ISSA Proceedings 2002 – Dialectical Argumentation With Argumentation Schemes: Towards A Methodology For The Investigation Of Argumentation Schemes

1. Introduction

Argumentation follows patterns. Here are two examples:

1. *P*. If *P* then *Q*. Therefore *Q*.
2. All *Ps* are *Qs*. Some *R* is not a *Q*. Therefore some *R* is not a *P*.

The first is known as *Modus ponens*, which plays a major role in logical proof systems. The second is one of the categorical syllogisms that were already studied by Aristotle. These examples are well-known from logic.
But there are many other patterns in argumentation. For instance, the following:
3. Person *E* says that *P*. Person *E* is an expert with respect to the fact that *P*. Therefore *P*.
4. Doing act *A* contributes to goal *G*. Person *P* has goal *G*. Therefore person *P* should
do act *A*.

Scheme (3) expresses a variant of argumentation from expert opinion, (4) one of means-end reasoning.

All four example schemes are sensible patterns of argumentation. In real-life argumentation, the latter two are very relevant, probably more than the former two. Still the former two (or variants of them) are more often encountered in

books on argumentation than the latter two.

For present purposes, there is no need to dive deeply into the reasons for this somewhat paradoxical situation. It is however not hard to think of some reasons that may be adduced for this situation:
– The former two fit in neat formal systems: *Modus ponens* (1) in natural deduction and other logical proof systems, scheme (2) in the complete classification of categorical syllogisms. It is not to be expected that the schemes (3) and (4) will appear in formalisms with similarly neat formal properties.
– The former two are thought of as necessarily valid schemes, and the latter as pragmatical validities or perhaps even as pragmatical contingencies. (How these notions are to be defined and whether such distinctions make sense is here not at issue.)
– The former two are strict in the sense that they allow no exceptions, while the latter are defeasible. For instance, with respect to (3), there is the exception that the expert is wrong, and with respect to (4), there can be many ways to achieve a goal, some better than others.
– The former two express abstract general schemes, where the latter two express concrete context-dependent schemes.

So, logical rules of inference seem to be neatly formalizable, necessarily valid, strict and independent of context, while pragmatic argumentation schemes are pragmatically valid or even contingent, defeasible and context-dependent.
It may therefore seem that a logical approach in which necessity, strictness and abstraction from context seem to be so crucial, is not appropriate for dealing with pragmatic argumentation schemes, such as (3) and (4). For instance, Toulmin (1958) has argued against the logic approach pointing at similar properties of real-life argumentation. The informal logic community has raised related issues.
Notwithstanding the different nature of pragmatic argumentation schemes, it is certainly not the case that the methods of logic are of no value at all. Here an attempt is made to find out the usefulness of logical methods for the study of argumentation schemes. The key observation backing the approach is that there is an obvious structural resemblance between logical rules of inference like (1) and (2) and pragmatic argumentation schemes like (3) and (4): both consist of one or more premises and a conclusion, all possibly with variables that must be instantiated uniformly over the sentences in the scheme.
Though the approach is logic-oriented, it deviates in several ways from

conceptions of traditional logic. The approach can be described as a concrete *dialectical logic approach*. The approach is concrete in the sense that the schemes presented can pertain to concrete argumentative situations (like (3) and (4)), and do not need to be generally applicable and independent of context. The approach is dialectical in the sense that the schemes are subject to counterarguments: there can be situations in which the scheme does not lead to its conclusion even though its premises obtain. The approach is logical in the sense that it uses formal methods for the analysis and representation of argumentation in a style related to formal logic.
My views on these matters have developed over the years. Further details can be found in my earlier work (Verheij 1996, 1999a, 2001a).

In the following we will speak of argumentation schemes casually as if it is intuitively clear what is an argumentation scheme and what is not. In spite of this, it is worth noting that there are of course no clear, predefined boundaries between patterns in argumentation that count as acceptable argumentation schemes and those that do not. Here a pragmatic approach is taken: the acceptability is considered to be determined by the context. For instance, the following is a pattern of argumentation that is common in a legal context:
5. Person *P* has committed crime *C*. Crime *C* is punishable by *n* years of imprisonment.
Therefore person *P* can be punished with up to *n* years of imprisonment.

In the legal context, this scheme is certainly an acceptable scheme, outside a legal context it is irrelevant. An even more concrete example is the following:
6. Person *A* is an unmarried man. Therefore person *A* is a bachelor.

Even this scheme can be regarded as an acceptable argumentation scheme, in the admittedly small context of social relations (Cf. the logic of love and hate, Verheij 1996, p. 22, 1999b). Many will not think of the latter scheme as an argumentation scheme, but as some other kind of rule. The present paper is not about the question which rule-like schemes are to be counted as argumentation schemes. It is assumed that there are rule-like schemes that can sensibly be thought of as argumentation schemes. The topic of the paper is how such schemes can be systematically analyzed. It provides a method for the investigation of argumentation schemes.
Many examples of argumentation schemes are given by Walton (1996). He builds on work of Perelman and Olbrechts-Tyteca (1958), Hastings (1963) and

Kienpointner (1992). Reed and Walton (forthcoming) discuss applications of argumentation schemes. Argumentation schemes are used in a software tool for analyzing arguments that is being designed by Reed and Rowe (see http://www.computing.dundee.ac.uk/staff/creed/araucaria/).
In the next section it is discussed how Walton uses argumentation schemes in some of his recent work. This will provide motivation for the formally oriented methodology discussed in section 3. For present purposes, the focus is on the method itself and no formal details are provided. The interested reader is referred to Verheij (2001a). In section 4, it is discussed how the methodology provides insight into different roles of the critical questions concerning an argumentation scheme.

*2. Walton on argumentation schemes***(i)**
A central aspect of Walton's recent work on argumentation concerns argumentation schemes (cf. e.g. Walton 1996). Argumentation schemes represent kinds of argument as they occur in conversation. Arguments based on argumentation schemes need not be conclusive, but can be defeasible. Walton lists argumentation schemes as a kind of semi-formal argument templates. For instance, in his book on ad hominem arguments the scheme 'Generic Ad Hominem Argument' looks as follows (Walton 1998, p. 249):
generic ah
a is a bad person.
Therefore, *a's* argument *a* should not be accepted.

While generic ah looks like a semi-formal rule of inference, other argumentation schemes are like small derivations or pieces of dialogue (p. 256-257):
guilt by association ah
a is a member of or is associated with group *G*, which should be morally condemned.
Therefore, *a* is a bad person.
Therefore, *a's* argument *a* should not be accepted.

two wrongs ah
Proponent: Respondent, you have committed some morally blameworthy action (and the specific action is then cited).
Respondent: You are just as bad, for you also committed a morally blameworthy action (then cited, generally a different type of action from the one cited by the proponent but comparable in respect of being blameworthy). Therefore, you are a

bad person, and your argument against me should not be accepted as having any worth.

Note that generic ah occurs in guilt by association ah and two wrongs ah (literally in the former, and with a minor adaptation in the latter).

Argumentation schemes come with critical questions, that can be asked to question the dialectical relevance of an argument based on the scheme. generic ah has the following three (p. 249):
cq1
Is the premise true (or well supported) that *a* is a bad person?

cq2
Is the allegation that *a* is a bad person relevant to judging *a's* argument *a*?

cq3
Is the conclusion of the argument that *a* should be (absolutely) rejected even if other evidence to support a has been presented, or is the conclusion merely (the relative claim) that a should be assigned a reduced weight of credibility, relative to the total body of evidence available?

In the book *Ad Hominem Arguments,* Walton uses argumentation schemes to classify different types of *ad hominem* arguments. He lists twenty-one argumentation schemes that are related to *ad hominem* style argumentation. As main types, he distinguishes the *direct* (or ethotetic) variant, in which an arguer's character is attacked, the *circumstantial* variant, in which an arguer advocates a claim that contradicts his earlier claims or behavior, and the *bias* variant, in which an arguer is discredited because of his biases. (The main schemes for the three variants occur on the pages 249, 251 and 255, respectively.)

For someone with a formal background, the way in which Walton uses argumentation schemes seems rather loose. He uses variables, like *a* for an arguer and *A* for a claim, but it turns out that different occurrences of a variable need not be identical. For instance, the scheme 'Argument from Commitment' is as follows (p. 248):
ac
a is committed to proposition *A* (generally, or in virtue of what she said in the past).
Therefore, in this case, *a* should support *A.*

The third critical question associated with *ac* is the following:
cq3
Is the proposition *A*, as cited in the premise, identical to the proposition *A* as cited in the conclusion? If not, what exactly is the nature of the relationship between the two propositions?

Apparently, *A* in the premise can differ from *A* in the conclusion. Also, the schemes and the critical questions as they are used by Walton cannot be regarded as purely formal specifications of kinds of arguments, in the sense that actual arguments simply are obtained by filling in variables. Good use of the schemes and questions requires further interpretation by a competent language user (cf. for instance the scheme two wrongs ah cited above).
This may sound as a criticism, but it is not meant that way. Walton's looseness may for the formally inclined be somewhat unsettling, it can be warranted by Walton's goal: provide tools for the analysis and evaluation of real-life arguments. Purely formal schemes and questions might not be sufficiently flexible for that goal.
At the same time, it is tempting to investigate how far one can get with the formal method. The task then becomes to formalize concrete kinds of argumentation as they occur in real-life contexts, such as the law. The result would be the design of concrete, contextual logics, such as a logic of law (cf. Verheij 1999b). Of course, formalization leads to *idealizations* of the kinds of argumentation (which would lead Walton away from his focus on real-life argument), but there is the gain of unambiguous precision and the possibility of computer implementation.

In this paper, a method for the investigation of argumentation schemes along these lines is proposed.

3. A method for the investigation of argumentation schemes
The methodology for the investigation of argumentation schemes proposed in the present paper consists of four steps:
1. Determine the relevant types of sentences
2. Determine the argumentation schemes
3. Determine the arguments against the use of the argumentation schemes
4. Determine the conditions for the use of the argumentation schemes

Though the steps have a natural order, it is not the order must be strictly adhered to while investigating argumentation schemes. Findings in one scheme will

regularly lead to a return to a previous step.

For the logical background, the interested reader is referred to my work on DefLog (Verheij 2000, forthcoming). DefLog was developed as the underlying logic of the argument assistance program ArguMed (Verheij 1999a, see http://www.metajur.unimaas.nl/~bart/aaa/).
Verheij (2001a) provides the formal setting for the methodology. A rudimentary version of the methodology was already applied by Verheij (1996, chapter 2) in the context of legal reasoning.

3.1 Step 1: Determine the relevant types of sentences
In step 1, the relevant types of sentences are determined. The relevant sentence types are the building blocks of the argumentation schemes. From the point of view of formal logic, it is the step in which the *language* is defined. Let's go back to the examples of the beginning of section 1:
1. *P.* If *P* then *Q.* Therefore *Q.*
2. All *Ps* are *Qs.* Some *R* is not a *Q.* Therefore some *R* is not a *P.*
3. Person *E* says that *P.* Person *E* is an expert with respect to the fact that *P.* Therefore
P.
4. Doing act *A* contributes to goal *G*. Person *P* has goal *G.* Therefore person *P* should
do act *A*.

Scheme (1) uses one sentence type as a building block of the scheme:
If *P* then *Q.*

Here the variables *P* and *Q* are placeholders for sentences.
Scheme (2) uses two sentence types. This time *P* and *Q* are placeholders for properties:
All *Ps* are *Qs.*
Some *P* is not a *Q.*

Scheme (3) uses two:
Person *E* says that *P.*
Person *E* is an expert with respect to the fact that *P.*

E is a placeholder for (the name of) a person, and *P* for a sentence.

And, finally, scheme (4) uses three, where *A* stands for some act, *P* for a person and *G* for a goal:
Doing act *A* contributes to goal *G.*
Person *P* has goal *G.*
Person *P* should do act *A.*

These examples may suggest that it is always possible to give a finite list of the relevant sentence types. Sometimes this is not the case, for instance when sentence types can be nested. An example is a sentence type expressing negation:
It is not the case that *P.*

Here *P* stands for a sentence. Of course negations can be negated, etc., leading to an infinite list of sentence types that are theoretically all meaningful, but in practice will only occur up to a level of complexity that can be humanly grasped:
It is not the case that *P.*
It is not the case that it is not the case that *P*.
It is not the case that it is not the case that it is not the case that *P.*
…

For determining the sentence types, it is not required that they can be finitely listed. Instead, it suffices that the sentence types are somehow effectively specified, for instance by a recursive definition, as is common in formal logic.

3.2 Step 2: Determine the argumentation schemes
The second step is the determination of the schemes themselves. Argumentation schemes express that given certain premises a particular conclusion can be drawn. From the point of view of logic, this step corresponds to the definition of the *rules of inference* of a logical system. The general form of argumentation schemes that is used in the present paper is the following:
Premise^{1}*. Premise*^{2}*. …. Premise* ^{n}*.* Therefore *Conclusion*.

The four schemes of the beginning of section 1 all have this form. Graphically, the structure of a scheme can be represented thus (in the style of the ArguMed system, Verheij 1999a):

Elementary arguments are simply instances of an argumentation scheme. Complex arguments are chains of instances of an argumentation scheme. In a complex argument, a conclusion of one scheme can occur as a premise in another. It can also occur that schemes have the same conclusion.

The examples of section 3 given by Walton are not all of this form. His scheme guilt by association ah consists of an argumentative chain of two steps, while his two wrongs ah is a small dialogue. The first example does not indicate a genuine restriction of the present methodology. It is very well possible to consider compositions of argumentation schemes whenever appropriate. From the point of view of the present theory, the one-step building blocks of a composite structure would count as argumentation schemes themselves. For guilt by association ah, this means that its parts

a is a member of or is associated with group *G*, which should be morally condemned.
Therefore, *a* is a bad person.

and

a is a bad person.
Therefore, *a's* argument *a* should not be accepted.

are considered as two separate schemes.

Arguably, the second example, the mini-dialogue two wrongs ah does provide a restriction of the present methodology, since the dialogue context of argumentation is not addressed. Note however that counterarguments – sometimes naively thought of as pertaining only to the dialogue context of argumentation – are addressed here in a non-dialogue setting (see below).
In logic, there are rules of inference that do not fit in the premise-conclusion form of argumentation schemes assumed here. An important class of rules of inference allows the withdrawal of premises. For instance, given a derivation of *Q* using *P*

as a premise, a new derivation can be formed with conclusion ***P* ® *Q* LET OP r IN RONDJE MOET PIJL ZIJN, ZIE OOK INTRODUCTION HIERONDER** in which *P* is no longer a premise. This rule of inference is often called ®-Introduction. Since the focus is here on pragmatic kinds of argumentation, in which the withdrawal of premises is not or less relevant (e.g., Walton (1996) does not list schemes involving the withdrawal of premises), this complication is here not addressed.

3.3 Step 3: Determine the arguments against the use of the argumentation schemes

Many schemes do not always lead to arguments justifying their conclusions on the basis of their premises. Schemes are subject to exceptions. An example is provided by scheme (5) of section 1:

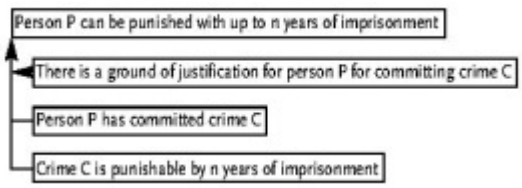
Person *P* has committed crime *C*. Crime *C* is punishable by *n* years of imprisonment. Therefore person *P* can be punished with up to *n* years of imprisonment.

One argument against the use of this scheme can be that there is a ground of justification for committing crime *C*. An example of such a ground is force majeure.

Note that the arguments against the use of a scheme can involve additional sentence types, requiring a return to step 1. In the example, the scheme and its counterargument make use of the following sentence types:

Person *P* has committed crime *C*.
Crime *C* is punishable by *n* years of imprisonment.
Person *P* can be punished with up to *n* years of imprisonment.
There is a ground of justification for person *P* for committing crime *C*.

Graphically, we have the following situation:



Another example of an argumentation scheme with a counterargument is the

following, expressing rule application:

Ps are *Qs*. *A* is a *P*. Therefore *A* is a *Q*.

Note that we have used the sentence type '*Ps* are *Qs*' and not 'All *Ps* are *Qs*' since the rule is not universal, but allows exceptions. Whenever an exception occurs, it can be used as an argument against the use of the scheme:

A is an exception to the rule that *Ps* are *Qs*.

The result of counterarguments to a scheme is that – when the counterargument is successful – the scheme's conclusion does not follow from the scheme's premises.

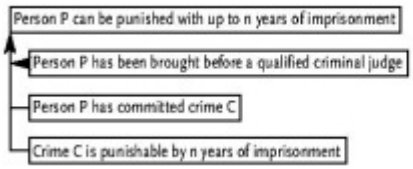
3.4 Step 4: Determine the conditions for the use of the argumentation schemes
The fourth and final step of the methodology consists of the determination of the conditions for the use of argumentation schemes. Looking again at scheme (5) of section 1, one condition can be that person *P* has been brought before a qualified criminal judge. For the scheme

Ps are *Qs*. *A* is a *P*. Therefore *A* is a *Q*.

a condition can be that some degree of uncertainty is allowed. When such conditions are considered to be sufficiently relevant to be made explicit, they require dedicated sentence types (and possibly a return to step 1):

Person *P* has been brought before a qualified criminal judge.
Some degree of uncertainty is allowed.

Graphically, we have the following situation:



This ends the informal discussion of a formally oriented methodology for the investigation of argumentation schemes. Verheij (2001a) provides the formal setting.

4. Critical questions

The critical questions accompanying argumentation schemes fit well in the methodology of section 3, but in different ways. This has to do with the fact that critical questions play several roles.

The first role is that of criticizing a scheme's premises. For instance, in section 2, we encountered the following critical question for the scheme generic ah mentioned by Walton:

cq1
Is the premise true (or well supported) that *a* is a bad person?

To any argumentation scheme of the form

Premise^1*.. Premise*^{2}*. …. Premisen*. Therefore *Conclusion*.

there are *n* critical questions of this kind:

cq1
Is *Premise*^{1} true (or well supported)?
cq2
Is *Premise*^{2} true (or well supported)?
…
cqn
Is *Premisen* true (or well supported)?

In the present methodology, they do not need to be made explicit as arguments against the use of a scheme: a precondition of the use of *any* scheme is that its premises are true, well supported, justified, … As a result, given a scheme, the critical questions of this kind are already given, albeit implicitly.

The second role of critical questions is to point to exceptional situations in which the scheme should not be used (cf. also Girle *et al.* forthcoming). Reconsidering scheme (3) of the introduction

Person *E* says that *P*. Person *E* is an expert with respect to the fact that *P*. Therefore *P*.

the following critical question makes sense:
Did expert *E* not make a mistake?

Obviously, this critical question also points to an argument against the scheme's use (cf. step 3), viz:
Expert *E* made a mistake.

The third role of the critical questions encountered in the literature corresponds to what here are called conditions for a scheme's use. Walton's second critical question for generic ah (see section 2) can be regarded to be of this kind:
cq2
Is the allegation that *a* is a bad person relevant to judging *a's* argument *a*?

If the allegation that *a* is a bad person is relevant to judging *a's* argument *a*, the scheme generic ah can be used. In this way, the question gives a condition for the scheme's use.

A fourth role of critical questions is to point to other possible arguments relevant for a scheme's conclusion. For instance, for scheme (3) on following an expert's opinion, a critical question could be whether there are other experts that say or deny *P*, or whether there is other information with respect to *P*. Just like the first role of questioning premises, critical questions of this kind are not specific for a scheme. For *any* scheme it is relevant to find out whether there are other arguments for or against the schemes conclusion. As a result, this kind of critical question can be asked for *any* scheme. The answer to such questions depends on the other argumentation schemes that pertain in the context.

5. Conclusion
In the present paper, a four-step methodology for the investigation of argumentation schemes is proposed:

1. Determine the relevant types of sentences
2. Determine the argumentation schemes
3. Determine the arguments against the use of the argumentation schemes
4. Determine the conditions for the use of the argumentation schemes

Step 3 is related to the defeasibility of argumentation schemes: there can be exceptional situations in which the scheme should not be used. Step 4 has to do with the contingency of schemes: it can be the case that the use of a scheme depends on certain conditions.

The methodology is inspired by previous formal work on dialectical

argumentation and concrete argumentation schemes (e.g., Verheij 1999b, 2001a). A deep issue concerning argumentation schemes is their specifiability. To what extent can argumentation schemes be specified at all? Argumentation schemes are variable, flexible and robust: people use the schemes all the time, and do not seem to encounter difficulties in adapting a scheme to neatly fit new circumstances. How to deal with this issue seems to be beyond our current state of understanding of argumentation schemes. The issue shows how the investigation of argumentation schemes is connected with deep questions concerning language use and (natural and artificial) cognition.

NOTES

[i] This section is adapted from Verheij (2001b).

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