Baseballs and Arguments from Fairness

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Argumentation schemes are proving to be increasingly useful for modeling reasoning in legal cases (Bench-Capon and Prakken, 2010), but it is also becoming apparent that the existing list of schemes in (Walton and Macagno, 2008, chapter 9) needs to be supplemented with some new schemes that are particularly important for this purpose. This paper applies such a new scheme, deriving from the work of Perelman (1980) on justice, to the reasoning given by Judge McCarthy supporting his decision to divide the proceeds of a homerun baseball in a case where the factual evidence appeared to be deadlocked as a basis for arriving at a decision. The case of Popov v Hayashi (Popov v. Hayashi 2002 WL 31833731 (Cal. Superior, Dec. 18, 2002)) has become a benchmark for study in the field of artificial intelligence and law (Wyner et al., 2007). A special issue of the journal *Artificial Intelligence and Law* (volume 20, no, 1, 2012) has been exclusively devoted to it. The contributions of the papers in the special issue and the importance of the case are summarized and explained by Atkinson (2012).

The issue of the case concerned which fan should have ownership rights to a homerun baseball hit into the stands by Barry Bonds. There were many arguments put forward by both sides on the issue of which of two claimants should be awarded the right to possession of a ball that bounced from the mitt of one who was attacked by a crowd into the possession of the other. After examining all these arguments in much detail, Judge McCarthy decided that any award to one party would be unfair to the other. He concluded that since each party had an equal and undivided interest in the ball, its monetary value should be divided equally between them. The Carneades Argumentation System (CAS) (Gordon, 2010) has already been applied to the argumentation in Popov v. Hayashi, based on an equitable division principle (Gordon and Walton, 2012). In the present paper the argumentation in this case is modeled in a comparable but different way using two versions of a scheme for argument from fairness. Using these schemes, along with some other schemes necessary to carry out the job, it is shown in finer detail how argument from fairness provides the basis of the reasoning that led to the decision to divide the proceeds between the two parties equally instead of awarding it to the one or the other based exclusively on the factual evidence in the case. A key factor is that the factual evidence was judged to be insufficient for the argument of the one side or the other. The paper takes a different approach to modeling the scheme for argument from lack of evidence to reveal a link between this type of argument and argument from fairness.

Section 1 offers an introductory explanation of the argumentation schemes needed for the work of the paper. Section 2 briefly explains the essentials of CAS necessary for the analysis of the case. Section 3 presents and explains the argument from fairness along with another argumentation scheme needed for the work of paper called argument from lack of evidence. Section 4 presents a description of the line of argumentation in the case summarized from the statement of decision of the judge, Kevin M. McCarthy (McCarthy, 2002). The main argument taken as the example of the use of argument from fairness in this paper is quoted from Judge McCarthy's account of how he arrived at his decision in the case. Section 5 summarizes the previous reconstruction and analysis of the main argument in the case using CAS (Gordon and Walton, 2012). Section 6 presents the first stage of the new analysis of the argument using CAS. Section 7 presents the second step, also based on argument from fairness, where the applicability of this type of argument to the case was defended by Judge McCarthy. Section 8 replies to two objections to the analysis. Section 9 states the conclusions of the paper.

1. Argumentation Schemes

Argumentation schemes represent, at an abstract level, forms of reasoning used in everyday conversational argumentation, and in other contexts, such as legal and scientific argumentation (Bench-Capon and Prakken, 2010). Many of the most common schemes, still recognized as centrally important in the literature, were identified in (Hastings, 1963), (Perelman and Olbrechts-Tyteca, 1969), and (Kienpointner, 1992). The schemes described and explained in chapter 9 of (Walton, Reed and Macagno, 2008) include the ones for argument from expert opinion, argument from sign, argument from commitment, argument from lack of knowledge, practical reasoning (argument from goal to action), argument from cause to effect, the sunk costs argument, argument from analogy, three kinds of *ad hominem* argument, and four kinds of slippery slope argument. Historically, schemes are the historical descendants of the topics, representing common types of arguments, originally catalogued by Aristotle.

Two schemes that we will have to use in this paper are the one for argument from expert opinion and the one for argument from lack of knowledge, widely known in the literature on fallacies as the argument from ignorance. To explain how schemes work, it is best to begin with a description of these two.

The simplest, and in many ways the most intuitive scheme for argument from expert opinion, can nicely be expressed in the form below.

Major Premise: E is an expert.
Minor Premise: E asserts that A is true (false).
Conclusion: A is true (false).

The reader might be interested comparing this form with a slightly more complex version of it given in (Walton, Reed and Macagno, 2008, 310).

This form of argument is defeasible, meaning that it only holds tentatively in a given case, subject to the possibility of new evidence might come in that can defeat it. It is important to recognize that argument from expert opinion is subject to critical questioning, and that therefore it needs to be treated as an open-ended type of argument rather than as a conclusive one of the kind that might be represented by deductive logic or any other monotonic system where the addition of new premises will not make the argument default. This set of critical questions matches this scheme for argument from expert opinion (Walton, Reed and Macagno, 2008, 310).

CQ_1: *Expertise Question.* How credible is E as an expert source?
CQ_2: *Field Question.* Is E an expert in the field that A is in?
CQ_3: *Opinion Question.* What did E assert that implies A?
CQ_4: *Trustworthiness Question.* Is E personally reliable as a source?
CQ_5: *Consistency Question.* Is A consistent with what other experts assert?
CQ_6: *Backup Evidence Question.* Is E's assertion based on evidence?

CQ_1 questions the expert's level of mastery of the field F. CQ_4 questions the expert's trustworthiness. For example, if the expert has something to lose or gain by saying A is true or false, this evidence would suggest that the expert may not be personally reliable. The asking of the critical question defeats the argument temporarily until the critical question has been answered successfully.

Argument from ignorance, also called inference from lack of knowledge, argument from lack of evidence, argument from negative evidence, or the *ex silentio* argument, is a subtle argument that is used very commonly but is not easy to identify because of its subtlety. It is associated with

what is called the closed world assumption in computing (Reiter, 1980). A good example is its use in expert systems. Consider the case where an expert system on coffee production in South America is questioned whether Guyana is a major coffee producer (Collins et al., 1975, 398). Let's say that this expert system contains a very large database on coffee production in South America, so that we can be confident that its knowledge on this subject is highly reliable, deep, and up-to-date, The system conducts a search which turns out finding that the proposition 'Guyana is a major coffee producer' is not in its database. Based on the evidence of the search, the questioner is entitled to draw the conclusion that there is strong evidence that Guyana is not a major coffee producer. Why is the evidence strong? The reason is that the expert system has a database that is highly reliable, up-to-date, and virtually complete, so that if Guyana was a major coffee producer, the system would know that. Therefore, when the system tells us that the proposition that Guyana is a major coffee producer is not in its knowledge base, we can reasonably infer by a process of argumentation that Guyana is not a major coffee producer. Essentially the reason is that if it were true that Guyana is a major coffee producer, the system would know that. Since the system does not know that this proposition is true, we can reasonably infer by a defeasible argument that this proposition is false.

Traditionally in logic, this form of argumentation is called the *argumentum ad ignorantiam,* argument from ignorance. The standard form of the argumentation scheme representing this type of argument is the following one, taken from (Walton, Reed and Macagno, 2008, 327).

Major Premise: If *A* were true, then *A* would be known to be true

Minor Premise: It is not the case that *A* is known to be true.

Conclusion: Therefore *A* is not true.

The argument from ignorance was traditionally for many years portrayed as a fallacious form of argument in leading logic textbooks, although in is some of them it is recognized that it can be reasonable in some instances. Recent research in argumentation studies in artificial intelligence, however, has turned this around by finding many cases, like the one in the expert system outlined above, showing that it is a reasonable but defeasible form of argument in many instances.

In some of the examples of argument from fairness we will examine below, we will see that evaluating arguments from ignorance is closely related to burden of proof, and depends on standards of proof that are set in place in an argument (Gordon and Walton, 2009). For these reasons, below we provide a reformulated version for the scheme. Instead of calling it argument from ignorance (the negative term 'ignorance' suggesting a fallacy), we will call it the standard scheme for argument from lack of evidence. Below, the simplest form of it is presented.

Premise: There is insufficient evidence to prove that *A* is acceptable [according to the standard of proof required].

Conclusion: *A* is not acceptable.

Instead of using the terms 'knowledge' or 'know' in the formulation of this scheme, along with the terms 'true' and 'false', the terms used are 'insufficient evidence', 'prove', and 'acceptable'. Below, it will be shown that this choice of terms fits better with the computational system we will use to model legal argumentation based on argumentation schemes. This scheme represents the simplest form of argument from lack of evidence, or argument from negative evidence as it might also be called, but it is significant to note in passing that both this scheme and also the one for argument from expert opinion have other more complex forms.

If we add an implicit conditional premise, argument from expert opinion can also be formulated as having the following scheme (Walton and Reed, 2003, 201).

Major Premise: *E* is an expert.

Minor Premise: *E* asserts that *A* is true (false).
Conditional Premise: If *E* is an expert and *E* asserts that *A* is true (false) then *A* is true (false).
Conclusion: *A* is true (false).

In the same way the scheme for argument from lack of evidence can be articulated more fully by inserting a comparable conditional premise.

Conditional Premise: If there is insufficient evidence to prove that *A* is acceptable [according to the standard of proof required] then *A* is not acceptable.
Search Premise: There is insufficient evidence to prove that *A* is acceptable [according to the standard of proof required].
Conclusion: *A* is not acceptable.

When each of these forms of argument is reformulated in this way, by inserting an implicit conditional premise, it can be seen that the general outline of its form is that of a *modus ponens* inference (DMP). This observation, coupled with the observation that many of the schemes recognized in the literature can be fitted this form may suggest the criticism that schemes can simply be eliminated and replaced by *modus ponens*. But it is important to recognize that this conditionalized version of the scheme for argument from expert opinion is an instance of a more general form of argument.

Verheij (2001, 232) put forward the hypothesis that argumentation schemes can be modeled as defeasible *modus ponens* inferences. To show how this is done he recast the deductive form of *modus ponens* as having the form of argument: as a rule, if *P* then *Q*; *P*; therefore *Q*. He contrasted this deductively form of inference with a defeasible form of argument he called *modus non excipiens*: as a rule, if *P* then *Q*; *P;* it is not the case that there is an exception to the rule that if *P* then *Q*; therefore *Q*. On his view, in a case where only strict rules are involved, *modus ponens* can be applied, but *modus non excipiens* needs to be applied in an instance where rules admitting of exceptions might come into play. It was suggested in (Walton, 2003) that these two forms of argument could be called strict *modus ponens* (SMP) and defeasible *modus ponens* (DMP). What is important to recognize is that the scheme for argument from expert opinion, as well as many of the other schemes employed in this paper, fit the DMP form.

2. Schemes in Computational Argumentation Systems

Schemes are now being used in computational argument mapping systems, for example Araucaria[1] and CAS[2]. A user can also select argumentation schemes from a menu and use them to analyze and evaluate arguments, as well as to search through the database for new arguments to prove a claim. CAS is a mathematical model of argumentation (Gordon and Walton, 2006) that has an Open Source argument mapping graphical user interface available at no cost to users. The version that presently exists can be used to analyze, construct and evaluate arguments using defeasible forms of argument like argument from testimony, argument from analogy, argument from precedent, practical reasoning, and many other kinds of arguments (Gordon, 2010).

CAS models critical questions by drawing a distinction between two kinds of premises in an argumentation scheme, assumptions and exceptions. The premises of the scheme that are explicitly stated are modeled as assumptions, meaning that they are taken to hold unless they are challenged, but if they are challenged the arguer has to back up the premise with some evidence, or else the argument is treated as no longer acceptable. Whereas the proponent has the burden of

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[1] Araucaria can be downloaded from http://araucaria.computing.dundee.ac.uk/doku.php.
[2] Carneades can be downloaded from http://carneades.github.com/

proving ordinary premises and questioned assumptions, the respondent has the burden of proving exceptions.

The CAS scheme for argument from expert opinion is shown below.

id: expert-opinion
strict: false
direction: pro
conclusion: *A*
premises:

- Source *E* is an expert in subject domain *S*.
- *A* is in domain S.
- *E* asserts that *A* is true.

assumptions:

- The assertion *A* is based on evidence.

exceptions:

- *E* is not personally reliable as a source.
- *A* is inconsistent with what other experts assert.

An exception is only shown to be acceptable when evidence is given to back up the allegation made in the critical question. Consider the field question matching the scheme for argument from expert opinion. Let's say the questioner asks whether *E* is an expert in the field that *A* is in. When this question is posed by a challenger, the arguer who put forward the argument from expert opinion has to provide some evidence that the expert is an expert in the appropriate field. Otherwise the argument from expert opinion defaults. The burden of proof is the other way around with the consistency question, however. When a challenger asks whether *A* consistent with what other experts assert, merely asking that question does not defeat the argument. To defeat the argument the questioner asked to present some evidence that *A* is not consistent with what other experts assert.
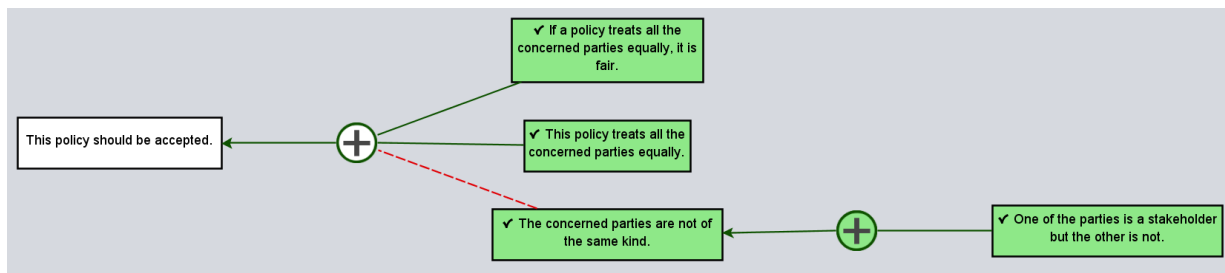

Figure 1: Visualization of an Example by an Argument Made with CAS

The CAS visual interface is currently under development. CAS provides no way to manually adjust the layout of the diagrams, which is often needed to produce readable diagrams for

inclusion in publications such as this. For this reason the rest of the argument diagrams in this paper have been constructed manually to produce each argument map as a clear and easily readable figure for publication purposes. However it should be noted that these figures are structurally equivalent to the argument diagrams produced by CAS. An example of an argument diagram produced using CAS is shown in figure 1.

Figure 1 shows an example that has been analyzed in an argument map displayed on the CAS screen as it appears to the user. Propositions that appear in the text boxes are premises and conclusions of the argument. The plus signs in the two argument nodes indicate that both are pro-arguments. The conclusion, the statement that this policy should be accepted, is shown at the far left of the argument diagram. The user can set the proof standard by choosing from among a set of proof standards displayed on a menu (not shown). The default standard is that of the preponderance of evidence. The status of the conclusion, stated but not accepted, is also shown at the bottom of the menu. The two premises shown at the top of the argument diagram form linked argument. As indicated by the checkmarks in front of the propositions and the darkening of the text boxes, which appear in green on the computer screen, both premises have been accepted. Whether they have been accepted or not depends on the audience. Once these premises have been accepted, the conclusion will normally be automatically changed from stated (but not accepted) to accepted by CAS. However in this instance, there is an exception at the bottom representing the first critical question, the statement that the concerned parties are not of the same kind. Since this statement is supported by an argument with a premise that has been accepted by the audience, the prior argument at the top of the diagram is now defeated.

There are some differences in the notation between the diagram produced in figure 1 and the way the diagrams will be drawn in the rest of this paper. Although CAS has a catalogues of argumentation schemes, and the schemes are included in the programming of the system, they cannot get marked on the argument diagram itself, as in the one shown in figure 1. Future development will include improvements in the capability to insert the name of the argumentation scheme inside the node representing the argument. Currently the information inside each node is only a plus or a minus sign, indicating a pro or contra argument. In figure 3, an undercutter argument from expert opinion is shown as attacking a previous argument from expert opinion.

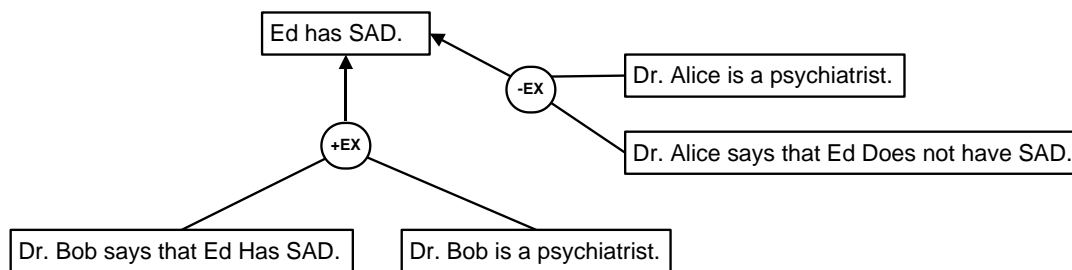Let's consider an example shown in figure 2.

Figure 2: One Expert Opinion Rebutting Another

The proponent puts forward an argument to prove this claim that Ed has social anxiety disorder (SAD), based on an argument from expert opinion. The two premises are his statements that Dr. Bob says that Ed has SAD, and that Dr. Bob is a psychiatrist. Next the respondent puts forward a counterargument by bringing in another argument from expert opinion in which a different expert says that Ed does not have SAD.

The form of argumentation shown in figure 2 is called a rebuttal. The first argument has a conclusion *A* and the second argument has conclusion not-*A*. This could be one way of modeling CQ_5. On this way of doing it, to ask the critical question CQ_5 is to put forward a counter-argument for the opposite conclusion of the one in the original argument being attached. On this way of representing the critical question, there is a deadlock. Neither argument can win over the other until one is shown to be stronger than the other. For example if the audience finds both premises of the first argument acceptable, but does not find one premise of the second argument acceptable, then the first arguments would win over the second one.

There is another way to model the operation of critical questions in a case of the battle of the experts. Consider once again the asking of critical question CQ_5. In the latest version of CAS exceptions are represented as a special kind of undercutter (Pollock, 1995) having a single premise, but CAS supports general undercutters with any number of premises as well. The asking of this critical question could be seen as an undercutter that attacks the argument from expert opinion itself rather than attacking its conclusion. It undercuts the support given by the argument from expert opinion to its conclusion. This way of modeling the operation of the critical question CQ_5 is shown in figure 3.
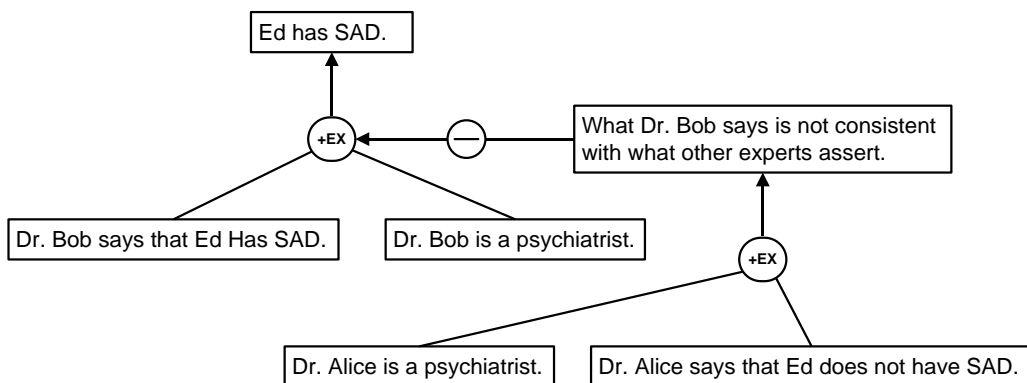

Figure 3: One Expert Opinion Undercutting Another

The difference between these two ways of modeling the operation of CQ5 stems from two theories of where the burden of proof should lie. Should the burden of proof lie on the respondent to prove that what Bob says is not consistent with what other experts assert? Or should the asking of the critical require the proponent to back up his argument from expert opinion or else his argument is cast into doubt and has to be given up?

CQ_5 should be classified as an exception, modeled as an undercutter. This means that the respondent's asking of the critical question only shifts the burden of proof back to the proponent's side if the respondent can produce backup evidence to support the claim that what Dr. Bob says is not consistent with what other experts assert.

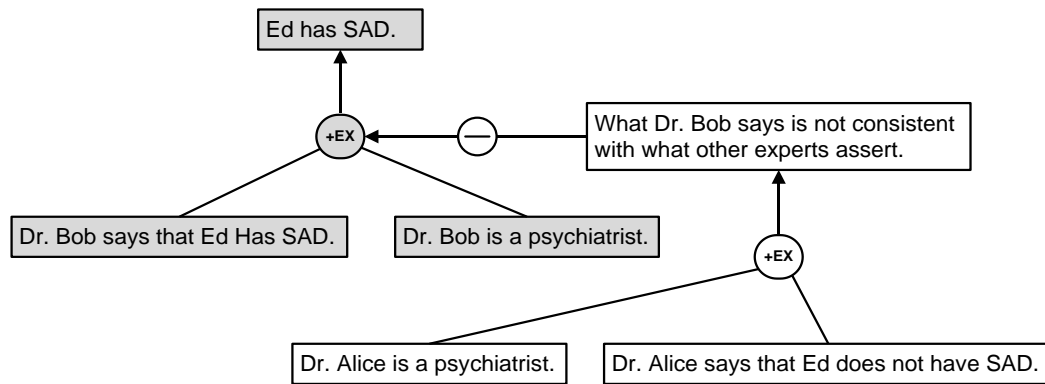To see how CAS evaluates arguments of this kind, consider figure 4.

Figure 4: First Step in Evaluating the Example in CAS

Let's assume that audience accepts both premises of the proponent's argument. In CAS, the text boxes in which these two premises are contained are colored in green (darkened in figure 4), indicating that both premises have been accepted. The argument from expert opinion is applicable (as shown by the node being darkened), and hence the conclusion that Ed has SAD is also automatically shown in a green box by CAS. But this is only the first step in the evaluation.

To show how CAS goes on to evaluates such arguments, let us continue with the example. Let's suppose, as shown in figure 5, that the respondent has not only asked the critical question, but has backed it up by giving evidence of another expert who has expressed an opinion that is not consistent with the opinion asserted by the first expert. Let's assume, in addition, that the audience accepts the two premises of the opposed argument that offers this evidence.
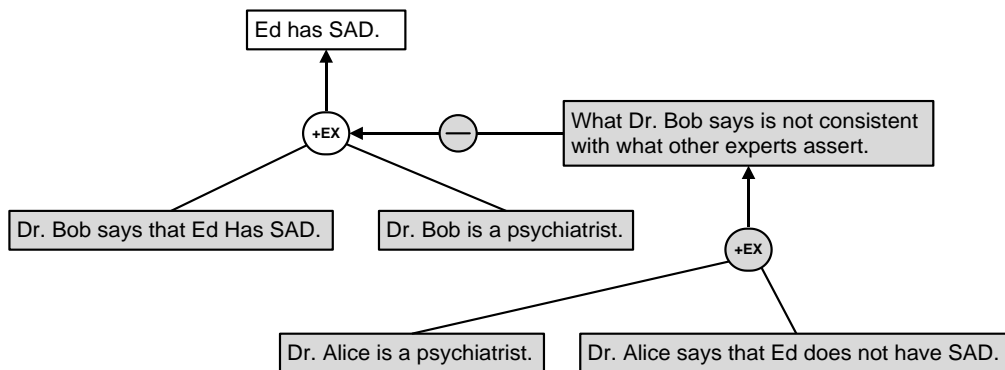

Figure 5: One Expert Opinion Undercuts Another in CAS

In CAS, the proposition that what Dr. Bob says is not consistent with what other experts assert is treated as an exception. In CAS, this premise is shown as posing a contra argument (indicated by the minus sign in the argument node), an argument that goes against the original argument from expert opinion.

The burden of proof is distributed as follows. The mere stating of this exception does not defeat the original argument from expert opinion. However, if supported by appropriate evidence it can defeat the original argument. If we look at the right side of figure 5, we see that the conclusion 'What Dr. Bob says is not consistent with what other experts assert' is supported by two premises: 'Dr. Alice is a psychiatrist', and 'Dr. Alice says that Ed has SAD'. Once these two

premises are accepted, since the argument from expert opinion scheme is applicable, the conclusion that what Dr. Bob says is not consistent with what other experts assert has been supported by evidence. Therefore the second argument defeats the original argument from expert opinion. Hence even though both of its premises are still accepted, its conclusion is not. Its text box is shown in white.

Now we have some grasp of how CAS works as a tool to assist with analyzing and evaluating arguments, we can go ahead and examine the schemes for argument from fairness.

3. Schemes for Argument from Fairness

In a study that identified different kinds of arguments used by the party leaders in a Canadian provincial election (Hansen and Walton, 2012), twelve instances of use of a particular kind of argument called argument from fairness were found. (Hansen and Walton, 2012) is a report on the types of arguments used during the Ontario provincial election of September 7 to October 6, 2011. The primary purpose of the study was to investigate what kinds of arguments were used by the candidates for political office by collecting a database of arguments identified by a team of students and professors trained (at various levels) in argumentation studies. More than 250 entries of arguments identified were made in the database for the election period. The analysis of the data determined what kinds of arguments were used by attempting to apply the existing set of argumentation schemes from (Walton, 1996), and by studying some forms of argument that did not appear to fit any of these schemes. One of these formerly unidentified schemes, the scheme for argument from fairness, was refined and formulated more precisely in (Walton and Hansen, 2013), where four argumentation schemes representing versions of this type of argument were proposed. These four versions of the scheme for argument from fairness were considered and evaluated using examples from the election project. Of these, problems were identified with two of these schemes, and so only the other two need to be considered in this paper, a simpler version and a more complex version. We begin with the scheme that will be called here the simple version of argument from fairness.

In this scheme, φ represents an action, or in some instances is taken to represent a policy for action. α and β (or others) are agents or groups of agents. ϕ is an alternative action (or policy) being considered.

Major Premise: If φ is fair (just) to α and β, φ should be carried out.
Minor Premise: φ is fair (just) to α and β.
Conclusion: φ should be carried out.
There are five critical questions matching this scheme.
CQ$_1$: Are agents α and β of the same kind?
CQ$_2$: In what respects are α and β equal?
CQ$_3$: In what respects are α and β different?
CQ$_4$: Are there special circumstances such that α and β should be treated differently?
CQ$_5$: Are there reasons supporting ϕ?
Argument from fairness fits into the classification system of (Walton and Macagno, 2008) as a species of argument from values. In the model of value-based argumentation of (Bench-Capon, 2003), the strength of an argument depends on the comparative strength of the values advanced by the competing parties.

When argument from fairness is used in everyday conversational reasoning, it is often used in a negative form. Children are very familiar with using this form of argument in the simple saying

that they often use repeatedly, "That's not fair". Since this form of argument appears to be so common, especially in political argumentation, it is useful to have a negative version of the simple scheme for argument from fairness.

Major Premise: If φ is unfair (unjust) to α and β, φ should not be carried out.
Minor Premise: φ is unfair (unjust) to α and β.
Conclusion: φ should not be carried out.

This simple form of argument from fairness is a good way of helping students to identify this form of argument, but it is dangerous. In (Walton, 2010) it is shown how fallacies are associated with heuristics. Heuristics are fast and frugal shortcuts to a solution to a problem even if they omit some factors that should be taken into account in a more fully worked out solution. Heuristics are reasonable to use in some instances, especially where time for a more fully evidence-based solution is not available. But in some instances heuristics can jump to a conclusion that is not justified because they overlook factors that are to be properly considered. According to the study of three major informal fallacies in (Walton, 2010), such a jump can be associated with a fallacy because the heuristic argument overlooks prerequisites of the defeasible argumentation scheme for the type of argument in question. For example, the simple heuristic version of the scheme for argument from expert opinion takes this form: *E* is an expert; *E* says that proposition *A* is true therefore *A* is true. This simplified heuristic version of the scheme can represent a useful even if defeasible form of argument from expert opinion in some instances. However, if a key qualification of the argument is overlooked, it can go badly wrong. For example, the expert may be an expert in a different field from one into which *A* falls. For these reasons it is often better to consider a more complex version of the scheme for argument from fairness.

As shown below, Perelman's views on the principle of justice suggest building a more refined version of the scheme based on the simple scheme for argument from justice presented above (Perelman, 1982). The variant of the argumentation scheme for argument from fairness presented below is called the complex version of the argument from fairness.

Premise 1: Agents α and β are of the same kind.
Premise 2: φ treats α and β equally.
Premise 3: If φ treats α and β equally, then φ is fair.
Interim Conclusion: φ is fair.
Premise 4: If φ is fair, then φ should be carried out.
Ultimate Conclusion: φ should be carried out.

The complex version of the argument from fairness treats the argumentation scheme as a chaining together of two inferences. The first inference leads to the conclusion that the action or policy φ is fair. The second inference uses this interim conclusion as a premise that is combined with an additional conditional premise, leading to the conclusion that φ should be carried out.

The complex version of the schemes also has some problems in it. The main problem with using the term 'equally' in the two simple versions of the scheme is that equality is such a highly contested concept in politics and law that there is a need to avoid building any particular political philosophy into the argumentation scheme from fairness. Perelman (1980, 11) provided a solution to this problem by formulating an underlying principle of "formal" or "abstract" justice. It is "a principle of action in accordance with which beings of one and the same essential category must be treated the same way". But how does the notion of an essential category work in this principle of justice? According to Perelman (1980, 11), everyone is agreed, despite their political disagreements, that to be just is to give the same treatment to those who possess a

particular characteristic that groups people together into a class or category defined by the fact that its members possess this characteristic. So for example, some contend that fairness requires that equal treatment be given to all persons who have the same needs. For the adherents of this political view, the essential characteristic will be that of having the same needs. Others might contend that equal treatment should be given to all persons who have the same merit. For the adherents of this political view, the essential characteristic will be that of having the same merit. Different groups or persons person advocate different political views to these questions, so that no system secures universal agreement. Underlying this diversity, however, all are agreed that to be just is to give the same treatment to those who are equal with regard to one particular characteristic defined as an essential category (Perelman, 1980, 10). Perelman's insight on how the abstract notion of fairness (justice) can be extended to accommodate particular cases shows how to configure the complex version of the scheme argument from fairness above.

The complex version eliminates the need for the first critical question, leaving only the other four critical questions matching the complex scheme.

Proposed here also is a negative version of the complex scheme for argument from unfairness.

Premise 1: Agents α and β are of the same kind.

Premise 2: φ treats α and β unequally.

Premise 3: If φ treats α and β unequally, then φ can be called unfair.

Interim Conclusion: φ can be called unfair.

Premise 4: If φ is unfair, then φ should not be carried out.

Ultimate Conclusion: φ should not be carried out.

Next we need to show for purposes of illustration how these two schemes can be applied to a relatively simple example of argument from fairness.

One of the examples (*The Globe and Mail* Sept. 29, 2011), 'Prison Guard Union Not Endorsing Ontario PC Chain-Gang Plan'[3] from the election project (Hansen and Walton, 2012) can be used to illustrate the use of argument from fairness in political argumentation. How this type of argument can be fitted into a larger network of argumentation can be shown by applying the argument mapping tool of CAS to it. In the example, Tim Hudak, the Progressive Conservative leader, told reporters that he believes that correctional officers are in favor of a work program which would require criminals to perform manual labor for up to forty hours a week in exchange for some compensation. His opponents derided the plan, calling it "a chain gang initiative". Hudak presented the following counter-argument: we are just asking the criminals to do what every other hard-working Ontarian does, an honest day's work instead of spending the day working out to become better criminals. The part of the text containing Hudak's use of argument from fairness is quoted below.

> Mr. Hudak told reporters Wednesday that he believes correctional officers are in favour of the work program, which would require prisoners to perform manual labour for up to 40 hours a week in exchange for perks in prison. His opponents have derided the plan, calling it a "chain gang" initiative. "Provincial guards like this idea," Mr. Hudak said at a press conference on Wednesday. "We're just asking the prisoners to do what every other hard-working Ontarian does – an honest day's work instead of spending the day working out to become better criminals."

The reader can examine the other details of the argumentation in this example by following the link to the article given in the footnote. One of his opponents said that he is opposed to having people on the side of the roads in shackles and chains with armed guards. He said that this work

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[3] http://www.theglobeandmail.com/news/politics/prison-guard-union-not-endorsing-ontario-pc-chain-gang-plan/article596143/ Accessed August 9, 2013.

program would be degrading and humiliating for prisoners. Another opponent suggested that the community work program is not the best use of scarce funding for correctional services. An argument diagram showing how these counterarguments are opposed to Mr. Hudak's original argument could be constructed, but we are only interested in presenting this example as an illustration of the use of argument from fairness.

As shown in (Walton and Hansen, 2013), what Hudak says essentially contains three arguments. The first is that correctional officers are in favor of the work program. The second is that criminals should be treated in the same way as other citizens with respect to having to put in an honest day's work. The third is that it is better for criminals to spend the day working than for them to spend the day "working out to become better criminals". It is the central part of the text that represents the use of argument from fairness, and so it is this part that will be analyzed. However one of the objections to it will be represented in a simplified manner.

Figure 4 shows how argumentation schemes can be applied to the argumentation in the example, including a scheme for argument from fairness and the scheme for argument from expert opinion. The third scheme is that of argument from classification. According to this argumentation scheme, if something fits a certain classification, and all things fitting that classification have a certain property, then this thing will have that property. For example, if something fits the classification of being a whale, and all things fitting the classification of being a whale have the property of being a mammal, then this particular thing is the property of being a mammal. In this instance Hudak's plan is classified as what is called "a chain gang initiative", which is taken to be something negative. In general, if a plan or policy can be described as something negative, it should not be carried out. So in this instance the plan should not be carried out. Because of the negative nature of the argument in this instance, in the argument map in figure 4, it is represented as a contra argument. It offers a reason for not carrying out the work program. AF stands for argument from fairness and AC for argument from classification. As noted above, other contra arguments against Mr. Hudak's proposal could be represented by making a more complex argument diagram, but this is not necessary to get an idea of how the argumentation in the example represents a use of argument from fairness.
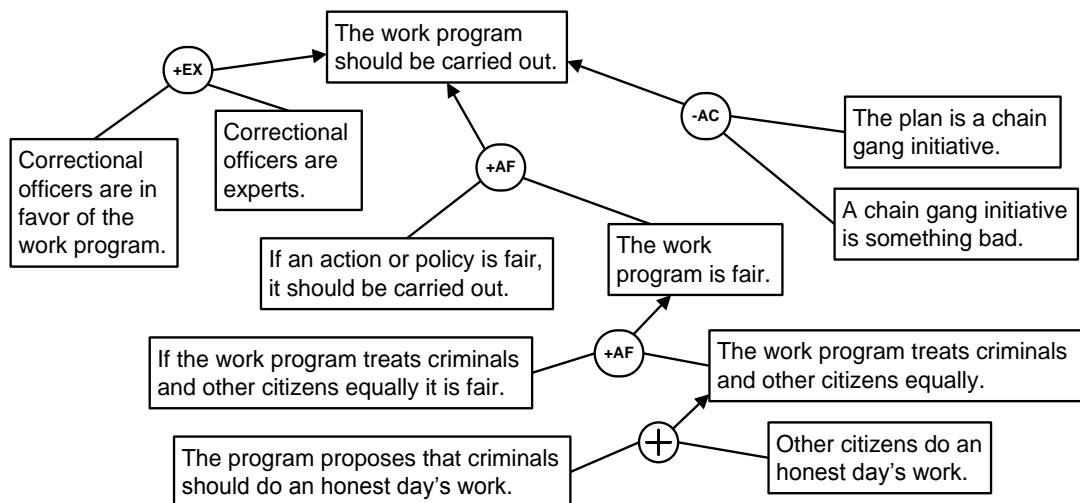

Figure 4: Argument Diagram of the Work Program Example

The ultimate conclusion is the statement that the work program should be carried out, shown in the text box at the top. On the left at the top, the statement that correctional officers are in favor of the work program is taken as one premise in an argument from expert opinion supporting the ultimate conclusion.

Notice in figure 4 how argument from fairness is represented in two different argument nodes, reflecting its representation in the format of the complex scheme for argument from fairness. At the top stage of the argument, the simple scheme for argument from fairness is applied. The argument tells us that if an action or policy is fair, it should be carried out. That is one premise. The other premise is that the work program is fair. According to the requirements for the application of the simple argumentation scheme for argument from fairness, the scheme can now be applied and provides a transition by a defeasible inference to the conclusion that the work program should be carried out. This application of the simple scheme is only part of the application of the complex scheme, which requires that another argument be chained to the simple argument from fairness. According to this way of structuring the argument as shown in figure 4, considerations of equal treatment are brought to bear to support the conclusion that the work program is fair. This conclusion is then reused as a premise in the simple argument. By combining the two arguments, a complex argument from fairness is produced.

Figure 4 also illustrates the support of one of the premises of the secondary argument from fairness by evidence. The one premise of the argument from fairness stating that the work program treats criminals and other citizens equally is supported by the argument containing the two premises shown at the bottom of figure 4. The argument is that the program proposes that criminals should do an honest day's work, and that other citizens do an honest day's work, so the work program treats criminals and other citizens equally.

4. The Case of Popov v. Hayashi

In the concluding section of (Walton and Hansen, 2012) it was suggested that argument from fairness, or argument from justice as it could be called in law, should be a subject for further research, citing the case of Popov v. Hayashi as a case for possible investigation. This case is now outlined and the reasons given by the presiding judge, Judge Kevin McCarthy, for making his decision based on fairness are summarized.

Barry Bonds, playing for the San Francisco Giants, hit his 73rd home run in 2001 at PacBell Park in San Francisco, breaking his previous record. The ball, worth millions of dollars (Mark McGwire's 70th homerun ball hit in 1998 sold for $3 million), went into the stands in the arcade section. It landed briefly in the upper portion of a glove worn by a fan, Alex Popov, who was at that moment thrown to the ground by a mob of fans trying to obtain it. At some point, the ball left Popov's glove and ended up on the ground. Another fan standing nearby, Patrick Hayashi, who was not part of the mob that had knocked Popov down, picked up the loose ball and put it in his pocket. Somebody in the crowd videotaped the incident. When the man making the videotape pointed the camera at Hayashi, he held the ball in the air for the others to see.

Popov later sued Hayashi contesting ownership of the ball, and arguments were presented on both sides. The case was tried in the Superior Court of California and the arguments on both sides along with the basis of the decision have been summarized by the presiding judge, the Honorable Kevin M. McCarthy (McCarthy, 2002). Hayashi argued that possession does not occur unless the fan has complete control of the ball. This claim was supported by an expert, Professor Brian Gray, who said that a ball is caught (possessed) only if the fan has complete

control of it. However, a number of other legal experts also participated in a forum during the trial to discuss the legal definition of possession and the group could not reach agreement on how 'possession' should be legally defined. If Popov had obtained control of the ball, he would have been entitled to possession of it, but the partial catch did not give certainty of obtaining control of the ball, since Popov had to reach for it and may have lost his balance while doing this. Thus the evidence was insufficient to show that Popov caught the ball, possessed it, and therefore had a legal right to the ownership of it.

Popov argued that Hayashi had illegally interfered with his possession of the ball, on the basis that Popov had taken steps to achieve possession but was interrupted by the unlawful action of others. According to Judge McCarthy's legal analysis (2002, 4), Popov pled four causes of action, but we will only mention two of them here, called conversion and trespass to chattel. Conversion is defined as a wrongful exercise of dominion over the personal property of another party. Essentially it is wrongful withholding of the property of another party, and requires interference of the accused party, which could be constituted by an unjustified refusal to give the property back to the other party. But there was no evidence of conversion of the part of Hayashi. Trespass to chattel takes place where personal property has been damaged or when one party has interfered with the other party's use of the property. But there was no evidence sufficient to support trespass to chattel on the part of Hayashi.

There were other interesting arguments in this case as well, including comparisons to some precedent cases involving the catching of wild animals. But what is of particular interest to us here is the ultimate ruling of Judge McCarthy and the way he supported it. Although there were strong arguments on both sides, Judge McCarthy ruled that neither argument was strong enough to meet its burden of proof. This being a civil case, the standard of proof is that of preponderance of the evidence. This aspect of lack of knowledge was stressed by Judge McCarthy (2002, 4).

> It is important to point out what the evidence did not and could not show. Neither the camera nor the percipient witnesses were able to establish whether Mr. Popov retained control of the ball as he descended into the crowd. Mr. Popov's testimony on this question is inconsistent on several important points, ambiguous on others and, on the whole, unconvincing. We do not know when or how Mr. Popov lost the ball.
>
> Perhaps the most critical factual finding of all is one that cannot be made. We will never know if Mr. Popov would have been able to retain control of the ball had the crowd not interfered with his efforts to do so. Resolution of that question is the work of a psychic, not a judge.

This aspect of lack of knowledge played an important role in Judge McCarthy's reasoning in arriving at his decision in the case. It will be shown in the analysis of this reasoning below that the scheme for argument from lack of evidence is therefore vitally important in reconstructing the argumentation that led to his decision.

Judge McCarthy concluded, as quoted below (2002, 10), that since we will never know if Mr. Popov would have been able to retain control of the ball had the crowd not interfered with his efforts to do so, based on what is known and what is not known, it would be unfair to award the ball to either side. The text below is quoted directly from Judge McCarthy's written account of his decision (McCarthy, 2002, 10).

> An award of the ball to Mr. Popov would be unfair to Mr. Hayashi. It would be premised on the assumption that Mr. Popov would have caught the ball. That assumption is not supported by the facts. An award of the ball to Mr. Hayashi would unfairly penalize Mr. Popov. It would be based on the assumption that Mr. Popov would have dropped the ball. That conclusion is also unsupported by the facts.

Judge McCarthy (2002, 10) described the case as posing a dilemma, but then he added that that there is a middle ground. Since it would be unfair to award the ball to either one side or the other, he concluded that the best solution would be to sell the ball and divide the proceeds equally between the two parties. He had shown, in his remarks above, the previous conclusion that the evidence was insufficient to show that Popov had caught the ball. Therefore it could not be proved, by the standard of proof required, that Popov had ownership.

This situation posed a dilemma, because the contention of neither side could be proved on the basis of the evidence presented in the trial (McCarthy, 2002, 10).

> Both men have a superior claim to the ball as against all the world. Each man has a claim of equal dignity as to the other. We are, therefore, left with something of a dilemma. Thankfully, there is a middle ground.

To confront the dilemma, Judge McCarthy proposed, as his way of finding the "middle ground", the solution that the ball should be sold and the proceeds divided equally between the two men.

5. The Analysis of Gordon and Walton

According to Judge McCarthy, the solution is to be found in the principle of equitable division, originating in Roman Law. This principle was previously used to resolve competing claims between finders of lost property and the owners of land on which the property was found (McCarthy, 2002, 10). The lack of evidence posed the dilemma that led to the use of the principle of equitable division. This principle has been used in the reconstruction of the argumentation in this case by Gordon and Walton (2012).
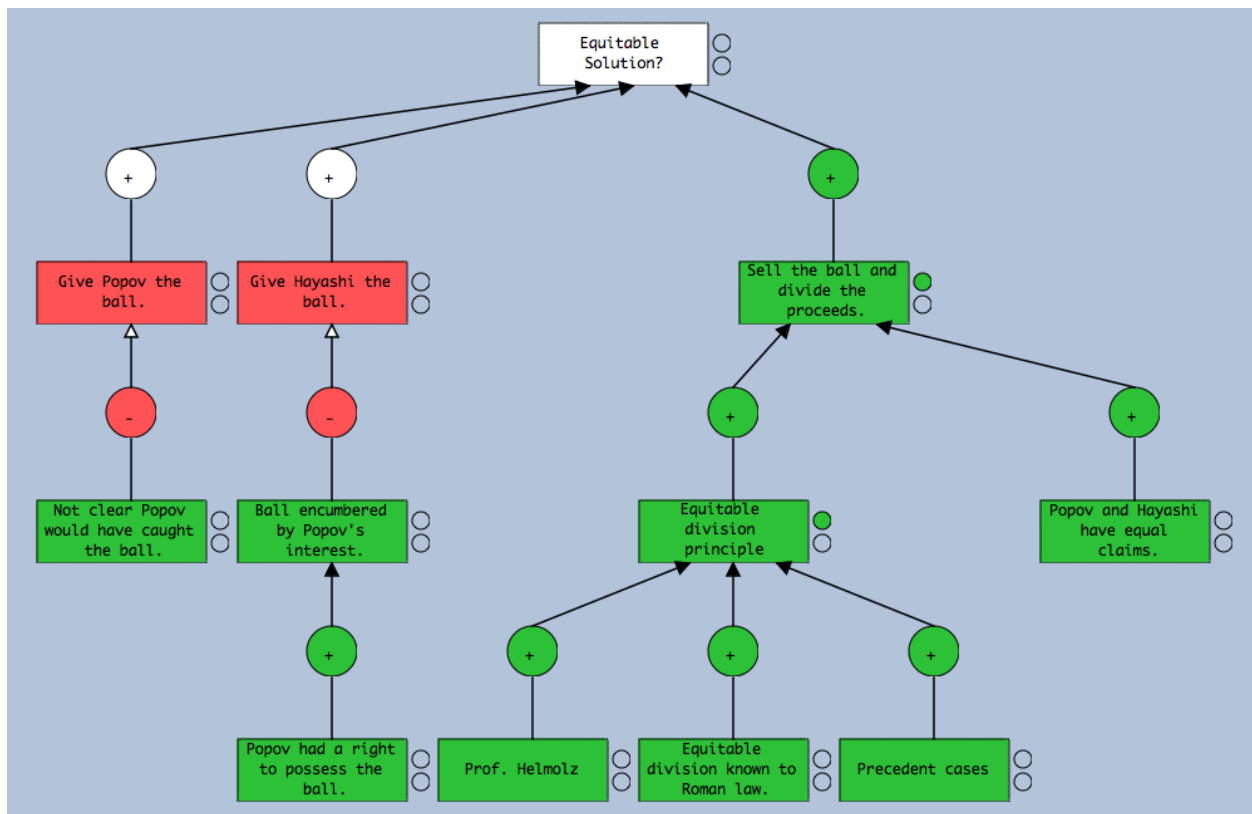

Figure 7: CAS Map Showing Prior Modeling of Popov v. Hayashi

CAS has already been applied to the case of Popov v. Hayashi in the full analysis of the argumentation in the case provided by Gordon Walton (2012). This paper shows in detail that since Popov, the plaintiff, failed to prove either of his claims of conversion or trespass, and since Popov had the burden of proof, Judge McCarthy should have decided the case in favor of Hayashi. Hayashi did not need to prove that he had the right to possession of the ball. He only needed to produce arguments sufficient to prevent Popov from proving his case (Gordon and Walton, 2012, 13). Gordon and Walton presented an argument map (2012, 13) representing Judge McCarthy's account of how he arrived at his middle ground solution (shown as figure 7).

The line of reasoning shown in figure 7 is presented as a deliberation problem with three solutions: give Popov the ball, give Hayashi the ball, or sell the ball and divide the proceeds. The arguments for each one of the alternative solutions are shown below it. Under the third solution, two sell the ball and divide the proceeds, we see the equitable division principle represented as a premise of the argument. Three arguments supporting that premise refer to previous authorities, precedent cases the equitable division principle being known in Roman Law.
Figure 7 shows one way of modeling the argumentation used in Judge McCarthy's description of how he arrived at the decision to divide the proceeds. Below a different approach will be taken by using the schemes for argument from fairness and argument from lack of evidence.

6. An Analysis of the Main Argument from Justice

It is possible to construct an argument map that is comparable to the one presented by Gordon and Walton, but uses argument from fairness, as well as argument from lack of evidence, to build an alternative reconstruction of the argument that exploits the explicit use of these two argumentation schemes. The analysis of Walton and Gordon presented their modeling of this part of Judge McCarthy's reasoning as a deliberation problem. In the analysis below, which represents argumentation schemes on the argument map as key components of the structure of the reasoning in the case, the approach of presenting the case as a deliberation problem is preserved.

In this new way of analyzing the argumentation in case, both the scheme for argument from lack of evidence and scheme for argument from fairness are used. The analysis will have two stages. The first stage, represented in the sequence of argumentation displayed in figure 8, more specifically uses two instances of the scheme for argument from unfairness. The second stage will be shown in figure 9.

Judge McCarthy's ultimate conclusion that the ball should be sold and the proceeds divided equally is shown in the top text box in figure 8. It represents an action, or a recommendation for action, that should be carried out based on the reasoning shown supporting it in figure 8. What is shown by this version of the argumentation in the case is that Judge McCarthy's main argument combines two instances of use of argument from fairness with two instances of argument from lack of evidence.

The best way to appreciate how this argument map is supposed to represent the reasoning of Judge McCarthy in the case is to start with the bottom and work upwards. The two arguments from lack of evidence at the bottom of the diagram show that Popov cannot present a superior argument against Hayashi, and also that Hayashi cannot present a superior argument against Popov. The conclusions of these two arguments show, again using argument from lack of

evidence as the scheme, both that an award of the ball to Popov would be unfair to Hayashi and that an award of the ball to Hayashi would be unfair to Popov.
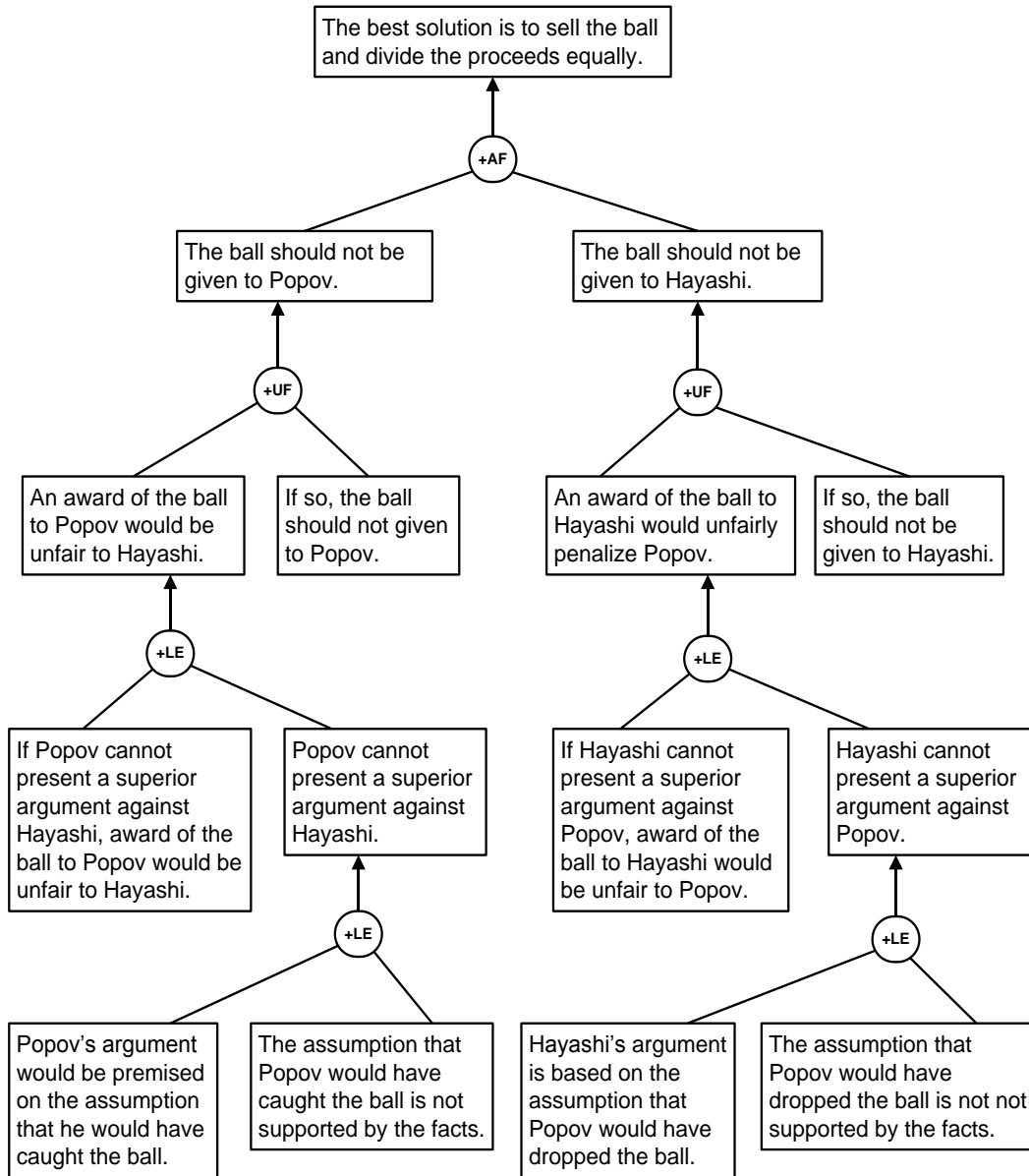

Figure 8: Argument Map for First Stage of Reasoning in Popov v. Hayashi

These two conclusions can now be used as premises in a pair of arguments that fit the scheme for argument from unfairness. Both these instances of argument from unfairness fit the complex form of the scheme, since each has a premise that makes a claim of equality in a certain respect, specifically, a claim of equal dignity. But once we get to these two arguments, we appreciate the dilemma pointed out by Judge McCarthy. We have a pair of equally persuasive arguments. The conclusion of one is that the ball should be awarded to Hayashi. The conclusion of the other is that the ball should be awarded to Popov.

The reason given that an award of the ball to Popov of would be unfair to Hayashi is that there is insufficient evidence to prove Popov's argument against Hayashi. Hence this argument, as shown in figure 8, is labeled as an instance of argument from lack of evidence. Also, if we look at the next level, the two text boxes shown at the next level from the bottom of figure 8, there is another argument from lack of evidence supporting the conclusion that Popov cannot present a superior argument against Hayashi. One of the premises is the proposition that Popov's argument would have to be based on the assumption that he would have caught the ball. The other is the proposition that this assumption about Popov is not supported by the facts. In other words, since the evidence that would be required to support a superior argument by Popov against Hayashi is lacking, the conclusion drawn is that Popov cannot present a superior argument against Hayashi. This argument too is an instance of argument from lack of evidence. Similarly, if we look down the right side of the chain of argumentation shown in figure 8, we see that there are two comparable instances of argument from lack of evidence supporting the premise of the argument from fairness above that an award of the ball to Hayashi would be unfair to Popov.

To appreciate the next step in the argument we have to look at the statement in the text box in the middle of the second level saying that there are reasons for supporting a third action. It needs to be recalled that this is critical question CQ_5 matching the scheme for argument from fairness. Using the approach of CAS in this instance, we represent this statement as an exception. It functions as an undercutter attacking the two arguments from unfairness just below it. If supported by evidence, it will defeat both of these arguments. And as shown on figure 6 at the right, it is supported by a statement saying that both of the first two actions being considered are unfair. This statement is in turn supported by the two other statements that awarding the ball to Popov is not fair and awarding the ball to Hayashi is not fair. Hence both arguments from unfairness are defeated. At the top of the diagram we see the argument from fairness supporting the ultimate conclusion of Judge McCarthy in the case that the ball should be sold and the proceeds divided equally. It proposes this third alternative as an action that is fair to both parties and that is supported by the body of evidence indicated below the premise that there are reasons supporting a third action.

The application of the argumentation schemes for argument from negative evidence and argument from fairness in CAS have therefore proved helpful to bring out the deeper logical structure of the evidential reasoning in Judge McCarthy's summary of how he arrived at the conclusion that the ball should be sold and the proceeds divided equally. The comprehensive treatment of Judge McCarthy's reasoning in the case of Popov v. Hayashi (Gordon and Walton, 2012) included thirty-three arguments and used other argumentation schemes including argument from witness testimony, argument from circumstantial evidence, arguments from legal rules, argument from precedent, practical reasoning, and argument from tradition. In the Gordon and Walton analysis, the type of argument that we have called argument from fairness, based on the principle of equitable division, was modeled as an argument from legal principle, the equitable division principle. Before we go to ask which analysis is better, there is another aspect of the argumentation in the case that can be taken into account.

7. The Second Stage of the New Analysis of Popov v. Hayashi

There is also another part of the reasoning used by Judge McCarthy to arrive at his decision that is apparent from his reconstruction of his evidential reasoning contained in our description

of the case above based on his remarks. This part of the reasoning is also closely related to argument from fairness, and it is necessary to give some account of it to get a full appreciation of how this argumentation scheme is a significant part of the evidential reasoning in the case. It is clear from these remarks that Judge McCarthy felt that he should justify the applicability of the argument from fairness this instance. The reason for this is not clear. Perhaps he felt that it is unusual to base the outcome of the case so directly on argument from fairness, when normally, cases are supposed to be decided on the basis of the factual evidence and the law. Or perhaps he wanted to emphasize that this was one of those cases where the arguments of the two sides based on the factual evidence were deadlocked in the sense that neither could present a superior argument against the other. We can also represent this aspect of the evidential reasoning using CAS.

The problem confronted by considering this aspect of the reasoning is one of justifying the applicability of the argument from fairness in the case. Judge McCarthy presented several independent lines of justification for taking this course of action. He referred to the concept of equitable division as explored in a law review article (Helmholtz, 1983). Helmholtz suggested employing the concept of equitable division to resolve competing claims on lost or mislaid property, pointing out that this concept had its roots in ancient Roman law. It was used as a way of resolving competing claims that are equally strong, and was based on the notion of what one instinctively feels to be fair. Judge McCarthy also cited some precedent cases where this type of argument was used to settle a case. Here we apply the scheme for argument from precedent (Bench-Capon, 2012). McCarthy (2002, 17) concluded that since neither Popov nor Hayashi could present a superior argument against the other, both had an "equal and undivided interest in the ball".
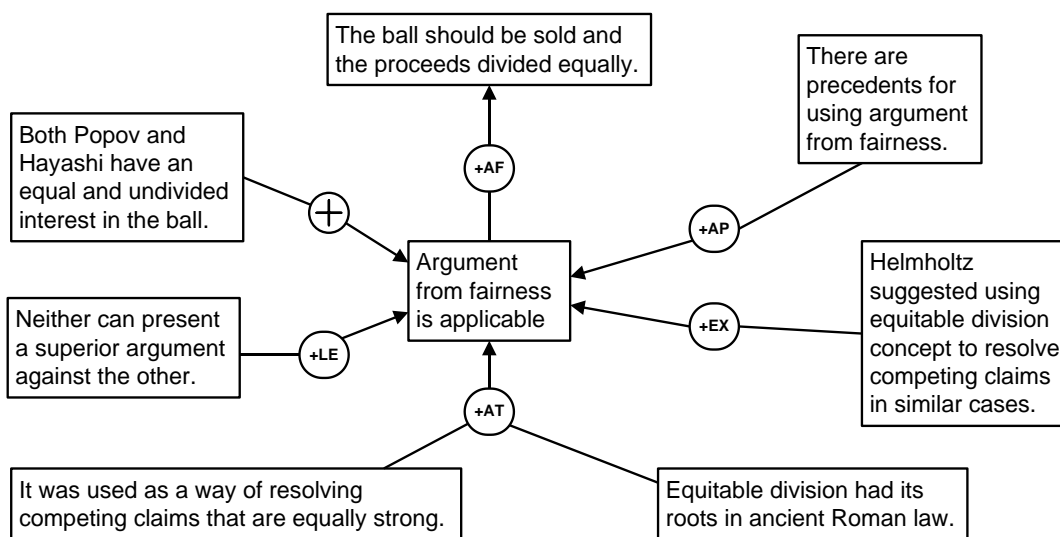

Figure 9: Argument Map for Second Stage of Reasoning in Popov v. Hayashi

How these arguments are combined together to support the applicability of the argument from fairness used to support the conclusion that the ball should be sold and the proceeds divided equally is shown in figure 9. AF stands for argument from fairness. LE stands for argument from lack of evidence. EX stands for argument from expert opinion. AT stands for argument from tradition. AP stands for argument from precedent. The argument from tradition shown at the

bottom of figure 9 is not, strictly speaking, an argument from precedent, in that rulings from ancient Roman law are not recognized as binding precedents in the Anglo-American common law. By arguing that the argument from fairness should be applicable in the case of Popov v. Hayashi, Judge McCarthy was supporting the legitimacy of his having adopted this third solution to the problem posed by case by citing legal tradition and precedent cases.

8. Replies to Two Objections

According to the analysis of the Popov case given above, Judge McCarthy's use of argument from fairness arises from the lack of evidence in the case, and therefore his argument weaves together argument from fairness with argument from lack of evidence. However, someone might object that Judge McCarthy's employment of argument from fairness does not really arise from any lack of evidence in the case. Instead, it might be claimed that Popov v. Hayashi is just a standard civil case where the plaintiff, Popov, is not able to meet his burden of proof. The proponent of this view thus looks for some other reason than argument from lack of evidence for the employment of argument from fairness by Judge McCarthy. The proponent of this view could then pose the following objection: it is not lack of evidence that leads McCarthy to employ argument from fairness, but rather the unjust outcome that would result for Popov if he were to decide for Hayashi. On this view, Judge McCarthy's use of argument from fairness stems not from argument from ignorance, but from his conviction that the result of simply deciding for Hayashi would be inequitable and unjust. In other words, it would be unfair.

This objection, however, seems to depend on a circular sequence of reasoning in which Judge McCarthy decides to employ argument from fairness based on his conviction that doing otherwise would be unfair. But perhaps there is more to it than that. Perhaps the objection is based on the view that the rationale for McCarthy's decision to use argument from fairness is based on argument from negative consequences. Not getting any income from the ball would be a negative consequence for either party. On this view, the use of argument from fairness in this case is not based on argument from lack of evidence but on argument from negative consequences.

In reply to this objection it needs to be pointed out that the connection between argument from fairness and argument from negative consequences is that the negative consequence of deciding for Hayashi, or for that matter for Popov, is the unfairness to either party that would result from making either decision given the lack of evidence to support it. Even though this view advocates bringing in the scheme for argument from negative consequences, it is still based on the argument from lack of evidence. The reason is basically that arriving at a decision in a situation where there is insufficient evidence to adequately support that decision, resulting in a negative outcome for the other side, is not fair. On this analysis then, the argument from fairness is still closely tied in with, and indeed based on, argument from lack of evidence.

A second objection is that the reformulated version of the argument from ignorance is a meta-level scheme about failure to meet a burden of proof. As such, it refers to the process of evaluating arguments using proof standards, and states that a proposition is not acceptable if there is a burden to prove it that has not been met. On this view, one might object that the argument from ignorance is an object level scheme, and therefore has no reference to argument evaluation. It is a scheme for defeasibly deriving the conclusion that a proposition is not the case if that proposition is not in a presumably complete database. On this view, it seems questionable to have meta-level schemes that make reference to aspects of the process of evaluating

arguments, such as proof burdens and standards. The question posed by this view is how an argument graph containing both meta and object level arguments should be evaluated.

To answer this question we have to embed a given argument in a framework of dialogue with an opening stage, an argumentation stage and a closing stage. The global burden of proof, called the burden of persuasion in law, including the standard of proof that is to be deemed appropriate, has to be set at the opening stage. Typically arguments are brought forward, replied to, and attacked by counterarguments, during the argumentation stage. At the closing stage, the global burden of proof is brought into play in order to determine whether a given argument, or sequence of argumentation put forward during the argumentation stage, can be evaluated as meeting its burden of proof, according to the standard of proof and the allocation of the burden to each side, set at the opening stage. During the argumentation stage local burden of proof, in law called the burden of producing evidence or the evidential burden, shifts back and forth from one side to the other as critical questions are asked, and as each side brings forward arguments supporting its own viewpoint or arguments attacking the viewpoint of the other side (Prakken and Sartor, 2011). Such arguments about the localized burden of proof with respect to a given argument involves the argument from ignorance, as each side may try to shift the burden to prove or disprove some point of contention at that point in the dialogue sequence by arguing that the other side has the burden of proof.

Precisely how arguments from ignorance in such cases need to be evaluated by integrating the argumentation scheme of an argument put forward at the object level with a global dialectical framework of the argumentation in a given case, which can be called the meta-level, is a problem that has not yet been solved. The reason is basically that although there has been a good deal of work on studying argumentation schemes at the object level, the literature is thinner on how such schemes fit into dialectical frameworks at the meta-level. A framework for studying the direction this kind of research has already been taken in Walton (1996), where many examples of argument from ignorance are presented that are instances of attacks by one side claiming that the other side has not fulfilled its burden of proof and counterattacks by the other side try to shift the burden of proof against the attacker. The problem is how to analyze such examples, revealing the connections between the object level and the meta-level by showing how the scheme for argument from ignorance fits into different meta-level frameworks of dialogue. In such cases, different global burdens of proof are set at the opening stage of a dialogue, and then function as devices for evaluating arguments such as the argument from ignorance by determining whether the appropriate burden of proof has been met or not in a given case. Solving this problem requires building on the existing literature formalizing matters of burden of proof in legal argumentation (Prakken and Sartor, 2009; Prakken and Sartor, 2011), connecting it with the notion of presumption, and showing how burdens of proof and presumption relate to argument from ignorance in different dialectical structures. A solution to this problem has been put forward in some unpublished research (Walton, 2014). The solution works by showing how arguments from ignorance based on a claim about insufficient evidence to prove a disputed proposition need to be evaluated by means of integrating an object level scheme for this type of argument with dialectical structures that have an opening stage, an argumentation stage and a closing stage.

9. Conclusions

So which of the two analyses is the better one, the Gordon and Walton one, or the new one proposed here? The new analysis also uses the principle of equitable division as part of the evidential structure of the case, as shown in figure 9. However, here the principle of equitable division is used in a different way. It is used to support the applicability of the argument from fairness as part of an argument from tradition. One key difference between the two analyses is that the new one uses the principle of equitable division to support the applicability of the argument from fairness, as shown in figure 9, while it displays the importance of the argument from lack of evidence when combined in a different way with argument from fairness, as shown in figure 3. Another difference is that the new analysis applies two argumentation schemes previously studied in the literature outside artificial intelligence and law to the case. A third difference is that it is a significant feature of the new analysis that it shows perhaps more specifically and graphically how the scheme for argument from lack of evidence supports and is connected to the part of the argument based on fairness. Thus it might be said that the new analysis links the argument in the case of Popov v. Hayashi more generally to recent work on argumentation schemes in the interdisciplinary field of argumentation studies.

The new analysis adopted Perelman's philosophical point of view on argument from fairness, as a way of seeing this type of argument as a complex structure based on a premise asserting that an abstract principle of equality is a necessary part of the complex version of the scheme. The conclusion of the paper is that there should be two variants of the scheme for argument from fairness, a simple version that can be quickly applied to initially identify an instance of the use of this type of argument in a given discourse, and a more complex version that can be used for analytical purposes of reconstructing an instance of argumentation based on fairness in a given case. The main findings of the paper are the presentation and justification of these two schemes, and the application of them to a legal case that is of special importance in its own right in artificial intelligence and law.

Another important lesson demonstrated by the paper is the revealing of the link between argument from lack of evidence and argument from fairness. A different approach to argument from lack of evidence has been taken in this paper, based on the analysis of burdens and standards of proof provided by CAS. In traditional logic, the argument from ignorance has been taken to be a fallacy, whereas in this paper, in sharp contrast, it has been shown to be a fundamentally important species of legal argumentation on which argument from fairness is based. It would seem that in certain cases, including the case of Popov v. Hayashi, argument from fairness always has to be based on the applicability of argument from lack of evidence as a necessary component. This finding is highly significant for argumentation studies.

It would seem that argument from fairness is especially applicable as as deliberative tool when the factual evidence is insufficient to meet the burden of proof, as in this case. In this case the deadlock was caused by lack of evidence to resolve issue exclusively by the factual evidence. However, the analysis of legal cases using the scheme for argument from fairness and argumentation tools such as CAS is still at a very early stage. Further investigations are needed to show how argument from fairness and argument from lack of evidence are more widely used in law in different cases.

Acknowledgements

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