critical question to their list to test for the appropriateness of the use of this scheme for the topic at issue. Some such critical question as the following might suit:

CQ7: *Appropriateness Question:*

Is domain *S* to which *A* belongs a field of knowledge?

In the case of other kinds of argument – arguments using other schemes – the use of the scheme might be inappropriate for other kinds of reasons, for example a *straw man* argument might be inappropriate because its conclusion is not a denial of the claim in dispute, and an case of *poisoning the well* might be inappropriate because it functions illegitimately to exclude some party from engaging in the argument.

Finally, since any argument relies on the warrant that allegedly licenses the inference from the grounds adduced to the claim in question, it seems advisable to add a critical question to test for the *prima facie* legitimacy of the warrant of the argument. This critical question gets overlooked when the focus is on well-known and often employed argument schemes whose *prima facie* force is well established. Also, except in cases of deliberate deception, when someone offers an argument to another or others, the arguer *thinks* the warrant is justified; and even in cases of deliberate deception, the arguer expects that *the audience* will think the warrant is justified. However, as we know, people are capable of completely irrelevant reasoning, so in principle it would seem legitimate to include a critical question to test whether an argument scheme is a *non sequitur*. Some such question as the following might apply to the Argument from Expert Opinion:

CQ8: *Warrant-testing question:*

Is it plausible that if a proposition is asserted to be true (or false) by someone who is an expert in the domain to which it belongs, one may [i.e., one is justified or entitled to] presume that it is true (or false), other things being equal?

Whether any particular argument instantiating an argument scheme is actually plausible will depend, then, on whether all the critical questions associated with that scheme – questions that function to test for the various ways that scheme can go wrong in a particular case – can be answered satisfactorily. I have suggested that critical questions serve several different functions, namely, to test (1) whether the given premises are true or otherwise acceptable, (2) whether that *type* of reasoning is *prima facie* plausible, (3) whether the inference from the premises to the conclusion in the given case is actually warranted, (4) whether there are independent reasons for rejecting the conclusion, and (5) whether the argument employed is appropriate in the situation in question.

The preceding contention glosses over some complexities that need not concern us for present purposes. For one, plausibility is relative to persons, because it is a function of consistency with other beliefs and other attitudes. For another, the account so far ignores complexities related to questions of burden of proof. Walton and others model all arguments as dialogues, which is a convenient fiction that permits assigning dialogue roles (proponent, opponent) and associated burdens of proof (often differing with different kinds of argument situations, such as in law *vs.* in science, and with different stages of the argument process, such as at the initiation of the argument *vs.* during argumentative exchanges).

8. Argument scheme theory and formal logic

It might seem that there is nothing of interest to the formal logician in such a method of informal analysis and appraisal of arguments. Clearly the testing of any particular argument will require its examination in the particular circumstances of its use. The situatedness of the argument scheme approach seems to preclude the possibility of useful formal analysis. Moreover, only the answers to the critical questions about the type of reasoning in general and the inference from the premises to the conclusion in the particular case seem to be related to what might be thought of as the “logic” of such arguments. The truth or acceptability of the premise is a factual or a procedural matter, and the appropriateness of the use of the argument scheme on the occasion in question is also a procedural matter.

However, the fact is that theorists working in Artificial Intelligence have turned to argument scheme theory to help develop programs to enable computers to recognize, analyze and construct arguments in natural language.

Obviously, if such a project is to succeed, the schemes must somehow be formalized so they can be expressed with deductively valid inference structures, and the fact that such programs have been developed shows that such formalizations are indeed possible (see, for example, *Araucaria* by Reed and Rowe 1995, *ArguMed* by Verheij 1998, *Reason!Able* by van Gelder 2002, *Rationale* by Austhink 2008). One approach is in effect to express each scheme in a defeasible *modus ponens*-like form, with its warrant used as the conditional premise, its antecedent as the grounds or data and its consequent as the conclusion. Provided there are no defeaters and the assumptions are not challenged, then the inference from the grounds to the conclusion is an entailment. A similar (logically equivalent?) approach is to treat the answers to all the critical questions as premises, and the warrant as a conditional with the conjunction of all those premises as the antecedent and the conclusion as the consequent. In that case, if all the premises are true, then the conclusion follows necessarily. (Both approaches are discussed in Walton, *et al.*, 2008, Chapters 11 and 12.) The resultant approximations to actual contexts of argument are close enough for the practical purposes for which these computer programs are designed. Moreover, as the various argument scheme descriptions are refined and made more complete, their formalizations get closer and closer to modeling ordinary language informal argumentation.

9. Concluding remarks

It seems that there has been a sort of Hegelian dialectical process at work. What began in the early days of the informal logic movement as a rejection of formal logic as the tool for analyzing and evaluating arguments has evolved to the point that there have successfully been developed formalizations of the schemes introduced to provide a framework for the informal analysis and evaluation of arguments. However, the new synthesis correctly puts the priority on natural language discourse. Those old enough to recall the heyday of Logical Empiricism will remember that natural language was criticized for its imprecision, its vagueness, its ambiguity – its resistance to ready formalization! Inferences that were not deductively valid were considered defective (see Grünbaum & Salmon 1988 for critiques of this view). Today it is appreciated that probably most natural language arguments that are cogent are not deductively valid, and that the task of anyone wishing to formalize such arguments for one or another practical purpose needs to accommodate that reality.

In this article I have been focusing on the relation of informal logic to standard formal logic. It needs to be mentioned that in doing so I have left out or only lurking in the background any mention of the dialectical and rhetorical properties of arguments which, in addition to their logical properties, most informal logicians today want to account for. Only a partial picture of the contemporary theoretical interests of informal logicians is conveyed here.

This article has addressed some remarks to the relation between informal logic and logic. Informal logic originated with a rejection of formal logic as an adequate basis for the analysis and evaluation of natural language discursive arguments. Various alternatives were considered. One that has just been mentioned here is the use of informal fallacies as an analytic and evaluative tool. Another that has received some attention is the triple of acceptability (of premises) and relevance and sufficiency (of the premise-conclusion link). A third, and the one given most attention, is argument scheme theory. On my analysis of it, this is a combination of the Toulmin notion of warrant as inference license, the Perelman and Olbrechts-Tyteca emphasis on argument schemes, and Hastings idea that critical questions can be associated with argument schemes and serve as the basis for evaluating arguments that instantiate them – all developed most fully by Walton. Argument scheme analysis and critique is decidedly informal, and yet, perhaps paradoxically, it has seemed to some computer scientists to be the best approach to use in developing programs to permit the use of computers in analyzing, evaluating and even in constructing arguments in natural language. To this end, the tools of formal and informal logic have recently been joined.

References

- Austhink (2008), *Rationale, Software Tool for Critical Thinking*.
(<http://rationale.austhink.com/reasonable>)
- Biro, J. & Siegel, H. (1992), 'Normativity, Argumentation and an Epistemic Theory of Fallacies', in F. H. van Eemeren, R. Grootendorst, J. A. Blair & C. A. Willard, eds., *Argumentation Illuminated*, SicSat, Amsterdam, pp. 85–103.
- Blair, J. A. (1989). 'Premise Relevance', in R. Maier, ed., *Norms in Argumentation*, Foris, Dordrecht, pp. 67–83.

- Blair, J. A. (1991), 'What is the right amount of support for a conclusion?' in F. H. van Eemeren, R. Grootendorst, J. A. Blair, C. A. Willard, eds., *Proceedings of the Second International Conference on Argumentation*, SicSat, Amsterdam, pp. 330–337.
- Blair, J. A. & Johnson, R. H., eds. (1980), *Informal Logic, The First International Symposium*, Edgepress, Inverness, CA.
- Bonevák, D. (1995), 'The Philosophy of Logic', in R. Audi, ed., *The Cambridge Dictionary of Philosophy*, Cambridge University Press, Cambridge – New York, pp. 592–594.
- Eemeren, F. H. van & Grootendorst, R. (1984), *Speech Acts in Argumentative Discussions*, Foris Publications, Dordrecht, Holland – Cinnamons, U.S.A.
- Eemeren, F.H. van & Grootendorst, R. (1992a), *Argumentation, Communication and Fallacies, A Pragma-Dialectical Perspective*, Lawrence Erlbaum Associates, Hillsdale, NJ – Hove and London.
- Eemeren, F. H. van & Grootendorst, R., eds. (1992b), *Relevance*, special issue of *Argumentation*, 6.
- Eemeren, F. H. van & Grootendorst, R. (2004), *A Systematic Theory of Argumentation*, Cambridge University Press, Cambridge.
- Gelder, T. van (1992), 'Argument Mapping with Reason!Able', *American Philosophical Association Newsletter, Philosophy and Computers*, 2.1, 85–90.
- Goldman, A. (1999), *Knowledge in a Social World*, Clarendon Press, Oxford.
- Grünbaum, A. & Salmon, W. C., eds. (1988), *The Limits of Deductivism*, University of California Press, Berkeley.
- Hamblin, C. L. (1970), *Fallacies*, Methuen & Co., London.
- Hansen, H. V. & Pinto, R. C., eds. (1995), *Fallacies, Classical and Contemporary Readings*, The Pennsylvania State University Press, University Park, PA.
- Harman, G. & Kulkarni, S. (2006), 'The Problem of Induction', *Philosophy and Phenomenological Research* 72, 559–575.
- Hastings, A. C. (1962), *A Reformulation of the Modes of Reasoning in Argumentation*, Doctoral Dissertation, Northwestern University, Evanston, IL.
- Hintikka, J. (1985), 'True and False Logics of Scientific Discovery', *Communication and Cognition* 18, 3–14.

- Hitchcock, D. (1995), 'Do Fallacies Have a Place in the Teaching of Reasoning Skills or Critical Thinking?' in H. V. Hansen and R. C. Pinto, eds., *Fallacies, Classical and Contemporary Readings*, The Pennsylvania State University Press, University Park, PA, pp. 321–338.
- Hitchcock, D. (2002), 'Toulmin's Warrants', in F. H. van Eemeren, J. A. Blair, C. A. Willard & A. F. Snoeck Henkemans, eds., Proceedings of the Fifth Conference of the International Society for the Study of Argumentation, SicSat, Amsterdam, pp. 485–490.
- Hitchcock, D. (2007), 'On the Generality of Warrants', <http://www.humanities.mcmaster.ca/~hitchckd/>
- Hodges, W. (1995), 'Modern Logic', in T. Honderich, ed., *The Oxford Companion to Philosophy*, Oxford University Press, Oxford – New York, pp. 500–504.
- Kahane, H. (1971), *Logic and Contemporary Rhetoric*, Wadsworth, Belmont, CA.
- Johnson, R. H. (2000), *Manifest Rationality: A Pragmatic Theory of Argument*, Lawrence Erlbaum Associates, Mahwah, NJ.
- Johnson, R. H. & Blair, J. A. (1977), *Logical Self-Defense*, McGraw-Hill Ryerson, Toronto. (1st U.S. edition of 1994 reissued in 2006 by the International Debate Education Association, New York.)
- Perelman, Ch. & Olbrechts-Tyteca, L. (1958). *La Nouvelle Rhétorique, Traité de l'Argumentation*, Presses Universitaires de France, Paris.
- Pollock, J. L. (2008), 'Defeasible Reasoning', in J. E. Adler and L. J. Rips, eds., *Reasoning: Studies in Human Inference and Its Foundations*, Cambridge University Press, Cambridge, pp. 451–470.
- Reed, C. & Rowe, G. (2005), *Araucaria, Version 3*. Available free at (<http://www.computing.dundee.ac.uk/staff/creed/araucaria>)
- Scriven, M. (1976), *Reasoning*, McGraw-Hill, New York.
- Scriven, M. (1980), 'The Philosophical and Practical Significance of Informal Logic', in J. A. Blair & R. H. Johnson, eds., *Informal Logic, The First International Symposium*, Edgepress, Inverness, CA, pp. 147–160.
- Toulmin, S. (1958), *The Uses of Argument*, Cambridge University Press, Cambridge.
- Verheij, B. (1998), 'ArguMed – A Template Based Argument Mediation System for Lawyers', Proceedings of the Seventh International Conference on Artificial Intelligence and Law, <http://www.metajur.unimaas.nl/~bart/papers/pdf/jurix98.pdf>

- Walton, D. (1995), *A Pragmatic Theory of Fallacy*, University of Alabama Press, Tuscaloosa – London.
- Walton, D. (1996), *Argumentation Schemes for Presumptive Reasoning*, Lawrence Erlbaum Associates, Mahwah, NJ.
- Walton, D. , Reed, C. & Macagno, F. (2008), *Argumentation Schemes*, Cambridge University Press, Cambridge.
- Woods, J. (2000), ‘How Philosophical Is Informal Logic?’ *Informal Logic* 20, 139–167.

J. Anthony Blair
Co-Director
Centre for Research in Reasoning, Argumentation and Rhetoric (CRRAR)
Department of Philosophy
University of Windsor
Windsor, ON N9B 3P4, Canada
tblair@uwindsor.ca