

## AN OVERVIEW OF THE USE OF ARGUMENTATION SCHEMES IN CASE MODELING

In this paper it is shown using argumentation schemes how the problem of arguing from a rule to a case, or from one case to another, includes subsumption problems of determining whether a fact can be subsumed under the condition of a rule. Essentially this is the problem of defeasible reasoning, first articulated in modern times by the work of H. L. A. Hart (1949) on open textured legal concepts. It is shown that there is a particular group of argumentation schemes that need to be brought to bear in order to solve subsumption problems of this kind. One scheme that is obviously central is that for argument from analogy. However, it will be shown that there are other closely related schemes that are sometimes difficult to separate from argument from analogy, like argument from precedent, that also need to be taken into account. One of the problems is that the existing set schemes in (Walton, Reed and Macagno, 2008) was designed to represent arguments commonly used in everyday conversational argumentation, not necessarily in special contexts like law. In this paper it is shown how some of these schemes need to be modified in order to be more useful for representing legal argumentation.

Section 1 presents an overview of how argumentation schemes have been applied to case modeling of legal arguments so far. This part of the paper will examine some now familiar cases, not only to see how schemes have been applied to them, but also to see how other forms of argument centrally used in each case could be represented with schemes, even though so far they have not been. The next sections of the paper focus on a certain group of schemes that are so closely connected in legal reasoning that there is a conceptual difficulty in separating them and seeing how they are connected to each other in typical chains of legal reasoning in cases. These schemes concern particular types of argumentation based on argument from analogy, argument from precedent, argument from classification and argument from a definition to a classification. The typical situation is one where there is an argument from one case to another that is based on argument from analogy and argument from classification. This type of reasoning fits the framework for case-based reasoning (CBR), where a principle from one case can be reused by applying to a new case that is similar to the first case (Ashley, 2006).

The last two sections of the paper take up the general problem that legal reasoning typically has to back up arguments that depend on classification by offering a definition of the key term used to make the classification at issue. However, since legal concepts are open textured, complete definitions, or essential definitions as they have often been called in philosophy, cannot be given in a way that would make the argument conclusive. Legal argumentation of the most common sort is typically defeasible, and the definitions that are used to support these arguments are themselves defeasible. They are continually subject to modification and are constantly in a process of evolution and refinement. A solution to this problem is offered by developing schemes that are integrated with the view that definitions can be supported or attacked by evidence, and on that basis used to support arguments from classification that are connected with other typical legal arguments like argument from analogy. It is shown how rules that can be seen as offering partial legal definitions of a contested term can be based on prior rules that are not themselves legal rules, but are based on arguments from generally accepted practices in a community.

## 1. Use of Schemes in Case Modeling So Far

The two cases that have most often been analyzed so far using schemes are *Pierson v. Post* (Atkinson, Bench-Capon and McBurney, 2005; Gordon and Walton, 2006) and *Popov v. Hayashi* (Wyner, Bench-Capon and Atkinson, 2007).

The schemes that appears to have been most prominently used so far are the one for argument from analogy (Weinreb, 2005; Wyner and Bench-Capon, 2008; Walton, Reed and Macagno, 2008, 46) and the one for practical reasoning (Atkinson, Bench-Capon and McBurney, 2005), including the value-based variant of practical reasoning (Bench-Capon, 2003; Bench-Capon, 2003a). One might expect that the most commonly employed schemes in law are those for arguing from a rule to a case, argument from classification and argument from definition to classification. Both *Pierson v. Post* and *Popov v. Hayashi* are based on the legal definition of ‘possession’. However, so far, although these schemes have been applied to legal reasoning (Gordon, 2007) they do not appear to have been prominently used in any detailed analyses as applied in a substantial way to legal cases, except for argument from classification in Weinreb’s case of the drug-sniffing dog as treated in (Walton, Reed and Macagno, 2008, chapter 2). This paper will explain why. Schemes for argument from witness testimony, argument from temporal persistence, and argument from memory have been applied to the *Umilian* case (from Wigmore) and to the *Sacco and Vanzetti* case (Bex et al., 2003).

In a brief presented to the court in *Popov v. Hayashi*, Gray (2002) made recommendation on first possession and surveyed how the law of capturing evolved from older cases in whaling and mining. In modeling *Popov v. Hayashi*, baseball fans’ common understandings of first possession of baseballs are important to know about (Gray, 2002; Wyner, Bench-Capon and Atkinson, 2007). In these cases, the principles that were used derived from customs, practices and understandings of persons in the special fields of activity (whaling, baseball). In *Pierson v. Post* (3 Cai. R. 175; 1805 N.Y. LEXIS 311), the judges cited older traditions as learned authorities.

Puffendorf (lib. 4, ch. 6, sec. 2 and 10) defines [HN3] occupancy of beasts *feroe naturoe*, to be the actual corporeal possession of them, and Bynkershock is cited as coinciding in this definition. It is indeed with hesitation that Puffendorf affirms that a wild beast mortally wounded or greatly [\*\*6] maimed, cannot be fairly intercepted by another, whilst the pursuit of [\*178] the person inflicting the wound continues. The foregoing authorities are decisive to show that mere pursuit gave Post no legal right to the fox, but that he became the property of Pierson, who intercepted and killed him.

These arguments do not fit the scheme for argument from expert opinion, or the one from argument from precedent, as one might expect. Two of the sources are cited as agreeing on a definition. As will be shown in section 4 below, arguing from definition to classification needs to be taken more seriously as a form of reasoning in AI and law. Although the principles cited are not precedents, they seem to be based on generally accepted rules of common practice that may not be legally binding but are important to consider. It will be shown in section 5 that these arguments could be based on schemes for argument from generally accepted practices.

Legal examples were sometimes used in the argumentation literature on schemes, but most of the examples were derived from everyday conversational (non-legal) argumentation. Legal argumentation can be more complex in some instances because there are procedural rules and rules of evidence that affect the form in which an argument needs to be put if it is to be considered admissible. Hence when we try to apply these schemes to real legal cases in any depth and detail, many questions of fit arise.

## 2. Arguments from Analogy and Classification

Part of the problem, as shown in (Walton, Reed and Macagno, 2008, chapter 2), is that there is not complete agreement within the field of argumentation on how the scheme for argument from analogy should be represented. Version 1 of Argument from Analogy is represented as follows in (Walton, Reed and Macagno, 2008, 315).

Similarity Premise: Generally, case *C1* is similar to case *C2*.

Base Premise: *A* is true (false) in case *C1*.

Conclusion: *A* is true (false) in case *C2*.

The fundamental problem with this simple version of the scheme for argument from analogy is how the notion of similarity in the first premise should be defined. In everyday reasoning, similarity works by a process of pattern recognition where one case is similar enough to a second case so that there is a “lock”, so that the user can immediately perceive the similarity. The next problem is how similarity can be measured or approximated. In his outline of the basic principles of case-based reasoning as applied to law, Ashley (2006) has provided a survey of ways of judging similarity, using devices like factors in dimensions, and systems like CATO and HYPO.

The next problem is that this simple version of the scheme for argument from analogy does not work very well in some cases (Weinreb, 2005, 32). For example, consider the argument: this apple is red and tastes good; this ball is red; therefore it will taste good. Here the argument from analogy fails because the observed similarity between the source and the target is not “relevant to the further similarity that is in question.”(p. 32). But what does relevance mean, or how could it be measured? According to Ashley, 2006, 41), “CATO’s (and HYPO’s) basic measure of relevance is on-pointedness; a case is on point if it shares at least one Factor with the problem”. The problem is that the simple scheme above makes no mention of relevance or factors. So how can it be applied?

To contend with this problem, there is also a more complex version of argument from analogy, called version 2 in (Walton, Reed and Macagno, 2008, 58).

Similarity Premise: Generally, case *C1* is similar to case *C2*.

Base Premise: *A* is true (false) in case *C1*.

Relevant Similarity Premise: The similarity between *C1* and *C2* observed so far is relevant to the further similarity that is in question.

Conclusion: *A* is true (false) in case *C2*.

In an example from the widely used logic textbook (Copi and Cohen, 1983, 101), cited in (Walton, Reed and Macagno, 2008, 58-59), two cases, prospecting for gold and scientific research, are presented as similar in relevant respects.

As in prospecting for gold, a scientist may dig with skill, courage, energy and intelligence just a few feet away from a rich vein – but always unsuccessfully. Consequently in scientific research the rewards for industry, perseverance, imagination and intelligence are highly uncertain.

The reason Copi and Cohen give (1983, 101) for the relevance of the similarity is that both fall under the category of “quest”, constituted by difficulty, training and fortune. But notice that this argument is partly based on a classification, arguing that two cases are relevantly similar because they fall under the classification of quest. This shows that argument from classification can sometimes be used to support argument from analogy. More commonly it is the other way around, as in the drug-sniffing dog case, where argument from analogy is used to support argument from classification.

The scheme for argument from verbal classification is also very important in AI and law. Obviously, for example, if something can be classified as a contract or a wetland, the consequences can be very significant in legal reasoning. Argument from classification can sometimes have a deductive form (Walton, Reed and Macagno, 2008, 66), but in the most common instances in law such arguments fit the following defeasible scheme (Walton, Reed and Macagno, 2008, 319).

Individual Premise: *a* has property *F*.

Classification Premise: For all *x*, if *x* has property *F*, then *x* can be classified as having property *G*.

Conclusion: *a* has property *G*.

There can be various ways to support argument from classification, but one of the most common is to present a definition of some key term. There are a lot of problems with definition in philosophy, since the traditional notion of the Aristotelian essential definition has long been abandoned, and there appears to be nothing presently available to fill this gap. It is a problem both in philosophy and law that the notion of definition does not appear to be taken as seriously as it should be.

The example of the drug-sniffing dog (Brewer, 1996) shows how an argument that has been classified in the law literature as argument from analogy is really an instance of arguing from analogy to a verbal classification. If a trained dog sniffs luggage left in a public place and signals to the police that it contains drugs, should this event be classified as a search according to the Fourth Amendment? If it can be classified as a search, information obtained as a result of the dog sniffing the luggage is not admissible as evidence. If it is not classified as a search, the information is admissible.

On Brewer’s analysis, this first classificatory stage of reasoning by analogy leads to a later evaluation stage in which the given event is compared to other cases that have already been classified legally as being searches or as not being searches. On his analysis, we would seem to have a chain of reasoning going from argument from analogy to a verbal classification and from there to further arguments from analogy. However we

analyze such cases, it seems apparent that argument from analogy and argument from classification are closely connected in common instances of legal argumentation.

Finally in this section another scheme needs to be added, because very often in legal argumentation the best way to critically question an argument from verbal classification is to ask for a definition of the term on which the classification was based. This leads us to a consideration of the scheme for argument from definition to verbal classification (Walton, Reed and Macagno, 2008, 319).

Definition Premise:  $a$  fits definition  $D$ .

Classification Premise:  $\forall x$ , if  $a$  fits definition  $D$ , then  $x$  can be classified as having property  $G$ .

Conclusion:  $a$  has property  $G$ .

The following critical questions match this scheme.

CQ<sub>1</sub>: What evidence is there that  $D$  is an adequate definition, in light of other possible alternative definitions that might exclude  $a$ 's having  $G$ ?

CQ<sub>2</sub>: Is the verbal classification in the classification premise based merely on a stipulative or biased definition that is subject to doubt?

For example, in the case of the drug-sniffing dog, a definition of the term 'search' might be offered, based on a statute or a court decision, and then the definition might be used to back up the argument from classification. We will look at some examples of how to define and classify a search in section 4.

### 3. Arguments from Precedent and Established Rule

Argument from analogy is fundamentally important in AI and law, and probably nobody would deny that. But is case-based reasoning better viewed as modeling other schemes such as argument from verbal classification or argument from precedent? To examine this issue, we look at the scheme for argument from precedent (Walton, Reed and Macagno, 2008, 344). This scheme would apply in a case, for example, there is a rule that vehicles are not allowed in the park, but where in this instance, the vehicle is an ambulance. In this case, the exception to the rule must be recognized. This might lead to modification of the rule as follows: vehicles are not allowed in the park, except for ambulances.

Major Premise: Generally, according to the established rule, if  $x$  has property  $F$ , then  $x$  also has property  $G$ .

Minor Premise: In this legitimate case,  $a$  has  $F$  but does not have  $G$ .

Conclusion: Therefore an exception to the rule must be recognized, and the rule appropriately modified or qualified.

This scheme, however, does not apply to cases of argument from precedent of the kind used most characteristically in legal reasoning. This scheme applies to a kind of case in which there is an established rule, but an exception to it is found of the kind that requires

modifying the rule by allowing the case at issue as representing a legitimate exception. So this kind of argument could be called argument from the creation of a precedent.

The more common type of argument from precedent used in legal reasoning applies to a different type of case. In this kind of case, there is a case that issue, and a prior case that has already been decided is taken as a precedent that can be applied to the present case. The argumentation scheme appropriate for this latter type of legal argumentation can be set up as follows.

Previous Case Premise: *C1* is a previously decided case.

Previous Ruling Premise: In case *C1*, rule *R* was applied and produced finding *F*.

New Case Premise: *C2* is a new case that has not yet been decided.

Similarity Premise: *C2* is similar to *C1* in relevant respects.

Conclusion: Rule *R* should be applied to *C2* and produce finding *F*.

It is the scheme above that should properly have the name of argument from precedent in legal reasoning. The prior scheme above, called argument from precedent in (Walton Reed and Macagno, 2008, 344) needs to be re-labeled, and should now be seen as representing arguments from an exception to the creation of a precedent. Note that this new scheme classifies argument from precedent as a species of argument from analogy.

The scheme called argument from an established rule, as represented in (Walton, Reed and Macagno, 343), is shown below.

Major Premise: If carrying out types of actions including the state of affairs *A* is the established rule for *x*, then (unless the case is an exception), *x* must carry out *A*.

Minor Premise: Carrying out types of actions including state of affairs *A* is the established rule for *a*.

Conclusion: Therefore *a* must carry out *A*.

But once again, this scheme does not apply to the common kind of case in law where an established rule is applied to a particular case, say by a judge. In this kind of case, the argumentation scheme for argument from an established rule has the following form.

Major Premise: If rule *R* applies to facts *F* in case *C*, conclusion *A* follows.

Minor Premise: Rule *R* applies to facts *F* in case *C*.

Conclusion: In case *C*, conclusion *A* follows.

This defeasible form of argument is extremely common in legal argumentation, as well as in AI. Indeed, it could simply be called rule-based reasoning.

We now have a group of schemes, comprising argument from analogy, argument from classification, argument from definition to classification, argument from precedent, and argument from an established rule. Now let's briefly discuss some problems with attempting to apply these schemes to typical instances of legal case-based reasoning

#### 4. Applying these Schemes to Cases

Wyner and Bench-Capon (2007) presented a reconstruction of legal case-based reasoning using a series of hypothetical cases extended from the *Mason V. Jack Daniels* case in which a bar owner's secret recipe for Lynchburg Lemonade was used in a promotion by a whiskey manufacturer. Their method was to compare the current case by analogy to a previously decided case on the basis of factors. The tool they devised is a set of six argument structures they describe as argumentation schemes. For example (143) their main scheme (AS1), looks like this, where P is the plaintiff, D the defendant,  $P_i$  are the factors, CC is the current case and PC is the precedent case.

P Factors Premise:  $P_1$  are reasons for P.

D Factors Premise:  $P_2$  are reasons for D.

Factors Preference Premise:  $P_1$  was preferred to  $P_2$  in  $PC_i$ .

CC Weaker Exception: The priority in  $PC_i$  does not decide CC.

Conclusion: Decide CC for P.

These six argument structures do not look like ordinary argumentation schemes, according to the way the notion of an argumentation scheme is currently used in argumentation theory. They contain the notions of proponent and respondent and provide a tool for determining whose side has the stronger argument on the balance of considerations at any given point as a case is argued. They are better seen as schemes within a system like Carneades (Gordon, Prakken and Walton, 2007) for determining which side has the stronger argument at a point during the argumentation stage, as factors are introduced on one side and the other, during the putting forward of and responding to an argument from precedent. However, these factor-based schemes come under the category of argument from precedent, where a current case is compared to a previous one on the basis of factors. They are special schemes that work as methods for evaluating a given argument from precedent in a dialog sequence in a case in a system.

When I first started to try to apply argumentation to legal reasoning, it appeared that many of the rules applied to facts to generate a legal conclusion in a case were based on definitions of key legal terms, like 'contract' and so forth. Hart's famous example of deciding whether a skateboard is a vehicle that ought to be banned from the park is a case in point (Hart, 1949; 1961; Loui, 1995). It looks like all we have to do is to define the concept of vehicle, and from the definition we can make a reasoned decision about whether a skateboard should be classified as a vehicle or not. This classification would then give us the rational support required for ruling on a case where someone's riding a skateboard in the park needs to be judged as illegal or not. But after examining many cases, it began to occur to me that it is not possible to give a legal definition, certainly in hard cases, that provides sufficient support by itself to arrive at a decision. The reason, of course, is that legal concepts like vehicle are open-textured, to use Hart's term, or defeasible, to use the current term.

This problem is as common in philosophy as it is in law, where it often seems impossible to offer a definition that is not so contestable that in the end it appears to be unconvincing as a useful tool to resolve disputes and move ahead. But as I examined some more cases, I began to see that the law does have a method for resolving the problem. What it does is to articulate rules or principles that are sometimes established by the courts based on previous cases, and in other instances may even be based on

commonly accepted practices that have found their way into law as supporting the formulation of such rules. A set of such rules can provide necessary or sufficient conditions that function as partial definitions help the argumentation to move forward even in the absence of a fixed definition that is complete and that can be mechanically applied to any case falling under the heading of the so-called elements of the case. Two examples of this phenomenon will serve to illustrate how it works.

Weinreb (2005, p. 24) cited three general rules established by prior court decisions that can be applied to Brewer's case of the drug-sniffing dog.

Rule 1: If a police officer sees something in plain view in a public place, the information collected is not classified as a search.

Rule 2: If a police officer opens luggage and then observes something inside the luggage, the information collected is classified as a search

Rule 3: If a police officer listens surreptitiously to a conversation in a private place, it is classified as a search.

These three rules are fairly specific and can be applied to a case at issue by seeing whether the case fits the condition stated in the antecedent of the conditional. If it does, a conclusion can then be drawn about whether the case should be classified as a search or not. Hence these rules can be used to support or attack argument from classification.

There is also a more general rule that Brewer called an analogy warranting rule (AWR) formulated by Weinreb (2005, p. 24) as follows.

AWR: If a police officer obtains information about a person or thing in a public place without intrusion on the person or taking possession of or interfering with the use of the thing, it is not a search for purposes of the Fourth Amendment.

This rule seems to be similar to the above three, in that it also functions as a partial definition of the concept of a search that can be applied to a particular case and yield a ruling on whether the case should be classified as a search or not. But it is different from the other three rules and at least two ways. First, it seems more general, because it defines the concept of a search in terms of other even more general legal concepts, like intrusion on a person and taking possession of thing. Second, is based on an interpretation of an authoritative statute, namely the U.S. constitution. This case shows that even though it may not be possible to give a set of necessary and sufficient conditions that completely defines the concept of the search, nevertheless several rules that classify certain things as being a search or not can apply to a new case and act as a partial definition.

## 5. Laws and Generally Accepted Practices

The other case illustrating this point is even more interesting in showing where these rules come from. The basic problem in the case of *Popov v. Hayashi* was that the law does not have the complete enough definition of the notion of possession that could be applied to solve the problem of whether Popov can properly be said to have possessed the ball when the party, after it left Barry Bonds' bat and was partly caught by Popov then lost when he was mobbed by a group of fans. The existing laws on possession that were



applied to this case came from cases concerning the capture and possession of wild animals. Applying one kind of case to another where the circumstances are very different seems to involve a kind of reasoning by analogy. Gray (2002) showed how an excellent example of this kind of judicial decision making can be found in rulings on whaling. It was found in Anglo-American cases where the ownership of the whale carcass was contested that judges deferred to commonly accepted principles used by the whalers themselves. These principles or rules in effect offered partial definitions of what it is to possess a wild animal. Different kinds of rules depended on different kinds of whales and the circumstances under which they were caught, like the depth of water and how fast a type of whale can swim. In *Pierson v. Post* (3 Cai. 175, 2 Am. Dec. 264 (N.Y. Spp. Ct. 1805)), similarly, laws of possession and capture were formulated by basing them on commonly held customs and practices previously accepted by those engaged in hunting and fishing incomparable activities in the past. Gray (2002, 4) showed that the California supreme court deferred to accepted customs and practices of those engaged in prospecting when they had to decide disputes between competing gold miners on who was entitled to water from a stream flowing through both of their claims.

From cases like this we can see that law is not in a position to offer complete definitions of fundamental concepts like search and possession that offer necessary and sufficient conditions that can be applied to any new case to solve the problem and make a ruling. So-called essential definitions are not available, but this absence should not be too surprising given from what we already know from Hart about the open-textured nature of legal concepts.

## 6. Arguments from Generally Accepted Practices

What is interesting here is the notion that legal rules partly define a concept that may be partly derived from, and may be held to be desirably consistent with previously existing customs practices and understanding of those engaged in common activities like hunting, fishing and gold mining. To illustrate this point, Gray (2002, 6) formulated six important concepts or rules about the understanding of first possession of baseballs excepted by fence and other participants in the sport of baseball. Two of these rules can be used to illustrate how each rule acts as a partial of definition of the notion of a catch. One is the negative rule that a catch does not occur simply because the ball hits the fan on the hands or enters the pocket or webbing of the fan's baseball glove. Another is the positive rule stating that a catch does occur when the fan has the ball in his hand or glove, the ball remains there after its momentum has ceased, and even remains there after the fan makes incidental contact with a railing, wall, the ground or other fans who are attempting to catch the baseball or get out of the way.

These commonly accepted rules show how legal rulings based on applying open-textured legal concepts to new cases can partially depends on evidence drawn from commonly accepted practices that exist prior to the legal framework. The use of such arguments prior to the legal framework can be represented by the scheme for argument from popular practice (Walton, Reed and Macagno, 2008, 314).

Major Premise: A is a popular practice among those who are familiar with what is acceptable or not in regard to A.

Minor Premise: If *A* is a popular practice among those familiar with what is acceptable or not with regard to *A*, that gives a reason to think that *A* is acceptable.

Conclusion: Therefore, *A* is acceptable in this case.

### Critical Questions

CQ<sub>1</sub>: What actions or other indications show that a large majority accepts *A*?

CQ<sub>2</sub>: Even if large majority accepts *A* as true, what grounds might here be there for thinking they are justified in accepting *A*?

It is clear from the statement of the minor premise that such arguments are defeasible. They can be argued against, and it can be argued that they are not applicable.

## 7. Conclusions

This paper has examined a special group of schemes that are typically tightly woven in together when arguing from one case to another as in CBR. Once they are clearly distinguished, we can get a better perspective on how the CBR process in law retrieves a past case that is similar to the target case, in order to solve the target problem. The problem is very often how to classify something. In an easy case, the classification problem can be solved by simply fitting in under a previously accepted rule, whether it is a legal rule or a generally accepted practice, or a definition that has already been accepted as authoritative. In a hard case, this may not solve the problem because, for one thing, concepts are open-textured, and for another thing, because of this, it is generally not possible to formulate a set of necessary and sufficient conditions that are complete to solve the problem.

How the six argument factor evaluation structures for argument from precedent (Wyner and Bench-Capon, 143-146, 2007) fit into the framework I have outlined here is not still entirely clear to me, possibly because I've never encountered anything like this device before in previous argumentation theory. It's something new. However, it strikes me that the device is extremely useful, because it provides a way of evaluating an argument from precedent while it is being put forward during the argumentation stage, and where it is being attacked by arguments from opposing precedents.

How does the process of applying these schemes to cases work, in general? The main points in the procedure can be set out as follows.

- The process uses general rules derived from legally authoritative sources by statutory interpretation.
- It uses arguments from analogy to previous decided cases.
- The new version of argument from precedent is based on argument from analogy.
- When so based, it can be evaluated by the six factor evaluation structures.
- It may also be based on argument from an established rule.
- In some instances, legal reasoning uses argument from generally accepted practices in specific kinds of practical activity domains.
- Significantly, it uses and arrives at classifications based on these rules.
- Instead of fixed definitions, it uses defeasible partial definitions in the form of necessary and sufficient condition rules.

- It applies these rules to the problematic case that needs to be decided by examining and weighing the arguments pro and contra based on the evidence from these and other sources.

The best we typically have are some general rules that are defeasible and that may be more or less on point. However, we have tried to show in this paper that such a set of rules can provide what can be called a defeasible definition, a definition that is not complete for making a classification beyond further arguments, but can move the argumentation in a case forward by supporting other arguments.

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